

Commission Regulation (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council (Text with EEA relevance) (repealed)

CHAPTER III

MONITORING OF EMISSIONS OF STATIONARY INSTALLATIONS

SECTION I

General provisions

Article 19

Categorisation of installations and source streams

- 1 Each operator shall determine the category of its installation pursuant to paragraph 2, and, where relevant, of each source stream pursuant to paragraph 3 for the purpose of monitoring emissions and determining the minimum requirements for tiers.
- 2 The operator shall classify each installation in one of the following categories:
 - a a category A installation, where average verified annual emissions of the trading period immediately preceding the current trading period, with the exclusion of CO₂ stemming from biomass and before subtraction of transferred CO₂, are equal to or less than 50 000 tonnes of CO_{2(e)};
 - b a category B installation, where the average verified annual emissions of the trading period immediately preceding the current trading period, with the exclusion of CO₂ stemming from biomass and before subtraction of transferred CO₂, are more than 50 000 tonnes of CO_{2(e)} and equal to or less than 500 000 tonnes of CO_{2(e)};
 - c a category C installation, where the average verified annual emissions of the trading period immediately preceding the current trading period, with the exclusion of CO₂ stemming from biomass and before subtraction of transferred CO₂, are more than 500 000 tonnes of CO_{2(e)}.
- 3 The operator shall classify each source stream, comparing the source stream against the sum of all absolute values of fossil CO₂ and CO_{2(e)} corresponding to all source streams included in calculation-based methodologies and of all emissions of emission sources monitored using measurement-based methodologies, before subtraction of transferred CO₂, in one of the following categories:
 - a minor source streams, where the source streams selected by the operator jointly correspond to less than 5 000 tonnes of fossil CO₂ per year or to less than 10 %, up to a total maximum contribution of 100 000 tonnes of fossil CO₂ per year, whichever is the highest in terms of absolute value;
 - b *de-minimis* source streams, where the source streams selected by the operator jointly correspond to less than 1 000 tonnes of fossil CO₂ per year or to less than 2 %, up to a total maximum contribution of 20 000 tonnes of fossil CO₂ per year, whichever is the highest in terms of absolute value;

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- c major source streams, where the source streams do not classify in any category referred to in points (a) and (b).

4 Where the average annual verified emissions of the trading period immediately preceding the current trading period for the installation are not available or inaccurate, the operator shall use a conservative estimate of annual average emissions, with the exclusion of CO₂ stemming from biomass and before subtraction of transferred CO₂, to determine the category of the installation.

Article 20

Monitoring boundaries

- 1 An operator shall define the monitoring boundaries for each installation.

Within those boundaries, the operator shall include all relevant greenhouse gas emissions from all emission sources and source streams belonging to activities carried out at the installation and listed in Annex I to Directive 2003/87/EC, as well as from activities and greenhouse gases included by a Member State pursuant to Article 24 of Directive 2003/87/EC.

The operator shall also include emissions from regular operations and abnormal events including start-up and shut-down and emergency situations over the reporting period, with the exception of emissions from mobile machinery for transportation purposes.

- 2 When defining the monitoring and reporting process, the operator shall include the sector specific requirements laid down in Annex IV.

3 Where leakages from a storage complex pursuant to Directive 2009/31/EC are identified and lead to emissions, or release of CO₂ to the water column, they shall be considered as emission sources for the respective installation and shall be monitored in accordance with section 23 of Annex IV to this Regulation.

The competent authority may allow the exclusion of a leakage emission source from the monitoring and reporting process, once corrective measures pursuant to Article 16 of Directive 2009/31/EC have been taken and emissions or release into the water column from that leakage can no longer be detected.

Article 21

Choice of the monitoring methodology

- 1 For the monitoring of the emissions of an installation, the operator shall choose to apply either a calculation-based methodology or a measurement-based methodology, subject to specific provisions of this Regulation.

A calculation-based methodology shall consist in determining emissions from source streams based on activity data obtained by means of measurement systems and additional parameters from laboratory analyses or default values. The calculation-based methodology may be implemented through the standard methodology set out in Article 24 or the mass balance methodology set out in Article 25.

A measurement-based methodology shall consist in determining emissions from emission sources by means of continuous measurement of the concentration of the

relevant greenhouse gas in the flue gas and of the flue gas flow, including the monitoring of CO₂ transfers between installations where the CO₂ concentration and the flow of the transferred gas are measured.

Where the calculation-based methodology is applied, the operator shall for each source stream define, in the monitoring plan, whether the standard methodology or the mass balance methodology is used, including the relevant tiers in accordance with Annex II.

