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Ministry of the Environment, Finland

**Government Decree**  
**on limiting emissions of sulphur dioxide, nitrogen oxides and dust from combustion plants**  
**and gas turbines with a rated thermal input of at least 50 megawatts**

**1017/2002**

Given in Helsinki on 3 December 2002

By decision of the Government, made on the submission of the Ministry of the Environment, the following is issued under the Environmental Protection Act (86/2000) of February 4, 2000:

**Chapter 1 – General provisions**

Section 1 — *Aims*

- (1) The aim of this Decree is to prevent environmental pollution by reducing acidifying emissions and dust emissions from combustion plants and gas turbines to air. In order to achieve this, the emissions of these pollutants shall be reduced to levels which do not exceed those laid down below.
- (2) A further aim of this Decree is to reduce emissions of sulphur dioxide and nitrogen oxides from plants licensed before July 1, 1987, so that their emissions remain below the amounts specified in Annex I and II of Directive 2001/80/EC of the European Parliament and of the Council on the limitation of emissions of certain pollutants into the air from large combustion plants.

Section 2 — *Scope*

- (1) This Decree applies to combustion plants and gas turbines with a rated thermal input ( $MW_{th}$ ) of at least 50 megawatts (MW), which use solid, liquid or gaseous fuels, and the purpose of which is to produce energy.
- (2) The Decree does not, however, apply to:
  - 1) combustion plants that make direct use of combustion products in manufacturing processes;
  - 2) plants that use combustion products for the direct heating, drying or any other treatment of objects or materials, such as reheating furnaces and furnaces for heat treatment;

- 3) post-combustion plants designed to purify waste gases by combustion and which are not operated as independent combustion plants;
- 4) facilities for the regeneration of catalytic cracking catalysts;
- 5) facilities for the conversion of hydrogen sulphide into sulphur;
- 6) reactors used in the chemical industry;
- 7) coke battery furnaces;
- 8) cowpers;
- 9) recovery boilers and lime kilns;
- 10) any technical apparatus used in the propulsion of a vehicle, ship or aircraft;
- 11) gas turbines used on offshore platforms ;
- 12) plants powered by diesel, petrol or gas engines.

### Section 3 — *Definitions*

(1) For the purpose of this Decree:

- 1) *emission* means air pollutants discharged from a combustion plant or gas turbine;
- 2) *waste gases* means solid, liquid or gaseous emissions the volumetric flow rates of which should be expressed in cubic metres per hour at the standard temperature (273 K) and pressure (101.3 kPa) after correction for water vapour content, hereafter referred to as (Nm<sup>3</sup>/h);
- 3) *emission limit value* means the permitted amount of emissions that can be discharged into the air during a given period and is defined as mass per volume of waste gases, expressed in mg/Nm<sup>3</sup>, assuming that the oxygen content by volume in the waste gases is three per cent when burning liquid or gaseous fuels, six per cent when burning solid fuels and 15 per cent when burning fuels in gas turbines;
- 4) *desulphurization rate* means the ratio of the quantity of sulphur recovered at a combustion plant over a given period to the quantity of sulphur in the fuel used at the plant and introduced into the plant facilities during the same period;
- 5) *fuel* means any solid, liquid or gaseous substances burned at a combustion plant or in a gas turbine, with the exception of waste covered by Directive 2000/76/EC of the European Parliament and of the Council on the incineration of waste;
- 6) *combustion plant* means any technical apparatus with the exception of a gas turbine, in which fuels are oxidized and which generate heat that can be used;
- 7) *multi-fuel firing unit* means any combustion plant which may be fired simultaneously or alternately by two or more types of fuel;
- 8) *existing plant* means any combustion plant or gas turbine in operation for which the operating licence has been granted in accordance with the provisions in force before the entry into force of this Decree, or a plant for which the application for an environmental permit has been publicly announced before the entry into force of this Decree and which will be taken into operation no later than one year after the entry into force of the Decree;

- 9) *new plant* means a combustion plant or gas turbine other than that referred to in paragraph 8, for which the environmental permit will be granted after the entry into force of this Decree;
- 10) *biomass* means products consisting of whole or partial vegetable matter from agriculture or forestry that can be used as a fuel for the purpose of recovering its energy content, and the following waste used as a fuel:
  - (a) vegetable waste from agriculture and forestry;
  - (b) vegetable waste from the food processing industry if the heat generated in the burning process is recovered;
  - (c) fibrous vegetable waste from virgin pulp production and from production of paper from pulp if the waste is co-incinerated at the place of production and the heat thus generated is recovered;
  - (d) cork waste;
  - (e) wood waste, with the exception of wood waste that may contain halogenated organic compounds or heavy metals as a result of treatment with wood preservatives or coating; this also excludes wood waste containing the above-mentioned substances that originates from buildings and from demolition sites.
- 11) *gas turbine* means any rotating machine converting thermal energy into mechanical work that has a compressor, a thermal device in which the fuel is oxidized in order to heat air, and a turbine as its main parts.

