

Technical Annex prepared by EGTEI

Suggested Technical Annex IV to the Gothenburg Protocol

The technical annexes have been delivered to WGS&R 44, as first release, in electronic and printed form, with the purpose of receiving preliminary comments and further guidance from the Parties, in view of the official submission of these annexes, along with the guidance documents, to WGS&R 45, September 2009.

Annex IV

LIMIT VALUES FOR EMISSIONS OF SULPHUR FROM STATIONARY SOURCES

1. Section A applies to Parties other than Canada and the United States of America, section B applies to Canada and section C applies to the United States of America.

A. Parties other than Canada and the United States of America

2. For the purpose of section A, except tables 2, 3, 4 and 6 paragraphs 11 and 12, limit value means the quantity of a gaseous substance contained in the waste gases from an installation that is not to be exceeded. Unless otherwise specified, it shall be calculated in terms of mass of pollutant per volume of the waste gases (expressed as mg/m³), assuming standard conditions for temperature and pressure for dry gas (volume at 273.15 K, 101.3 kPa). With regard to the oxygen content of the exhaust gas, the values given in the tables below for each source category shall apply. Dilution for the purpose of lowering concentrations of pollutants in waste gases is not permitted. Start-up, shutdown and maintenance of equipment are excluded.

~~3. Emissions shall be monitored in all cases. Compliance with limit values shall be verified. The methods of verification can include continuous or discontinuous measurements, type approval, or any other technically sound method.¹~~

~~4.3. Sampling and analysis of pollutants relevant polluting substances and measurements of process parameters, as well as the quality assurance of automated measuring systems and the reference measurement methods to calibrate those systems any measurement system, shall be carried out in accordance with CEN standards. If CEN standards are not available, ISO standards, national or international standards which will ensure the provision of data of an equivalent scientific quality shall apply the standards laid down by the European Committee for Standardization (CEN) or by the International Organization for Standardization (ISO). While awaiting the development of CEN or ISO standards, national standards shall apply.~~

~~5. Measurements of emissions should be carried out continuously when emissions of SO₂ exceed 75 kg/h.~~

~~6. In the case of continuous measurement for new plant, compliance with the emission standards is achieved if the calculated daily mean values do not exceed the limit value and if no hourly value exceeds the limit value by 100%.~~

~~7. In the case of continuous measurements for existing plant, compliance with the emission standards is achieved if (a) none of the monthly mean values exceeds the limit values; and (b) 97% of all the 48-hour mean values do not exceed 110% of the limit values.~~

~~8. In the case of discontinuous measurements, as a minimum requirement, compliance with the emission standards is achieved if the mean value based on an appropriate number of measurements under representative conditions does not exceed the value of the emission standard.²~~

¹ Former paragraph 3 on monitoring was deleted to let maximum flexibility to the Parties.

² Former paragraphs 5 to 8 on measurements were also deleted to let maximum flexibility to the Parties. Measurements and ELV-compliance requirements could be an issue of implementation in national legislation, while international standardization has to be taken into account. Therefore, former paragraph 4 is kept.

On request of the WGSR the EGTEI could come back on these issues and suggest some paragraphs to include provisions on monitoring, measurements and compliance with ELV.

[Tapez un texte]

4. Special provision for combustion plants:

4.1 For combustion plants larger than 50 MWth, the competent authority may grant derogation from the obligation to comply with the emission limit values provided for in paragraph 5 in the following cases:

[a] for combustion plants using only gaseous fuel who have to resort exceptionally to the use of other fuels because of a sudden interruption in the supply of gas and for this reason would need to be equipped with a waste gas purification facility]

[b] for old existing plants that will close down before a certain date]

[c] for emergency and/or peak plants with less than a certain number of operational hours per year]

4.2 Where a combustion plant is extended by at least 50MW, the emission limit value specified in paragraph 5 for new installation shall apply to the extensional part and to the part of the plant affected by the change.