2 An operator may combine, subject to approval by the competent authority, standard methodology, mass balance and measurement-based methodologies for different emission sources and source streams belonging to one installation, provided that neither gaps nor double counting concerning emissions occur.

3 Where the operator does not choose a measurement-based methodology, the operator shall choose the methodology required by the relevant section of Annex IV, unless he provides evidence to the competent authorities that the use of such methodology is technically not feasible or incurs unreasonable costs, or that another methodology leads to a higher overall accuracy of emissions data.

Article 22

Monitoring methodology not based on tiers

By way of derogation from Article 21(1), the operator may use a monitoring methodology that is not based on tiers (hereinafter ‘the fall-back methodology’) for selected source streams or emission sources, provided that all of the following conditions are met:

- (a) applying at least tier 1 under the calculation-based methodology for one or more major source streams or minor source streams and a measurement-based methodology for at least one emission source related to the same source streams is technically not feasible or would incur unreasonable costs;
- (b) the operator assesses and quantifies each year the uncertainties of all parameters used for the determination of the annual emissions in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (JCGM 100:2008), or another equivalent internationally accepted standard, and includes the results in the annual emissions report;
- (c) the operator demonstrates to the satisfaction of the competent authority that by applying such a fall-back monitoring methodology, the overall uncertainty thresholds for the annual level of greenhouse gas emissions for the whole installation do not exceed 7,5 % for category A installations, 5,0 % for category B installations and 2,5 % for category C installations.

Article 23

Temporary changes to the monitoring methodology

1 Where it is for technical reasons temporarily not feasible to apply the tier in the monitoring plan for the activity data or each calculation factor of a fuel or material stream as approved by the competent authority, the operator concerned shall apply the highest achievable tier until the conditions for application of the tier approved in the monitoring plan have been restored.

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The operator shall take all necessary measures to allow the prompt restoration of the tier in the monitoring plan as approved by the competent authority.

2 The operator concerned shall notify the temporary change referred to in paragraph 1 to the monitoring methodology without undue delay to the competent authority, specifying:

- a the reasons for the deviation from the tier;
- b in detail the interim monitoring methodology that the operator uses to determine the emissions until the conditions for the application of the tier in the monitoring plan have been restored;
- c the measures the operator is taking to restore the conditions for the application of the tier in the monitoring plan approved by the competent authority;
- d the anticipated point in time when application of the tier as approved by the competent authority will be resumed.

SECTION 2

Calculation-based methodology

Subsection 1

General

Article 24

Calculation of emissions under the standard methodology

1 Under the standard methodology, the operator shall calculate combustion emissions per source stream by multiplying the activity data related to the amount of fuel combusted, expressed as terajoules based on net calorific value (NCV), with the corresponding emission factor, expressed as tonnes CO₂ per terajoule (t CO₂/TJ) consistent with the use of NCV, and with the corresponding oxidation factor.

The competent authority may allow the use of emission factors for fuels, expressed as t CO₂/t or t CO₂/Nm³. In that case, the operator shall determine combustion emissions by multiplying the activity data related to the amount of fuel combusted, expressed as tonnes or normal cubic metres, with the corresponding emission factor and the corresponding oxidation factor.

2 The operator shall determine process emissions per source stream by multiplying the activity data related to the material consumption, throughput or production output, expressed in tonnes or normal cubic metres with the corresponding emission factor, expressed in t CO₂/t or t CO₂/Nm³, and the corresponding conversion factor.

3 Where a tier 1 or tier 2 emission factor already includes the effect of incomplete chemical reactions, the oxidation factor or conversion factor shall be set to 1.

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Article 25

Calculation of emissions under the mass balance methodology

1 Under the mass balance methodology, the operator shall calculate the CO₂ quantity corresponding to each source stream included in the mass balance by multiplying the activity data related to the amount of material entering or leaving the boundaries of the mass balance, with the material's carbon content multiplied by [¹³C,664 t CO₂/t C,] applying section 3 of Annex II.

2 Notwithstanding Article 49, the emissions of the total process covered by the mass balance shall be the sum of the CO₂ quantities corresponding to all source streams covered by the mass balance. CO emitted to the atmosphere shall be calculated in the mass balance as emission of the molar equivalent amount of CO₂.

Editorial Information

- X1** Substituted by [Corrigendum to Commission Regulation \(EU\) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council \(Official Journal of the European Union L 181 of 12 July 2012\)](#).

Article 26

Applicable tiers

1 When defining the relevant tiers in accordance with Article 21(1), to determine the activity data and each calculation factor, each operator shall apply the following:

- a at least the tiers listed in Annex V, in the case of an installation that is a category A installation, or where a calculation factor is required for a source stream that is a commercial standard fuel;
- b in other cases than those referred to in point (a), the highest tier as defined in Annex II.

