ANNEX II

Tier thresholds for calculation-based methodologies related to installations (Article 12(1))

1. Definition of tiers for activity data

The uncertainty thresholds in Table 1 shall apply to tiers relevant to activity data requirements in accordance with point (a) of Article 28(1) and the first subparagraph of Article 29(2), and Annex IV, of this Regulation. The uncertainty thresholds shall be interpreted as maximum permissible uncertainties for the determination of source streams over a reporting period.

Where Table 1 does not include activities listed in Annex I to Directive 2003/87/EC and the mass balance is not applied, the operator shall use the tiers listed in Table 1 under 'Combustion of fuels and fuels used as process input' for those activities.

TABLE 1

Tiers for activity data (maximum permissible uncertainty for each tier)

Activity/ source stream type	**Parameter to which the uncertainty is applied**	**Tier 1**	**Tier 2**	**Tier 3**	**Tier 4**
Combustion of fuels and fuels used as process input					
Commercial standard fuels	Amount of fuel [t] or [Nm^3]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Other gaseous and liquid fuels	Amount of fuel [t] or [Nm^3]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Solid fuels	Amount of fuel [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Flaring	Amount of flare gas [Nm3]	± 17,5 %	± 12,5 %	± 7,5 %	
Scrubbing: carbonate (Method A)	Amount carbonate consumed [t]	± 7,5 %			
Scrubbing: gypsum (Method B)	Amount gypsum produced [t]	± 7,5 %			
Refining of mineral oil					

a For monitoring emissions from catalytic cracker regeneration (other catalyst regeneration and flexi-cokers) in mineral oil refineries, the required uncertainty is related to the total uncertainty of all emissions from that source.

b Amount [t] of CKD or bypass dust (where relevant) leaving the kiln system over a reporting period estimated using industry best practice guidelines.

Catalytic cracker regeneration[a]	Uncertainty requirements apply separately for each emission source	± 10 %	± 7,5 %	± 5 %	± 2,5 %
Hydrogen production	Hydrocarbon feed [t]	± 7,5 %	± 2,5 %		
Production of coke					
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Metal ore roasting and sintering					
Carbonate input	Carbonate input material and process residues [t]	± 5 %	± 2,5 %		
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Production of iron and steel					
Fuel as process input	Each mass flow into and from the installation [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Production of cement clinker					
Kiln input based (Method A)	Each relevant kiln input [t]	± 7,5 %	± 5 %	± 2,5 %	
Clinker output (Method B)	Clinker produced [t]	± 5 %	± 2,5 %		
CKD	CKD or bypass dust [t]	n.a.[b]	± 7,5 %		
Non-carbonate carbon	Each raw material [t]	± 15 %	± 7,5 %		
Production of lime and calcination of dolomite and magnesite					

a For monitoring emissions from catalytic cracker regeneration (other catalyst regeneration and flexi-cokers) in mineral oil refineries, the required uncertainty is related to the total uncertainty of all emissions from that source.

b Amount [t] of CKD or bypass dust (where relevant) leaving the kiln system over a reporting period estimated using industry best practice guidelines.

Carbonates (Method A)	Each relevant kiln input [t]	± 7,5 %	± 5 %	± 2,5 %	
Alkali earth oxide (Method B)	Lime produced [t]	± 5 %	± 2,5 %		
Kiln dust (Method B)	Kiln dust [t]	n.a.[b]	± 7,5 %		
Manufacture of glass and mineral wool					
Carbonates (input)	Each carbonate raw material or additives associated with CO_2 emissions [t]	± 2,5 %	± 1,5 %		
Manufacture of ceramic products					
Carbon inputs (Method A)	Each carbonate raw material or additive associated with CO_2 emissions [t]	± 7,5 %	± 5 %	± 2,5 %	
Alkali oxide (Method B)	Gross production including rejected products and cullet from the kilns and shipment [t]	± 7,5 %	± 5 %	± 2,5 %	
Scrubbing	Dry $CaCO_3$ consumed [t]	± 7,5 %			
Production of pulp and paper					
Make up chemicals	Amount of $CaCO_3$ and Na_2CO_3 [t]	± 2,5 %	± 1,5 %		
Production of carbon black					
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Production of ammonia					

a For monitoring emissions from catalytic cracker regeneration (other catalyst regeneration and flexi-cokers) in mineral oil refineries, the required uncertainty is related to the total uncertainty of all emissions from that source.

b Amount [t] of CKD or bypass dust (where relevant) leaving the kiln system over a reporting period estimated using industry best practice guidelines.