4.3 Parties shall ensure that provisions are made in the permits for procedures relating to malfunction or breakdown of the abatement equipment.

4.4 In the case of a multi-fuel firing combustion plant involving the simultaneous use of two or more fuels, the competent authority shall provide rules for setting the emission limit values

95. [5. An alternative emission reduction strategy for mineral oil refineries (like the use of the bubble concept) is currently being investigated and could be proposed in the next draft of this TA. The bubble concept, allowing flexibility but at the same time aiming at equivalent reductions, could be restricted to combustion plants above 50 MW (as it is in the current protocol) or could relate to the whole refinery to allow maximum flexibility.]

96. Boilers and process heaters with a rated thermal input exceeding 50 MWth:

Table 1. Suggested options for limit values for SO_x emissions released from boilers [and process heater]⁹⁷

	Thermal input (MW_{th})	Limit value (mg SO_x/Nm³)⁹⁸	Alternative for domestic solid fuels removal efficiency
Solid and liquid fuels, new installations	50–100	850	90%⁹⁹
	100–300	850–200¹⁰⁰ (linear decrease)	92%⁹⁹
	≥300	200¹⁰⁰	95%⁹⁹
Solid fuels, existing installations	50–100	2000	
	100–500	2000–400 (linear decrease)	
	≥500	400	
	50–150		40%
	150–500		40–90% (linear increase)
	≥500		90%
Liquid fuels, existing installations	50–300	1700	
	300–500	1700–400	

[Tapez un texte]

		(linear decrease)	
	≥500	400	
Gaseous fuels in general, new and existing installations		35	
Liquefied gas, new and existing installations		5	
Low calorific value gases (e.g. gasification of refinery residues or combustion of coke oven gas)		new 400 existing 800	
Blast furnace gas		new 200 existing 800	
New combustion plant in refineries (average of all new combustion installations)	≥50 (total refinery capacity)	600	
Existing combustion plant in refineries (average of all existing combustion installations)		1000	

Fuel type	Thermal input [MWth]	Suggested ELV for SO _x [mg/Nm ³] ^{b)} [hourly, monthly, daily] ²⁾		
		Option 1 ¹⁾	Option 2 ¹⁾	Option 3 ¹⁾
Solid fuels	50-100	New plants: [300] (coal, lignite) [250] (peat) [100] (biomass)	New plants: [400] (coal, lignite) [300] (peat) [150] (biomass)	New plants: [850] (coal, lignite) [850] (peat) [200] (biomass)
		Existing plants: [300] (coal, lignite) [250] (peat) [100] (biomass)	Existing plants: [400] (coal, lignite) [300] (peat) [150] (biomass)	Existing plants: [2000] (coal, lignite) [2000] (peat) [2000] biomass)
	100-300	New plants: [150] (coal, lignite) [200] (peat) [100] (biomass)	New plants: [200] (coal, lignite) [200] (peat) [150] (biomass)	New plants: [200] (coal, lignite) [200] (peat) [200] (biomass)
		Existing plants: [150] (coal, lignite) [250] (peat) [100] (biomass)	Existing plants: [250] (coal, lignite) [300] (peat) [150] (biomass)	Existing plants: [2000] (coal, lignite) [2000] (peat) [2000] (biomass)
	>300	New plants: [100] (coal, lignite) (FBC: [150]) [100] (peat) (FBC: [100]) [100] (biomass)	New plants: [150] (coal, lignite) (FBC: [200]) [150] (peat) (FBC: [200]) [150] (biomass)	New plants: [200] (coal, lignite) [200] (peat) [200] (biomass)
		Existing plants: [100] (coal, lignite) (FBC: 150) [100] (peat) [100] (biomass)	Existing plants: [200] (coal, lignite) [200] (peat) [150] (biomass)	Existing plants: [1200] (coal, lignite) [1200] (peat) [1200] (biomass)