However, the operator may apply a tier one level lower than required in accordance with the first subparagraph for category C installations and up to two levels lower for category A and B installations, with a minimum of tier 1, where it shows to the satisfaction of the competent authority that the tier required in accordance with the first subparagraph is technically not feasible or incurs unreasonable costs.

The competent authority may, for a transitional period of up to three years, allow an operator to apply lower tiers than those referred to in the second subparagraph, with a minimum of tier 1, provided that both of the following conditions are met:

- a the operator shows to the satisfaction of the competent authority that the tier required pursuant to the second subparagraph is technically not feasible or incurs unreasonable costs;
- b the operator provides an improvement plan indicating how and by when at least the tier required pursuant to the second subparagraph will be reached.

2 For activity data and each calculation factor for minor source streams, the operator shall apply the highest tier which is technically feasible and does not incur unreasonable costs, with a minimum of tier 1.

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3 For activity data and each calculation factor for *de-minimis* source streams, the operator may determine activity data and each calculation factor by using conservative estimations instead of using tiers, unless a defined tier is achievable without additional effort.

4 For the oxidation factor and conversion factor, the operator shall, as a minimum, apply the lowest tiers listed in Annex II.

5 Where the competent authority has allowed the use of emission factors expressed as t CO₂/t or t CO₂/Nm³ for fuels, and for fuels used as process input or in mass balances in accordance with Article 25, the net calorific value may be monitored using lower tiers than the highest tier as defined in Annex II.

Subsection 2

Activity data

Article 27

Determination of activity data

1 The operator shall determine the activity data of a source stream in one of the following ways:

- a based on continual metering at the process which causes the emissions;
- b based on aggregation of metering of quantities separately delivered taking into account relevant stock changes.

2 For the purposes of point (b) of paragraph 1, the quantity of fuel or material processed during the reporting period shall be calculated as the quantity of fuel or material purchased during the reporting period, minus the quantity of fuel or material exported from the installation, plus the quantity of fuel or material in stock at the beginning of the reporting period, minus the quantity of fuel or material in stock at the end of the reporting period.

Where it is technically not feasible or would incur unreasonable costs to determine quantities in stock by direct measurement, the operator may estimate those quantities based on one of the following:

- a data from previous years and correlated with output for the reporting period;
- b documented procedures and respective data in audited financial statements for the reporting period.

Where the determination of activity data for the entire calendar year is technically not feasible or would incur unreasonable costs, the operator may choose the next most appropriate day to separate a reporting year from the following one, and reconcile accordingly to the calendar year required. The deviations involved for one or more source streams shall be clearly recorded, form the basis of a value representative for the calendar year, and be considered consistently in relation to the next year.

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Article 28

Measurement systems under the operator's control

1 For determining the activity data in accordance with Article 27, the operator shall use metering results based on measurement systems under its own control at the installation, provided that all of the following conditions are complied with:

- a the operator must carry out an uncertainty assessment and ensures that the uncertainty threshold of the relevant tier level is met;
- b the operator must ensure at least once per year, and after each calibration of measuring instruments, that the calibration results multiplied by a conservative adjustment factor based on an appropriate time series of previous calibrations of that or similar measuring instruments for taking into account the effect of uncertainty in service, are compared with the relevant uncertainty thresholds.

Where tier thresholds approved in accordance with Article 12 are exceeded or equipment found not to conform to other requirements, the operator shall take corrective action without undue delay and notify the competent authority thereof.

2 The operator shall provide the uncertainty assessment referred to in point (a) of paragraph 1 to the competent authority when notifying a new monitoring plan or when it is relevant for a change to the approved monitoring plan.

The assessment shall comprise the specified uncertainty of the applied measuring instruments, uncertainty associated with the calibration, and any additional uncertainty connected to how the measuring instruments are used in practice. Uncertainty related to stock changes shall be included in the uncertainty assessment where the storage facilities are capable of containing at least 5 % of the annual used quantity of the fuel or material considered. When carrying out the assessment, the operator shall take into account the fact that the stated values used to define tier uncertainty thresholds in Annex II refer to the uncertainty over the full reporting period.

The operator may simplify the uncertainty assessment by assuming that the maximum permissible errors specified for the measuring instrument in service, or where lower, the uncertainty obtained by calibration, multiplied by a conservative adjustment factor for taking into account the effect of uncertainty in service, is to be regarded as the uncertainty over the whole reporting period as required by the tier definitions in Annex II, provided that measuring instruments are installed in an environment appropriate for their use specifications.