#### Section 4 — *Combination of combustion plants*

- (1) When, in a combustion plant that has been granted an operating licence on or after July 1, 1987, two or more plants will be or have been installed in such a way that the environmental permit authority considers that their waste gases can, taking technical and economic factors into account, be discharged through a common stack, this combination of units is considered a single combustion plant.

#### Section 5 — *Determining stack height*

- (1) An environmental permit for a combustion plant or gas turbine must specify that waste gases be discharged into the open air through a stack. The height of the stack must be determined in such a way as to safeguard human health and the environment.

#### Section 5 a - *Complying with the best available techniques (907/2005)*

- (1) A permit regulation may be more stringent than a minimum requirement laid down in this Decree if compliance with the best available techniques so requires.

## Chapter 2 — Reducing emissions in new plants

### Section 6 — *Emission limit values for new plants*

- (1) Emissions of sulphur dioxide, nitrogen oxides and dust from new combustion plants and gas turbines shall not exceed the emission limit values specified in Annex 1, tables 1-8, in milligrams per normal cubic metre ( $\text{mg}/\text{Nm}^3$ ) in an oxygen content of six per cent when burning solid fuels, three per cent when burning liquid or gaseous fuels, and 15 per cent when burning fuels in a gas turbine.

### Section 7 — *Compliance with the emission limit values and desulphurization rates in new plants*

- (1) The emission limit values shall be regarded as having been complied with if none of the validated daily average values exceeds the given limit values, and 95 per cent of all the validated hourly average values over the year do not exceed 200 per cent of the given limit values.
- (2) The validated daily and hourly average values are all calculated from the measured, validated hourly averages, which are obtained by deducting from the measured value the figure representing 95 per cent confidence intervals of the measurement result. The figures representing 95 per cent confidence intervals for the measurement result are 20 per cent for sulphur dioxide and nitrogen oxides, and 30 per cent for dust of the relevant emission limit value.
- (3) The desulphurization rate requirement shall be regarded as having been complied with if the measurements carried out as specified in Annex 3 show that the average values for all calendar months or all rolling monthly average values are in compliance with the required desulphurization rate.
- (4) Start-up and shut-down periods or malfunctions of a combustion plant or gas turbine are not included when examining compliance with emission limit values or desulphurization rates.

## Chapter 3 — Reducing emissions in existing plants

### Section 8 — *Emission limit values for existing plants*

- (1) As of January 1, 2008, emissions of sulphur dioxide, nitrogen oxides and dust from existing combustion plants and gas turbines shall not exceed the emission limit values specified in Annex 2, tables 9-15, in milligrams per normal cubic metre ( $\text{mg}/\text{Nm}^3$ ) in an oxygen content of six per cent when burning solid fuels, three per cent when burning liquid or gaseous fuels, and 15 per cent when burning fuels in a gas turbine.

- (2) As of January 1, 2016, nitrogen oxide emissions from plants with a rated thermal input of more than 500 megawatts burning solid fuels shall be reduced in accordance with phase II, as detailed in Annex 2, table 12.

#### Section 9 — *Impact of remaining operational life time*

- (1) It can be specified in an environmental permit that an existing combustion plant for which an operating licence was granted before July 1, 1987 does not have to comply with the emission limit values referred to in section 8 if the operator undertakes to operate the plant for no more than 20,000 hours between January 1, 2008 and December 31, 2015. The operator must submit a written notification to that effect to the appropriate environmental permit authority and supervisory authority by June 30, 2004 at the latest.
- (2) The permit regulation cannot, however, be incorporated into the environmental permit for a combustion plant of rated thermal input more than 200 megawatts that began operating before July 1, 1987 and is covered by the provisions of section 4 (2) of the Government Decision on Restricting Sulphur Dioxide Emissions from Coal-fired Power Plants and Boilers (256/1990), which was in force at the time this Decree entered into force.
- (3) By the end of February each year, the operator must supply the regional environment centre and the municipal environmental protection authority with information on how much of the remaining operational life time of the plant as permitted under subsection 1 above had been used by the end of the previous calendar year and how much remains.