[Tapez un texte]

Liquid fuels	50-100	New plants: [200]	New plants: [350]	New plants: [850]
		Existing plants: [200]	Existing plants: [350]	Existing plants: [1700]
	100-300	New plants: [150]	New plants: [200]	New plants: [400]
		Existing plants: [150]	Existing plants: [250]	Existing plants: [1700]
	>300	New plants: [100]	New plants: [150]	New plants: [200]
		Existing plants: [100]	Existing plants: [200]	Existing plants: [1700]
Gaseous fuels in general	>50	New plants: [10]	New plants: [20]	New plants: [35]
		Existing plants: [10]	Existing plants: [30]	Existing plants: [35]
Liquefied gas	>50	New plants: [5]	New plants: [5]	New plants: [5]
		Existing plants: [5]	Existing plants: [5]	Existing plants: [5]
Low-calorific-value gases ^{a/}	>50	New plants: [150]	New plants: [200]	New plants: [400]
		Existing plants: [200]	Existing plants: [250]	Existing plants: [800]
Low calorific gases from blast furnace	>50	New plants: [200]	New plants: [200]	New plants: [200]
		Existing plants: [200]	Existing plants: [400]	Existing plants: [800]
FBC fluidized bed combustion (circulating, pressurized, bubbling)				

a/ In particular, the limit values shall not apply to:

- Plant where the combustion process is an integrated part of a specific production, for example the coke oven used in the Iron and Steel industry and glass and ceramics production plants;
- Plant in which the products of combustion are used for direct heating, drying, or any other treatment of objects or materials, e.g. reheating furnaces, furnaces for heat treatment;
- Post-combustion plant, i.e. any technical apparatus designed to purify the waste gases by combustion that is not operated as an independent combustion plant;
- Facilities for the regeneration of catalytic cracking catalysts;
- Facilities for the conversion of hydrogen sulphide into sulphur;
- Reactors used in the chemical industry;
- Coke battery furnaces;
- Cowpers;
- Waste incinerators; and
- Plant powered by diesel, petrol or gas engines or by combustion turbines, irrespective of the fuel used.

b/ The O₂ reference content is 6% for solid fuels and 3% for others.

c/ ~~400 with heavy fuel oil S < 0.25%~~ e.g. gasification of refinery residues or coke oven gas

d/ ~~If an installation reaches 300 mg/Nm³ SO₂, it may be exempted from applying the removal efficiency.~~

[Tapez un texte]

~~10~~7. Gas oil:

Table 22. Limit values for the sulphur content of gas oil^{a/}

	Sulphur content (per cent by weight)
Gas oil	≤ 0.2 after 1 July 2000 < 0.1 after 1 January 2008

a/ "Gas oil" means any petroleum product within HS 2710, or any petroleum product which, by reason of its distillation limits, falls within the category of middle distillates intended for use as fuel and of which at least 85 per cent by volume, including distillation losses, distils at 350°C. Fuels used in on-road and non-road vehicles and agricultural tractors are excluded from this definition. Gas oil intended for marine use is included in the definition if it meets the description above or it has a viscosity or density falling within the ranges of viscosity or density defined for marine distillates in table I of ISO 8217 (1996).

~~11~~8. Mineral oil and gas refineries

Claus plant: for plant that produces more than 50 Mg of sulphur a day:

- ~~(a) Sulphur recovery 99.5% for new plant;~~
- ~~(b) Sulphur recovery 97% for existing plant.~~

Table 3. Suggested options for limit values for SO_x emissions released from Claus plant

Plant type	Suggested limit values for sulphur recovery^{a/} [hourly, monthly, daily]^{2/}		
	Option 1^{1/}	Option 2^{1/}	Option 3^{1/}
New plant	[99.9]	[99.5]	[99.5]
Existing plant	[99.5]	[98]	[97]

a/ An adequate definition for sulphur recovery is being investigated and could be proposed in the next draft of this TA.