3 Notwithstanding paragraph 2, the competent authority may allow the operator to use metering results based on measurement systems under its own control at the installation, where the operator provides evidence that the measuring instruments applied are subject to relevant national legal metrological control.

For that purpose, the maximum permissible error in service allowed by the relevant national legislation on legal metrological control for the relevant measuring task may be used as the uncertainty value without providing further evidence.

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Article 29

Measurement systems outside the operator's own control

1 Where, based on a simplified uncertainty assessment, the use of measurement systems outside the operator's own control, compared to the use of those within the operator's own control pursuant to Article 28, allows the operator to comply with at least as high a tier, gives more reliable results and is less prone to control risks, the operator shall determine the activity data from measurement systems outside its own control.

To that end, the operator may revert to one of the following data sources:

- a amounts from invoices issued by a trade partner, provided that a commercial transaction between two independent trade partners takes place;
- b direct readings from the measurement systems.

2 The operator shall ensure compliance with the applicable tier pursuant to Article 26.

To that end, the maximum permissible error in service allowed by relevant legislation for national legal metrological control for the relevant commercial transaction may be used as uncertainty without providing further evidence.

Where the applicable requirements under national legal metrological control are less stringent than the applicable tier pursuant to Article 26, the operator shall obtain evidence on the applicable uncertainty from the trade partner responsible for the measurement system.

Subsection 3

Calculation factors

Article 30

Determination of calculation factors

1 The operator shall determine calculation factors either as default values or values based on analysis depending on the applicable tier.

2 The operator shall determine and report calculation factors consistently with the state used for related activity data, referring to the fuel's or material's state in which the fuel or material is purchased or used in the emission causing process, before it is dried or otherwise treated for laboratory analysis.

Where such an approach incurs unreasonable costs, or where higher accuracy can be achieved, the operator may consistently report activity data and calculation factors referring to the state in which laboratory analyses are carried out.

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Article 31

Default values for calculation factors

1 Where the operator determines calculation factors as default values, it shall, in accordance with the requirement of the applicable tier, as set out in Annexes II and VI, use one of the following values:

- a standard factors and stoichiometric factors listed in Annex VI;
- b standard factors used by the Member State for its national inventory submission to the Secretariat of the United Nations Framework Convention on Climate Change;
- c literature values agreed with the competent authority, including standard factors published by the competent authority, which are compatible with factors referred to in point (b), but they are representative of more disaggregated sources of fuel streams;
- d values specified and guaranteed by the supplier of a material where the operator can demonstrate to the satisfaction of the competent authority that the carbon content exhibits a 95 % confidence interval of not more than 1 %;
- e values based on analyses carried out in the past, where the operator can demonstrate to the satisfaction of the competent authority that those values are representative for future batches of the same material.

2 The operator shall specify all default values used in the monitoring plan.

Where the default values change on an annual basis, the operator shall specify the authoritative applicable source of that value in the monitoring plan.

3 The competent authority may only approve a change of default values for a calculation factor in the monitoring plan pursuant to Article 15(2), where the operator provides evidence that the new default value leads to a more accurate determination of emissions.

4 Upon application by the operator, the competent authority may allow that the net calorific value and emission factors of fuels are determined using the same tiers as required for commercial standard fuels provided that the operator submits, at least every three years, evidence that the 1 % interval for the specified calorific value has been met during the last three years.

Article 32

Calculation factors based on analyses

1 The operator shall ensure that any analyses, sampling, calibrations and validations for the determination of calculation factors are carried out by applying methods based on corresponding EN standards.

Where such standards are not available, the methods shall be based on suitable ISO standards or national standards. Where no applicable published standards exist, suitable draft standards, industry best practice guidelines or other scientifically proven methodologies shall be used, limiting sampling and measurement bias.

2 Where online gas chromatographs or extractive or non-extractive gas analysers are used for emission determination, the operator shall obtain approval from the competent authority for the use of such equipment. The equipment shall be used only with regard to composition data of gaseous fuels and materials. As minimum quality assurance measures, the operator

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shall ensure that an initial validation and annually repeated validations of the instrument are performed.

3 The result of any analysis shall be used only for the delivery period or batch of fuel or material for which the samples have been taken, and for which the samples were intended to be representative.

For the determination of a specific parameter the operator shall use the results of all analyses made with regards to that parameter.

Article 33

Sampling plan

1 Where calculation factors are determined by analyses, the operator shall submit to the competent authority for approval for each fuel or material a sampling plan in the form of a written procedure, which contains information on methodologies for the preparation of samples, including information on responsibilities, locations, frequencies and quantities, and methodologies for the storage and transport of samples.