#### Section 10 — *Emission limit values for existing plants according to annual operating hours*

- (1) In an existing combustion plant with a rated thermal input of at least 400 megawatts burning solid fuels, a sulphur dioxide emissions limit value of 800 mg/Nm<sup>3</sup> can be applied if the plant is not operated for more than 2,000 hours a year, calculated as a five-year rolling average, until December 31, 2015, and not more than 1,500 hours a year, calculated as a five-year rolling average, as of January 1, 2016.
- (2) In an existing combustion plant with a rated thermal input of more than 500 megawatts burning solid fuels and for which an operating licence has been granted before July 1, 1987, a nitrogen oxide emissions limit value of 600 mg/Nm<sup>3</sup>, as converted into nitrogen dioxide (NO<sub>2</sub>), can be applied until December 31, 2015 if the plant is not operated for more than 2,000 hours a year, calculated as a five-year rolling average, from January 1, 2008.
- (3) In an existing combustion plant with a rated thermal input of more than 500 megawatts burning solid fuels and for which an operating licence has been granted before July 1, 1987, a nitrogen oxide emissions limit value of 450 mg/Nm<sup>3</sup>, as converted into nitrogen dioxide

(NO<sub>2</sub>), can be applied from January 1, 2016 if the plant is not operated for more than 1,500 hours a year, calculated as a five-year rolling average, from January 1, 2016.

- (4) An existing gas turbine with a rated thermal input of more than 100 megawatts and for which an operating licence has been granted before April 1, 1991 does not have to comply with the nitrogen oxide emissions limit values referred to in section 8 if the operator notifies the regional environment centre by June 30, 2003 that the gas turbine will be operated for an equivalent of no more than 15,000 hours at peak capacity use, as calculated from the beginning of the year 1995.

#### Section 10a - *Limit values for dust emissions in specific cases (907/2005)*

- (1) Existing solid-fuel plants with a rated thermal input of less than 500 megawatts and existing liquid-fuel plants with a fuel ash content of over 0.06 per cent may comply with a dust emissions limit value of no more than 100 mg/Nm<sup>3</sup> if the operator proves, in a manner acceptable to the permit authority, that it is not technically and economically feasible for the plant to comply with the dust emissions limit value referred to in Table 15 of Annex 2.

#### Section 11 — *Compliance with emission limit values in existing plants*

- (1) In continuous measurements, emission limit values shall be regarded as having been complied with if no calendar monthly average value exceeds the emission limit values during a calendar year and if 97 per cent of all 48-hour average values for sulphur dioxide and dust, and 95 per cent of all 48-hour average values for nitrogen oxides, do not exceed 110 per cent of the emission limit values.
- (2) In discontinuous measurements, emission limit values shall be regarded as having been complied with if the results of each series of measurements or other similar procedure approved by the permit authority do not exceed the emission limit values.
- (3) Start-up and shut-down periods or malfunctions of a combustion plant or gas turbine are not included when examining compliance with the emission limit values.

#### Section 12 — *Government decision on environmental protection requirements for certain existing plants*

- (1) In existing combustion plants for which an operating licence has been granted before July 1, 1987 and which were in operation in 2000, emissions reductions for sulphur dioxide, nitrogen oxides and dust can be set in accordance with the Government decision referred to in section 110a of the Environmental Protection Act (86/2000). The decision will not apply to plants covered by the provisions of section 9 on remaining operational life time. Under the Government decision, plants to which the decision applies are required to reduce their emis-

sions by at least the same amount as would be achieved by applying the emission limit values referred to in sections 8 and 10 in the first phase as of January 1, 2008, and in the second phase as of January 1, 2016. A closure of a plant included in the Government decision shall not result in an increase in the overall annual emissions of other similar plants included in the Decision.