Other plants: Combustion plants in refineries (> 50 MW, excluding turbines and stationary engines)

Table 4. Suggested options for limit values for SO_x emissions released from other plant

Plant type	Suggested ELV for SO_x [mg/Nm³] [hourly, monthly, daily]^{2/}		
	Option 1^{1/}	Option 2^{1/}	Option 3^{1/}
New plant	[to be filled in later]	[to be filled in later]	[600]
Existing plant	[to be filled in later]	[to be filled in later]	[1000]

[Tapez un texte]

~~129.~~ Titanium dioxide production: ~~in new and existing installations, discharges arising from digestion and calcination steps in the manufacture of titanium dioxide shall be reduced to a value of not more than 10 kg of SO₂ equivalent per Mg of titanium dioxide produced.~~

Table 5. Suggested options for limit values for SO_x emissions released from titanium dioxide production.

Plant type	Suggested ELV for SO _x [kg/t of TiO ₂]		
	Option 1 ^{1/}	Option 2 ^{1/}	Option 3 ^{1/}
Sulphate process, emission main sources	[3]	[6]	[10]
Chloride process, emission main sources	[1.5]	[1.7]	[3]

B. Canada^{3/}

~~130.~~ Limit values for controlling emissions of sulphur dioxide from new stationary sources in the following stationary source category will be determined on the basis of available information on control technology and levels including limit values applied in other countries and the following document: Canada Gazette, Part I. Department of the Environment. Thermal Power Generation Emissions - National Guidelines for New Stationary Sources. May 15, 1993. pp. 1633-1638.

C. United States of America^{3/}

~~141.~~ Limit values for controlling emissions of sulphur dioxide from new stationary sources in the following stationary source categories are specified in the following documents:

- (a) Electric Utility Steam Generating Units - 40 Code of Federal Regulations (C.F.R.) Part 60, Subpart D, and Subpart Da;
- (b) Industrial-Commercial-Institutional Steam Generating Units - 40 C.F.R. Part 60, Subpart Db, and Subpart Dc;
- (c) Sulphuric Acid Plants - 40 C.F.R. Part 60, Subpart H;
- (d) Petroleum Refineries - 40 C.F.R. Part 60, Subpart J;
- (e) Primary Copper Smelters - 40 C.F.R. Part 60, Subpart P;
- (f) Primary Zinc Smelters - 40 C.F.R. Part 60, Subpart Q;
- (g) Primary Lead Smelters - 40 C.F.R. Part 60, Subpart R;
- (h) Stationary Gas Turbines - 40 C.F.R. Part 60, Subpart GG;
- (i) Onshore Natural Gas Processing - 40 C.F.R. Part 60, Subpart LLL;
- (j) Municipal Waste Combustors - 40 C.F.R. Part 60, Subpart Ea, and Subpart Eb; and
- (k) Hospital/Medical/Infectious Waste Incinerators - 40 C.F.R. Part 60, Subpart Ec.

Note

~~1/ Monitoring is to be understood as an overall activity, comprising measuring of emissions, mass balancing, etc. It can be carried out continuously or discontinuously.~~ The definitions of option 1, option 2 and option 3 are available in Informal document prepared by EGTEI for the 44th WGSR meeting. These options were designed to leave maximum flexibility for discussion at the WGSR.

[Tapez un texte]

2/ Proposed ELVs are based on BAT-AEL or current ELVs which usually are defined for a certain averaging period (mainly hourly, daily or monthly). The same averaging period could be also used for setting ELVs. See reference documents for more information. More specifics will be presented in the next drafts of the TA. Averaging periods normally relate to continuous measurements and can be made dependent to the height (ambition level) of the ELVs that will be finally selected. Higher (less strict) ELVs could be associated with shorter averaging periods and vice versa.

3/ Up to now, no information has been provided by North America, then part B and C of the annex have not been modified yet.