The operator shall ensure that the derived samples are representative for the relevant batch or delivery period and free of bias. Relevant elements of the sampling plan shall be agreed with the laboratory carrying out the analysis for the respective fuel or material, and evidence of that agreement shall be included in the plan. The operator shall make the plan available for the purposes of verification pursuant to Regulation (EU) No 600/2012.

2 The operator shall, in agreement with the laboratory carrying out the analysis for the respective fuel or material and subject to the approval of the competent authority, adapt the elements of the sampling plan where analytical results indicate that the heterogeneity of the fuel or material significantly differs from the information on heterogeneity on which the original sampling plan for that specific fuel or material was based.

Article 34

Use of laboratories

1 The operator shall ensure that laboratories used to carry out analyses for the determination of calculation factors are accredited in accordance with EN ISO/IEC 17025, for the relevant analytical methods.

2 Laboratories not accredited in accordance with EN ISO/IEC 17025 may only be used for the determination of calculation factors where the operator can demonstrate to the satisfaction of the competent authority that access to laboratories referred to in paragraph 1 is technically not feasible or would incur unreasonable costs and that the non-accredited laboratory meets requirements equivalent to EN ISO/IEC 17025.

3 The competent authority shall deem a laboratory to meet the requirements equivalent to EN ISO/IEC 17025 within the meaning of paragraph 2 where the operator provides, to the extent feasible, in the form of and to a similar level of detail required for procedures pursuant to Article 12(2), evidence in accordance with the second and the third subparagraph of this paragraph.

With respect to quality management, the operator shall produce an accredited certification of the laboratory in conformity with EN ISO/IEC 9001, or other certified

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quality management systems that cover the laboratory. In the absence of such certified quality management systems, the operator shall provide other appropriate evidence that the laboratory is capable of managing its personnel, procedures, documents and tasks in a reliable manner.

With respect to technical competence, the operator shall provide evidence that the laboratory is competent and able to generate technically valid results using the relevant analytical procedures. Such evidence shall cover at least the following elements:

- a management of the personnel's competence for the specific tasks assigned;
- b suitability of accommodation and environmental conditions;
- c selection of analytical methods and relevant standards;
- d where applicable, management of sampling and sample preparation, including control of sample integrity;
- e where applicable, development and validation of new analytical methods or application of methods not covered by international or national standards;
- f uncertainty estimation;
- g management of equipment, including procedures for calibration, adjustment, maintenance and repair of equipment, and record keeping thereof;
- h management and control of data, documents and software;
- i management of calibration items and reference materials;
- j quality assurance for calibration and test results, including regular participation in proficiency testing schemes, applying analytical methods to certified reference materials, or inter-comparison with an accredited laboratory;
- k management of outsourced processes;
- l management of assignments, customer complaints, and ensuring timely corrective action.

Article 35

Frequencies for analyses

1 The operator shall apply the minimum frequencies for analyses for relevant fuels and materials listed in Annex VII. Annex VII will be reviewed on a regular basis and in the first instance not more than two years from this Regulation entering into force.

2 The competent authority may allow the operator to use a different frequency than those referred to in paragraph 1, where minimum frequencies are not available or where the operator demonstrates one of the following:

- a based on historical data, including analytical values for the respective fuels or materials in the reporting period immediately preceding the current reporting period, any variation in the analytical values for the respective fuel or material does not exceed 1/3 of the uncertainty value to which the operator has to adhere with regard to the activity data determination of the relevant fuel or material;
- b using the required frequency would incur unreasonable costs.

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Subsection 4

Specific calculation factors

Article 36

Emission factors for CO₂

- 1 The operator shall determine activity-specific emission factors for CO₂ emissions.
- 2 Emission factors of fuels, including when used as process input, shall be expressed as t CO₂/TJ.

The competent authority may allow the operator to use an emission factor for a fuel expressed as t CO₂/t or t CO₂/Nm³ for combustion emissions, where the use of an emission factor expressed as t CO₂/TJ incurs unreasonable costs or where at least equivalent accuracy of the calculated emissions can be achieved by using such an emission factor.

- 3 For the conversion of the carbon content into the respective value of a CO₂ related emission factor or vice versa, the operator shall use the factor [^X13,664 t CO₂/t C.]

Editorial Information

- X1** Substituted by [Corrigendum to Commission Regulation \(EU\) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council \(Official Journal of the European Union L 181 of 12 July 2012\)](#).

Article 37

Oxidation and conversion factors

- 1 The operator shall use as a minimum tier 1 to determine oxidation or conversion factors. The operator shall use a value of 1 for oxidation or for a conversion factor where the emission factor includes the effect of incomplete oxidation or conversion.

However, the competent authority may require operators to always use tier 1.