Fuel as process input	Amount fuel used as process input [t] or [Nm^3]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Production of hydrogen and synthesis gas					
Fuel as process input	Amount fuel used as process input for hydrogen production [t] or [Nm^3]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Production of bulk organic chemicals					
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Production or processing of ferrous and non-ferrous metals, including secondary aluminium					
Process emissions	Each input material or process residue used as input material in the process [t]	± 5 %	± 2,5 %		
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Primary aluminium production					
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
PFC emissions (slope method)	primary aluminium production in [t], anode effect minutes in [number anode effects/ cell day] and [anode effect	± 2,5 %	± 1,5 %		

a For monitoring emissions from catalytic cracker regeneration (other catalyst regeneration and flexi-cokers) in mineral oil refineries, the required uncertainty is related to the total uncertainty of all emissions from that source.

b Amount [t] of CKD or bypass dust (where relevant) leaving the kiln system over a reporting period estimated using industry best practice guidelines.

	minutes/ occurrence]				
PFC emissions (overvoltage method)	primary aluminium production in [t], anode effect overvoltage [mV] and current efficiency [-]	± 2,5 %	± 1,5 %		

a For monitoring emissions from catalytic cracker regeneration (other catalyst regeneration and flexi-cokers) in mineral oil refineries, the required uncertainty is related to the total uncertainty of all emissions from that source.

b Amount [t] of CKD or bypass dust (where relevant) leaving the kiln system over a reporting period estimated using industry best practice guidelines.

2. Definition of tiers for calculation factors for combustion emissions

Operators shall monitor CO_2 emissions from all types of combustion processes taking place under all activities as listed in Annex I to Directive 2003/87/EC or included in the Union Scheme under Article 24 of that Directive using the tier definitions laid down in this section. Where fuels are used as a process input, the same rules as for combustion emissions shall apply. Where fuels form part of a mass balance in accordance with Article 25(1) of this Regulation, the tier definitions for mass balances in section 3 of this Annex apply.

Process emissions from related exhaust gas scrubbing shall be monitored in accordance with subsection C of section 1 of Annex IV.

2.1. *Tiers for emission factors*

Where a biomass fraction is determined for a mixed fuel or material, the tiers defined shall relate to the preliminary emission factor. For fossil fuels and materials the tiers shall relate to the emission factor.

Tier 1 : The operator shall apply one of the following:

(a) the standard factors listed in section 1 of Annex VI;

(b) other constant values in accordance with points (d) or (e) of Article 31(1), where no applicable value is contained in section 1 of Annex VI.

Tier 2a : The operator shall apply country specific emission factors for the respective fuel or material in accordance with points (b) and (c) of Article 31(1).

Tier 2b : The operator shall derive emission factors for the fuel based on one of the following established proxies, in combination with an empirical correlation as determined at least once per year in accordance with Articles 32 to 35 and 39:

(a) density measurement of specific oils or gases, including those common to the refinery or steel industry;

(b) net calorific value for specific coal types.

The operator shall ensure that the correlation satisfies the requirements of good engineering practice and that it is applied only to values of the proxy which fall into the range for which it was established.

Tier 3 : The operator shall determine the emission factor in accordance with the relevant provisions of Articles 32 to 35.

2.2. *Tiers for net calorific value (NCV)*

Tier 1 : The operator shall apply one of the following:

(a) the standard factors listed in section 1 of Annex VI;

(b) other constant values in accordance with points (d) or (e) of Article 31(1), where no applicable value is contained in section 1 of Annex VI.

Tier 2a : The operator shall apply country specific factors for the respective fuel in accordance with points (b) or (c) of Article 31(1).

Tier 2b : For commercially traded fuels the net calorific value as derived from the purchasing records for the respective fuel provided by the fuel supplier shall be used provided it has been derived based on accepted national or international standards.

Tier 3 : The operator shall determine the net calorific value in accordance with Article 32 to 35.

2.3. *Tiers for oxidation factors*

Tier 1 : The operator shall apply an oxidation factor of 1.

Tier 2 : The operator shall apply oxidation factors for the respective fuel in accordance with points (b) or (c) of Article 31(1).

Tier 3 : For fuels, the operator shall derive activity-specific factors based on the relevant carbon contents of ashes, effluents and other wastes and by-products, and other relevant incompletely oxidised gaseous forms of carbon emitted except CO. Composition data shall be determined in accordance with Article 32 to 35.