- (2) The Government decision must clearly state the emissions reduction requirements for each plant from the start of 2008 and 2016, the measures and timetables for meeting the requirements, and the obligations to ensure proper monitoring of the implementation of the decision. The assumed annual operating hours of the plants in use in 2008 and 2016, the amount of fuel they consume and their rated thermal input are all calculated as an average of the last five calendar years ending in 2000, based on the annual figures for operating hours, fuel consumed, and rated thermal input.
- (3) The Government decision will also specify the authority to which operators must submit the decision-monitoring information every year and which assesses the progress in reducing emissions from the plants.
- (4) Plants covered by the Government decision must apply for a permit under section 28 of the Environmental Protection Act and comply with the provisions of this Decree on matters other than emission limit values.

### Section 13 — *Preparing the Government decision*

- (1) A written draft of the Government decision is to be submitted as a proposal to the Ministry of the Environment by May 31, 2003. If necessary, the decision can be revised on the initiative of the Ministry of the Environment or the environmental permit authority, or on the joint initiative of the operators concerned.
- (2) The Ministry of the Environment must submit the Government decision to the Commission of the European Communities by November 27, 2003 at the latest. Within six months of the submission of the document, the Commission will decide whether it meets the requirements. If the Commission informs the Member State that the decision does not meet the requirements, the Member State must inform the Commission within three months of the new and revised measures it is putting into effect in order to meet the requirements.

## Chapter 4 — Exceptional situations

### Section 14 — *Permit regulations covering exceptional situations*

- (1) As a precaution in case of a breakdown or malfunction of waste gas purification equipment at a combustion plant or gas turbine, the permit authority is required to state in the environmental permit that the operator must use low polluting fuels. If it is not possible to use low polluting fuels, the permit authority is required to specify in the environmental permit that the operator must limit the plant's operation, or close it down for a limited period or until further notice if the plant cannot return to normal operations within 24 hours.
- (2) In the environmental permit, the permit authority must set the maximum amount of time the plant can be operated without waste gas purification equipment at 120 hours during one calendar year. (907/2005)

### Section 15 - *Reporting exceptional situations*

- (1) In accordance with section 64a of the Environmental Protection Act, the operator must notify the regional environment centre and the municipal environmental protection authority of any malfunction or breakdown of the waste gas purification equipment in a combustion plant or gas turbine within 48 hours of the occurrence, or immediately if the problem concerns the fuel supply.

### Section 16 — *Provisions concerning reports on exceptional situations*

- (1) Following a notification on an exceptional situation, a regional environment centre can, under section 64a of the Environmental Protection Act, specify time limits that differ from those referred to in section 14 if there is an overriding need to maintain the energy supply or if the damaged plant is replaced for a limited period by a plant generating higher emissions than the damaged plant would have produced during the malfunction.
- (2) If a plant using low-sulphur fuels cannot comply with its emission limit values because a serious fuel shortage has caused an interruption in fuel supply, a regional environment centre can allow the exceptional situation to continue for a maximum of six months.
- (2) If a plant burning gaseous fuels cannot comply with its emission limit values because of problems with the fuel supply and if it would therefore have to be equipped with waste gas purification equipment, a regional environment centre can permit the plant to use other than gaseous fuel for a maximum of 10 days. If there is an overriding need to maintain energy supply, the regional environment centre can permit the other type of fuel to be used for a

longer period. The Ministry of Trade and Industry shall be asked to submit a statement on whether an overriding need to maintain energy supply exists.

## **Chapter 5 — Supervision and monitoring**

### *Section 17 — Providing information*

- (1) By the end of February each year, the operator have to supply the regional environment centre and the municipal environmental protection authority with the information specified in Annex 3 regarding combustion plants, gas turbines and measures, so that it can be determined whether the operator complies with the provisions of this Decree.
- (2) Information on emissions from combustion plants at refineries must be supplied separately.
- (3) In the environmental permit, the environmental permit authority can request the operator to provide other information on the plant's emissions and operations than that specified in Annex 3.

### *Section 18 — Monitoring emissions*

- (1) Emissions from combustion plants and gas turbines shall be monitored in accordance with Annex 3.

## **Chapter 6 — Miscellaneous provisions**

### *Section 19 — Determining emission limit values in a multi-fuel firing unit*

- (1) The emission limit value for a multi-fuel firing unit burning more than one type of fuel simultaneously is determined as the sum of the fuel-weighted emission limit values. Fuel-weighted emission limit values are calculated by multiplying the thermal input of each fuel by the corresponding emission limit value and dividing the result by the sum of the thermal inputs of all fuels used. The emission limit value is then obtained by aggregating these fuel-weighted emission limit values in accordance with the formula given in Annex 4.  
(907/2005)
- (2) In a multi-fuel firing unit alternately burning different types of fuel, the applicable emission limit values are the emission limit value specified for each type of fuel in Annexes 1 and 2, tables 1-15.