- 2 Where several fuels are used within an installation and tier 3 is to be used for the specific oxidation factor, the operator may ask for the approval of the competent authority for one or both of the following:
 - a the determination of one aggregate oxidation factor for the whole combustion process and to apply it to all fuels;
 - b the attribution of the incomplete oxidation to one major source stream and use of a value of 1 for the oxidation factor of the other source streams.

Where biomass or mixed fuels are used, the operator shall provide evidence that application of points (a) or (b) of the first subparagraph does not lead to an underestimation of emissions.

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Subsection 5

Treatment of biomass

Article 38

Biomass source streams

1 The operator may determine the activity data of biomass source streams without using tiers and providing analytical evidence regarding the biomass content, where that source stream consists exclusively of biomass and the operator can ensure that it is not contaminated with other materials or fuels.

2 The emission factor of biomass shall be zero.

The emission factor of a mixed fuel or material shall be calculated and reported as the preliminary emission factor determined in accordance with Article 30 multiplied by the fossil fraction of the fuel or material.

3 Peat, xylite and fossil fractions of mixed fuels or materials shall not be considered biomass.

4 Where the biomass fraction of mixed fuels or materials is equal or higher than 97 %, or where due to the amount of the emissions associated with the fossil fraction of the fuel or material it qualifies as a *de-minimis* source stream, the competent authority may allow the operator to apply no-tier methodologies, including the energy balance method, for determining activity data and relevant calculation factors, unless the respective value is to be used for the subtraction of biomass derived CO₂ from emissions determined by means of continuous emission measurement.

Article 39

Determination of biomass and fossil fraction

1 Where subject to the tier level required and to the availability of appropriate default values as referred to in Article 31(1), the biomass fraction of a specific fuel or material are determined using analyses, the operator shall determine that biomass fraction on the basis of a relevant standard and the analytical methods therein, and apply that standard only if approved by the competent authority.

2 Where the determination of the biomass fraction of a mixed fuel or material by analysis in accordance with paragraph 1 is technically not feasible or would incur unreasonable costs, the operator shall base its calculation on standard emission factors and biomass fraction values for mixed fuels and materials and estimation methods published by the Commission.

In the absence of such standard factors and values, the operator shall either assume the absence of a biomass share or submit an estimation method to determine the biomass fraction to the competent authority for approval. For fuels or materials originating from a production process with defined and traceable input streams, the operator may base such estimation on a mass balance of fossil and biomass carbon entering and leaving the process.

3 By way of derogation from paragraphs 1 and 2 and Article 30, where the guarantee of origin has been established in accordance with Articles 2(j) and 15 of Directive 2009/28/EC for

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biogas injected into and subsequently removed from a gas network, the operator shall not use analyses for the determination of the biomass fraction.

SECTION 3

Measurement-based methodology

Article 40

Use of the measurement-based monitoring methodology

The operator shall use measurement-based methodologies for all emissions of nitrous oxide (N₂O) as laid down in Annex IV, and for quantifying CO₂ transferred pursuant to Article 49.

In addition, the operator may use measurement-based methodologies for CO₂ emission sources where it can provide evidence that for each emission source the tiers required in accordance with Article 41 are complied with.

Article 41

Tier requirements

1 For each emission source which emits more than 5 000 tonnes of CO_{2(e)} per year, or which contributes more than 10 % of the total annual emissions of the installation, whichever is higher in terms of absolute emissions, the operator shall apply the highest tier listed in section 1 of Annex VIII. For all other emission sources, the operator shall apply at least one tier lower than the highest tier.

2 Only where the operator can demonstrate to the satisfaction of the competent authority that application of the tier required under paragraph 1 is technically not feasible or incurs unreasonable costs and application of a calculation methodology using the tier levels required by Article 26 is technically not feasible or incurs unreasonable costs, may a next lower tier be used for the relevant emission source, with a minimum of tier 1.

Article 42

Measurement standards and laboratories

1 All measurements shall be carried out applying methods based on EN 14181 Stationary source emissions — Quality assurance of automated measuring systems, EN 15259 Air quality — Measurement of stationary source emissions — Requirements for measurement sections and sites and for the measurement objective, plan and report, and other corresponding EN standards.

Where such standards are not available, the methods shall be based on suitable ISO standards, standards published by the Commission or national standards. Where no applicable published standards exist, suitable draft standards, industry best practice guidelines or other scientifically proven methodologies shall be used, limiting sampling and measurement bias.

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The operator shall consider all relevant aspects of the continuous measurement system, including the location of the equipment, calibration, measurement, quality assurance and quality control.

2 The operator shall ensure that laboratories carrying out measurements, calibrations and relevant equipment assessments for continuous emission measurement systems (CEMS) shall be accredited in accordance with EN ISO/IEC 17025 for the relevant analytical methods or calibration activities.