2.4. *Tiers for biomass fraction*

Tier 1 : The operator shall apply a value from those published in accordance with the first subparagraph of Article 39(2) or a value determined in accordance with the second subparagraph of Article 39(2) or Article 39(3).

Tier 2 : The operator shall determine specific factors in accordance with Article 39(1).

3. **Definition of tiers for calculation factors for mass balances**

Where an operator uses a mass balance in accordance with Article 25, it shall use the tier definitions of this section.

3.1. *Tiers for carbon content*

The operator shall apply one of the tiers listed in this point. For deriving the carbon content from an emission factor, the operator shall use the following equations:

(a) for emission factors expressed as t CO_2/TJ : $C = (EF \times NCV) / f$

(b) for emission factors expressed as t CO_2/t : $C = EF / f$

In those formulae, C is the carbon content expressed as fraction (tonne carbon per tonne product), EF is the emission factor, NCV is the net calorific value, and f is the factor laid down in Article 36(3).

Where a biomass fraction is determined for a mixed fuel or material, the tiers defined shall relate to the total carbon content. The biomass fraction of the carbon shall be determined using the tiers defined in section 2.4 of this Annex.

Tier 1 : The operator shall apply one of the following:

(a) the carbon content derived from standard factors listed in Annex VI sections 1 and 2;

(b) other constant values in accordance with points (d) or (e) of Article 31(1), where no applicable value is contained in Annex VI sections 1 and 2.

Tier 2a : The operator shall derive the carbon content from country specific emission factors for the respective fuel or material in accordance with points (b) or (c) of Article 31(1).

Tier 2b : The operator shall derive the carbon content from emission factors for the fuel based on one of the following established proxies in combination with an empirical correlation as determined at least once per year in accordance with Articles 32 to 35:

(a) density measurement of specific oils or gases common, for example, to the refinery or steel industry;

(b) net calorific value for specific coals types.

The operator shall ensure that the correlation satisfies the requirements of good engineering practice and that it is applied only to values of the proxy which fall into the range for which it was established.

Tier 3 : The operator shall determine the carbon content in accordance with the relevant provisions of Articles 32 to 35.

3.2. *Tiers for net calorific values*

The tiers defined in section 2.2 of this Annex shall be used.

4. Definition of tiers for the calculation factors for process emissions from carbonate decomposition

For all process emissions, where they are monitored using the standard methodology in accordance with Article 24(2), the following tier definitions for the emission factor shall be applied in the case of:

(a) Method A : Input based, the emission factor and activity data related to the amount of material input into the process.

(b) Method B : Output based, the emission factor and activity data related to the amount of output from the process.

4.1. *Tiers for the emission factor using Method A*

Tier 1 : The determination of the amount of relevant carbonates in each relevant input material shall be carried out according Articles 32 to 35. Stoichiometric ratios as listed in section 2 of Annex VI shall be used to convert composition data into emission factors.

4.2. *Tiers for the conversion factor using Method A*

Tier 1 : A conversion factor of 1 shall be used.

Tier 2 : Carbonates and other carbon leaving the process shall be considered by means of a conversion factor with a value between 0 and 1. The operator may assume complete conversion for one or several inputs and attribute unconverted materials or other carbon to the remaining inputs. The additional determination of relevant chemical parameters of the products shall be carried out in accordance with Articles 32 to 35.

4.3. *Tiers for the emission factor using Method B*

Tier 1 : The operator shall apply the standard factors listed in Annex VI, section 2, Table 3.

Tier 2 : The operator shall apply a country specific emission factor in accordance with points (b) or (c) of Article 31(1).

Tier 3 : The determination of the amount of relevant metal oxides stemming from the decomposition of carbonates in the product shall be carried out in accordance with Articles 32 to 35. Stoichiometric ratios referred to in Annex VI, section 2, Table 3 shall be used to convert composition data into emission factors assuming that all of the relevant metal oxides have been derived from respective carbonates.

4.4. *Tiers for the conversion factor using Method B*

Tier 1 : A conversion factor of 1 shall be used.

Tier 2 : The amount of non-carbonate compounds of the relevant metals in the raw materials, including return dust or fly ash or other already calcined materials, shall be reflected by means of conversion factors with a value between 0 and 1 with a value of 1 corresponding to a full conversion of raw material carbonates into oxides. The additional determination of relevant chemical parameters of the process inputs shall be carried out in accordance with Articles 32 to 35.

Changes to legislation:
There are currently no known outstanding effects for the Commission Regulation (EU) No 601/2012 (repealed), ANNEX II.