Section 20 — *Determining emission limit values for a multi-fuel firing unit that uses products of crude-oil refining*

- (1) In multi-fuel firing units that use distillation and conversion residues from crude-oil refining for their own consumption, alone or with other fuels, the provisions for the fuel with the highest emission limit value (the determinative fuel) will apply if, during the operation of the combustion plant, the proportion of that fuel is at least 50 per cent of the combined thermal input of all fuels.
- (2) If the proportion of the determinative fuel is less than 50 per cent, the emission limit value is determined on a pro rata basis as the ratio of the thermal input of each fuel to the thermal inputs of all fuels by first calculating the emission limit value of the determinative fuel and then determining the sum of the fuel-weighted emission limit values. The emission limit value of the determinative fuel is calculated by multiplying the emission limit value of this fuel by a factor of two and deducting from the sum the emission limit value of the fuel with the lowest emission limit value. The determinative fuel is the fuel which has the highest emission limit value according to Annexes 1 and 2, tables 1-15, and if there are two fuels with the same emission limit value, it is the fuel with the higher thermal input. Weighted emission limit values are calculated as referred to in section 19.
- (3) Instead of the emission limit values referred to in subsections 1 and 2 above, new refinery units burning more than one type of fuel can apply the sulphur dioxide emission limit value of 600 mg/Nm<sup>3</sup> as an average value for all new combustion plants at the refinery, while existing units burning more than one type of fuel can apply the sulphur dioxide emission limit value of 1,000 mg/Nm<sup>3</sup> as the average value for all existing combustion plants.

Section 21 — *Emission limit values in the event of substantial modifications to a combustion plant or gas turbine*

- (1) If a combustion plant or gas turbine is modified in such a way that the emissions resulting from its operation or the environmental impacts of the emissions increase, the plant shall comply with the emission limit values specified in Annex 1, tables 1-8.
- (2) If the capacity of a combustion plant or gas turbine is increased by at least 50 megawatts, the emission limit values specified in Annex 1, tables 1-8, have to be applied to the extension. The emission limit values are determined in proportion to the thermal input of the entire plant. However, the provision does not apply to cases referred to in section 20.

## Chapter 7 — Entry into force

### Section 22 — *Entry into force*

- (1) This Decree enters into force on December 9, 2002.
- (2) The provisions of Annex 3 shall apply to existing combustion plants and gas turbines from November 27, 2004.
- (3) This Decree repeals:
  - 1) Government Decision on Restricting Sulphur Dioxide Emissions from Coal-fired Power and Boiler Plants (256/1990), issued on March 8, 1990;
  - 2) Government Decision on General Instructions on Restricting Nitrogen Oxide Emissions from Boilers and Gas Turbines (527/1991), issued on March 14, 1991;
  - 3) Government Decision on the Limiting Sulphur Dioxide Emissions from Peat-fired Boilers (367/1994), issued on May 20, 1994; and
  - 4) Government Decision on Limiting Particle Emissions from Boilers (368/1994), issued on May 20, 1994.
- (4) The provisions in sections 1, 4 and 5 of the Government decision referred to in subsection 3(1) above, and provisions in sections 2-4 of the Government decision referred to in paragraph 2, will, however, remain in force until December 31, 2007.

*Annex 1***Emission limit values for new combustion plants and gas turbines with a rated thermal input of at least 50 megawatts***Table 1.* Limit values for sulphur dioxide emissions from combustion plants burning solid fuels

Thermal input MW	Emission limit value, mg SO <sub>2</sub> /Nm <sup>3</sup> , 6% O <sub>2</sub>		
	Fuel		
	Biomass	Peat	Other solid fuels
50≤MW <sub>th</sub> ≤100	200	400	850
100<MW <sub>th</sub> ≤300	200	200 <sup>1)</sup>	200
MW <sub>th</sub> >300	200	200	200

<sup>1)</sup> If the peat is of such quality that the plants are unable to comply with the requirement, they shall comply with a desulphurization rate of at least 92 per cent or an emission limit value of 300 SO<sub>2</sub>/Nm<sup>3</sup>.