Where the laboratory does not have such accreditation, the operator shall ensure that equivalent requirements of Article 34(2) and (3) are met.

Article 43

Determination of emissions

1 The operator shall determine the annual emissions from an emission source over the reporting period by summing up over the reporting period all hourly values of the measured greenhouse gas concentration multiplied by the hourly values of the flue gas flow, where the hourly values shall be averages over all individual measurement results of the respective operating hour.

In the case of CO₂ emissions, the operator shall determine annual emission on the basis of equation 1 in Annex VIII. CO emitted to the atmosphere shall be treated as the molar equivalent amount of CO₂.

In the case of nitrous oxide (N₂O), the operator shall determine annual emissions on the basis of the equation in subsection B.1 of section 16 of Annex IV.

2 Where several emission sources exist in one installation and cannot be measured as one emission source, the operator shall measure emissions from those sources separately and add the results to obtain the total emissions of the specific gas over the reporting period.

3 The operator shall determine the greenhouse gas concentration in the flue gas by continuous measurement at a representative point through one of the following:

- a direct measurement;
- b in the case of a high concentration in the flue gas, calculation of the concentration using an indirect concentration measurement applying Equation 3 of Annex VIII and taking into account the measured concentration values of all other components of the gas stream as laid down in the operator's monitoring plan.

4 Where relevant, the operator shall determine separately any CO₂ amount stemming from biomass using calculation-based monitoring methodologies and subtract it from the total measured CO₂ emissions.

5 The operator shall determine the flue gas flow for the calculation in accordance with paragraph 1 by one of the following methods:

- a calculation by means of a suitable mass balance, taking into account all significant parameters on the input side, including for CO₂ emissions at least input material loads, input airflow and process efficiency, as well as on the output side including at least the product output, the O₂, SO₂ and NO_x concentration;
- b determination by continuous flow measurement at a representative point.

Changes to legislation: There are currently no known outstanding effects for the Commission Regulation (EU) No 601/2012 (repealed), CHAPTER III. (See end of Document for details)

Article 44

Data aggregation

1 The operator shall calculate hourly averages for each parameter, including concentrations and flue gas flow, relevant for determining emissions using a measurement-based methodology by using all data points available for that specific hour.

Where an operator can generate data for shorter reference periods without additional cost, he shall use those periods for the determination of the annual emissions in accordance with Article 43(1).

2 Where the continuous measurement equipment for a parameter is out of control, out of range or out of operation for part of the hour or reference period referred to in paragraph 1, the operator shall calculate the related hourly average pro rata to the remaining data points for that specific hour or shorter reference period provided that at least 80 % of the maximum number of data points for a parameter are available. Article 45(2) to (4) shall apply where less than 80 % of the maximum number of data points for a parameter are available.

Article 45

Missing data

1 Where a piece of measurement equipment within the continuous emissions monitoring system is out of operation for more than five consecutive days in any calendar year, the operator shall inform the competent authority without undue delay and propose adequate measures to improve the quality of the continuous emissions monitoring system affected.

2 Where a valid hour or shorter reference period in accordance with Article 44(1) of data cannot be provided for one or more parameters of the measurement-based methodology due to the equipment being out of control, out of range or out of operation, the operator shall determine values for substitution of each missing hour of data.

3 Where a valid hour or shorter reference period of data cannot be provided for a parameter directly measured as concentration, the operator shall calculate a substitution value as the sum of an average concentration and twice the standard deviation associated with that average, using Equation 4 in Annex VIII.

Where the reporting period is not applicable for determining such substitution values due to significant technical changes at the installation, the operator shall agree with the competent authority a representative timeframe for determining the average and standard deviation, where possible with the duration of one year.

4 Where a valid hour of data cannot be provided for a parameter other than concentration, the operator shall obtain substitute values of that parameter through a suitable mass balance model or an energy balance of the process. The operator shall validate the results by using the remaining measured parameters of the measurement-based methodology and data at regular working conditions considering a time period of the same duration as the data gap.

Changes to legislation: There are currently no known outstanding effects for the Commission Regulation (EU) No 601/2012 (repealed), CHAPTER III. (See end of Document for details)

Article 46

Corroborating with calculation of emissions

The operator shall corroborate emissions determined by a measurement-based methodology, with the exception of nitrous oxide (N₂O) emissions from nitric acid production and greenhouse gases transferred to a transport network or a storage site, by calculating the annual emissions of each considered greenhouse gas for the same emission sources and source streams.

The use of tier methodologies shall not be required.