*Table 2.* Limit values for sulphur dioxide emissions from combustion plants burning liquid fuels

Thermal input MW	Emission limit values, mg SO <sub>2</sub> /Nm <sup>3</sup> , 3% O <sub>2</sub>
50≤MW <sub>th</sub> ≤100	850
100<MW <sub>th</sub> ≤300	400-200 (linear reduction)
MW <sub>th</sub> >300	200

*Table 3.* Limit values for sulphur dioxide emissions from combustion plants burning gaseous fuels

Fuel	Emission limit values, mg SO <sub>2</sub> /Nm <sup>3</sup> , 3% O <sub>2</sub>
Gaseous fuels in general	35
Liquefied gas	5
Gases with low thermal value from coke-oven	400
Gases with low thermal value from blast furnaces	200

*Table 4.* Limit values for nitrogen oxides from combustion plants burning solid fuels

Thermal input MW	Emission limit value, mg NO <sub>2</sub> /Nm <sup>3</sup> , 6% O <sub>2</sub>	
	Fuel	
	Biomass	Other solid fuels
50≤MW <sub>th</sub> ≤100	400	400
100<MW <sub>th</sub> ≤300	300	200
MW <sub>th</sub> >300	150	150

*Table 5.* Limit values for nitrogen oxide emissions from combustion plants burning liquid fuels

Thermal input	Emission limit value,
MW	mg NO <sub>2</sub> /Nm <sup>3</sup> , 3% O <sub>2</sub>
50≤MW <sub>th</sub> ≤100	400
100<MW <sub>th</sub> ≤300	200
MW <sub>th</sub> >300	175

*Table 6.* Limit values for nitrogen oxide emissions from combustion plants burning gaseous fuels

Thermal input	Emission limit value, mg NO <sub>2</sub> /Nm <sup>3</sup> , 3% O <sub>2</sub>	
MW	Fuel	
	Natural gas <sup>*)</sup>	Other gaseous fuels
50≤MW <sub>th</sub> ≤300	150	200
MW <sub>th</sub> >300	100	200

<sup>\*)</sup> Most natural gas is methane, and a maximum of 20 per cent by volume consists of inert gases and other constituents.

*Table 7.* Limit values for nitrogen oxide emissions contained in fuels burned in gas turbines

Fuel	Emission limit value,
MW	mg NO <sub>2</sub> /Nm <sup>3</sup> , 15% O <sub>2</sub> (load more than 70%)
Natural gas (reference 1)	50 (reference 2)
Liquid fuels (reference 3)	120
Gaseous, other than natural gas	120

The limit values in table 7 do not apply to gas turbines operated for less than 500 hours per year that are intended for emergency use. The operator should provide the environmental permit authority each year with a report on the operating hours of the plant.

Reference 1: Most natural gas is methane, and a maximum of 20 per cent by volume consists of inert gases and other constituents.

Reference 2: The emission limit value of 75 mg NO<sub>2</sub>/Nm<sup>3</sup> is applicable if the efficiency of the gas turbine is determined in ISO base load conditions.

- in gas turbines used in combined heat and power systems that have an overall efficiency of more than 75 per cent,
- in gas turbines used in combined cycle plants that have an annual average overall electrical efficiency of more than 55 per cent,

- in gas turbines for mechanical drives.

For single-cycle gas turbines not coming under the categories above that have an efficiency of more than 35 per cent as determined in ISO base load conditions, an emission limit value of  $50 \cdot \eta / 35$  can be applied, in which  $\eta$  is the efficiency of the gas turbine expressed as a percentage (in ISO base load conditions).

Reference 3: The emission limit value for liquid fuels only applies to gas turbines burning light and middle distillates.

*Table 8.* Limit values for dust emissions from combustion plants burning solid, liquid or gaseous fuels

Fuel	Emission limit value, mg/Nm <sup>3</sup>	
	Thermal input	
	50 ≤ MW <sub>th</sub> ≤ 100 MW	MW <sub>th</sub> > 100 MW
Solid, 6% O <sub>2</sub>	50	30
Liquid, 3% O <sub>2</sub>	50	30
Gaseous, 3% O <sub>2</sub>		
- in general	5	5
- blast furnace gases	10	10
- gases generated in the steel industry that can also be used elsewhere	30	30

## Annex 2

**Emission limit values for existing combustion plants and gas turbines with a rated thermal input of at least 50 megawatts, from January 1, 2008**

*Table 9.* Limit values for sulphur dioxide emissions from combustion plants burning solid fuels

Thermal input MW	Emission limit value, mg SO <sub>2</sub> /Nm <sup>3</sup> , 6% O <sub>2</sub>	Fuel			
		Biomass	Peat	Other solid fuels	
			Licensed before January 1, 1994	Licensed after January 1, 1994	
50 ≤ MW <sub>th</sub> ≤ 100	400		800	400	2,000
100 < MW <sub>th</sub> ≤ 400	400		800-400 <sup>1</sup> (linear reduction)	400	2,000-400 (linear reduction)
MW <sub>th</sub> > 400	400		400	400	400

<sup>1</sup>An emission limit value of 800–600 mg SO<sub>2</sub>/m<sup>3</sup>(n) (linear reduction) can be applied to combustion plants burning pulverized fuel.

*Table 10.* Limit values for sulphur dioxide emissions from combustion plants burning liquid fuels

Thermal input MW	Emission limit value, mg SO <sub>2</sub> /Nm <sup>3</sup> , 3% O <sub>2</sub>
50 ≤ MW <sub>th</sub> ≤ 300	1,700
300 < MW <sub>th</sub> ≤ 500	1,700-400 (linear reduction)
MW <sub>th</sub> > 500	400

*Table 11.* Limit values for sulphur dioxide emissions from combustion plants burning gaseous fuels

Fuel	Emission limit value, mg SO <sub>2</sub> /Nm <sup>3</sup> , 3% O <sub>2</sub>
Gaseous fuels, in general	35
Liquefied gas	5
Gases with low thermal value from gasification of refinery residues; blast furnace gas; and coke oven gas	800

*Table 12.* Limit values for nitrogen oxide emissions from combustion plants burning solid fuels

Thermal input MW	Emission limit value, mg NO <sub>2</sub> /Nm <sup>3</sup> , 6% O <sub>2</sub>			
	Phase I until De- cember 31, 2015		Phase II as of January 1, 2016	
	Fuel		Fuel	
	Peat	Other solid fuels	Peat	Other solid fuels
50 ≤ MW <sub>th</sub> ≤ 500	600	600	600	600
500 < MW <sub>th</sub> ≤ 1,000	500	500	200	200
MW <sub>th</sub> > 1,000	200	200	200	200

*Table 13.* Limit values for nitrogen oxide emissions from combustion plants burning liquid and gaseous fuels

Thermal input MW	Emission limit value, mg NO <sub>2</sub> /Nm <sup>3</sup> , 3% O <sub>2</sub>	
	Fuel	
	Liquid	Gaseous
50 ≤ MW <sub>th</sub> ≤ 500	450	300
MW <sub>th</sub> > 500	400	200

*Table 14.* Limit values for nitrogen oxide emissions from gas turbines burning liquid and gaseous fuels

Thermal input MW	Emission limit value, mg NO <sub>2</sub> /Nm <sup>3</sup> , 15% O <sub>2</sub>			
	Fuel	Gaseous		
		Liquid	Licensed before April 1, 1991	Licensed after April 1, 1991
100 ≤ MW <sub>th</sub> ≤ 500	200	150	100	
MW <sub>th</sub> > 500	120	150	100	

*Table 15.* Limit values for dust emissions from combustion plants burning solid, liquid or gaseous fuels

Fuel	Emission limit value, mg/Nm <sup>3</sup>	
	Thermal input	
	50≤MW <sub>th</sub> ≤300 MW	MW <sub>th</sub> >300 MW
Solid, 6% O <sub>2</sub>		
- Licensed before January 1, 1994	50	50
- Licensed after January 1, 1994	50	30
Liquid, 3% O <sub>2</sub>		
- Licensed before January 1, 1994	50	50
- Licensed after January 1, 1994	50	30
Gaseous, 3% O <sub>2</sub>		
- In general	5	5
- Blast furnace gas	10	10
- Steel industry gases that can also be used elsewhere	50	50

### *Annex 3*

#### **Monitoring and measuring emissions**

1. For combustion plants and gas turbines with a rated thermal input of at least 100 megawatts, concentrations of sulphur dioxide, nitrogen oxides and dust shall be measured continuously.

However, if the plant has a remaining operational life of no more than 10,000 hours, no continuous measurements are necessary.

Continuous measurements of sulphur dioxide or dust emissions are not required for plants and gas turbines burning natural gas.

Measurements of sulphur dioxide emissions are not required for gas turbines or plants that burn oil with a known sulphur content and have no desulphurization equipment.

Continuous measurements of sulphur dioxide emissions are not required for units burning biomass if the operator can show, in a manner approved by the permit authority, that sulphur dioxide emissions never exceed the prescribed emission limit value.

If the emissions of the plant are not measured continuously, discontinuous measurements shall be carried out at least every six months or the level of emissions assessed in a way approved by the environmental permit authority. The assessments should make use of relevant standards of the European Committee for Standardization (CEN), or if these are not available, of ISO standards or other national or international standards which ensure that the information supplied is of equivalent quality.

2. If the plant has to comply with the desulphurization rate requirements specified in table 1, footnote 1, instead of the emission limit values, its sulphur dioxide emissions shall be measured in accordance with the obligations specified in item 1 above. The sulphur content of the fuel used at the plant should also be regularly monitored.

3. Any substantial changes in the type of fuel used or the way the plant is operated shall be reported to the environmental permit authority, which decides on the adequacy of the monitoring requirements or any changes in them.

4. Oxygen content, temperature, pressure and water vapour content of the exhaust gases shall be measured continuously in accordance with the requirements specified in items 1-3 above. However, it is not necessary to measure the water vapour content of the exhaust gases on a continuous basis if the exhaust gases are dried before the emissions are analysed.

Representative measurements of the pollutants, process parameters, collection and analysis of samples, and the reference measurements used for calibrating the automatic measurement systems shall be in accordance with CEN standards. If CEN standards are not available, ISO standards or national or international standards shall be used so that all information supplied is of equivalent quality.

In continuous measurements, the reliability and the quality of the measurement results shall be verified at least once a year by means of parallel measurements.

5. The 95 per cent confidence interval for the result of the measurements being taken to ensure the quality of continuous measurement **shall** not exceed the following percentage proportions of the respective emission limit values in each case:

Sulphur dioxide 20%

Nitrogen oxides 20%

Dust 30%

If, in continuous measurements carried out on any given day, more than three hourly average values are invalidated due to malfunction or maintenance of the measurement system used, that day's measurement results must be invalidated. If the measurement results of more than 10 days are invalidated during one year, the regional environment centre shall order the operator to carry out measures that help to improve the reliability of the continuous measurement system. (907/2005)

#### **Monitoring of emissions from certain plants until November 27, 2004**

6. In combustion plants and gas turbines with a rated thermal input of more than 300 megawatts licensed after July 1, 1987, concentrations of sulphur dioxide, nitrogen oxides and dust have to be measured on a continuous basis. However, concentrations of sulphur dioxide and dust can be monitored using discontinuous measurements or other appropriate determination procedures if such measurements or procedures, which shall be approved by the permit authority, are suitable for measuring these concentrations.

The environmental permit authority can require continuous measurement of sulphur dioxide, nitrogen oxide and dust concentrations in plants licensed after July 1, 1987 which are not referred to in the above paragraph 1. If no continuous measurements are required, the level of the emissions referred to above should be assessed using regular discontinuous measurements or other determination procedures approved by the permit authority.

#### **Information supplied to the environmental supervision authorities on an annual basis**

7. The operator of a plant shall provide the regional environment centre and the municipal environmental protection committee with at least the following information every year: total emissions of

sulphur dioxide, nitrogen oxides and dust; the plant's total annual energy input specified by fuel; sulphur concentration of the fuels; results of continuous emission measurements; inspections of measurement devices; and individual measurements. Fuels should be classified as follows: biomass, coal, peat, wood and other solid fuels, heavy fuel oil, light fuel oil and other liquid fuels, natural gas and other gaseous fuels.

*Annex 4 (907/2005)***Determining the emission limit value for a multi-fuel firing unit**

The weighted emission limit value ( $C_p$ ) for a multi-fuel firing unit burning more than one type of fuel simultaneously is calculated according to the following formula:

$C_p = C_1 + C_2 + \dots + C_n$ , where

$$Q_{1..n} M_{1..n} \times C_{1..n}$$

$$C_{1..n} = \frac{Q_{1..n} M_{1..n} \times C_{1..n}}{Q_1 M_1 + Q_2 M_2 + \dots + Q_n M_n}$$

$Q$  = the calorific value of each fuel (MJ/kg)

$M$  = the amount of each fuel (kg/h or tonnes p.a.)

$C_{1..n}$  = the emission limit value of each fuel in mg/Nm<sup>3</sup>, modified to take into account the oxygen content of the determinative fuel