SECTION 4

Special provisions

Article 47

Installations with low emissions

1 The competent authority may allow the operator to submit a simplified monitoring plan in accordance with Article 13, provided that it operates an installation with low emissions.

The first subparagraph shall not apply to installations carrying out activities for which N₂O is included pursuant to Annex I to Directive 2003/87/EC.

2 For the purposes of the first subparagraph of paragraph 1, an installation shall be considered an installation with low emissions where at least one of the following conditions is met:

- a the average annual emissions of that installation reported in the verified emission reports during the trading period immediately preceding the current trading period, with the exclusion of CO₂ stemming from biomass and before subtraction of transferred CO₂, were less than 25 000 tonnes of CO_{2(e)} per year;
- b the average annual emissions referred to in point (a) are not available or are no longer applicable because of changes in the installation's boundaries or changes to the operating conditions of the installation, but the annual emissions of that installation for the next five years, with the exclusion of CO₂ stemming from biomass and before subtraction of transferred CO₂, will be, based on a conservative estimation method, less than 25 000 tonnes of CO_{2(e)} per year.

3 The operator of an installation with low emissions shall not be required to submit the supporting documents referred to in the third subparagraph of Article 12(1), and shall be exempt from the requirement of reporting on improvement referred to in Article 69(4).

4 By way of derogation from Article 27, the operator of an installation with low emissions may determine the amount of fuel or material by using available and documented purchasing records and estimated stock changes. The operator shall also be exempt from the requirement to provide the uncertainty assessment referred to in Article 28(2) to the competent authority.

Changes to legislation: There are currently no known outstanding effects for the Commission Regulation (EU) No 601/2012 (repealed), CHAPTER III. (See end of Document for details)

5 The operator of an installation with low emissions shall be exempt from the requirement of Article 28(2) to determine stock data at the beginning and the end of the reporting period, where the storage facilities are capable of containing at least 5 % of the annual consumption of fuel or material during the reporting period, in order to include related uncertainty in an uncertainty assessment.

6 By way of derogation from Article 26(1) the operator of an installation with low emissions may apply as a minimum tier 1 for the purposes of determining activity data and calculation factors for all source streams, unless higher accuracy is achievable without additional effort for the operator, without providing evidence that applying higher tiers is technically not feasible or would incur unreasonable costs.

7 For the purpose of determining calculation factors on the basis of analyses in accordance with Article 32, the operator of an installation with low emissions may use any laboratory that is technically competent and able to generate technically valid results using the relevant analytical procedures, and provides evidence for quality assurance measures as referred to in Article 34(3).

8 Where an installation with low emissions subject to simplified monitoring exceeds the threshold referred to in paragraph 2 in any calendar year, its operator shall notify the competent authority thereof without undue delay.

The operator shall, without undue delay, submit a significant modification of the monitoring plan within the meaning of point (b) of Article 15(3), to the competent authority for approval.

However, the competent authority shall allow that the operator continues simplified monitoring provided that that operator demonstrates to the satisfaction of the competent authority that the threshold referred to in paragraph 2 has not already been exceeded within the past five reporting periods and will not be exceeded again from the following reporting period onwards.

Article 48

Inherent CO₂

1 Inherent CO₂ which is transferred into an installation, including that contained in natural gas or a waste gas including blast furnace gas or coke oven gas, shall be included in the emission factor for that fuel.

2 Where inherent CO₂ originates from activities covered by Annex I to Directive 2003/87/EC or included pursuant to Article 24 of that Directive and is subsequently transferred out of the installation as part of a fuel to another installation and activity covered by that Directive, it shall not be counted as emissions of the installation where it originates.

However, where inherent CO₂ is emitted, or transferred out of the installation to entities not covered by that Directive, it shall be counted as emissions of the installation where it originates.

3 The operators may determine quantities of inherent CO₂ transferred out of the installation both at the transferring and at the receiving installation. In that case, the quantities of respectively transferred and received inherent CO₂ shall be identical.

Where the quantities of transferred and received inherent CO₂ are not identical, the arithmetic average of both measured values shall be used in both the transferring and

Changes to legislation: There are currently no known outstanding effects for the Commission Regulation (EU) No 601/2012 (repealed), CHAPTER III. (See end of Document for details)

receiving installations' emission reports, where the deviation between the values can be explained by the uncertainty of the measurement systems. In such case, the emission report shall refer to the alignment of that value.

Where the deviation between the values cannot be explained by the approved uncertainty range of the measurement systems, the operators of the transferring and receiving installations shall align the values by applying conservative adjustments approved by the competent authority.

[^{F1}Article 49

Transferred CO₂

1 The operator shall subtract from the emissions of the installation any amount of CO₂ originating from fossil carbon in activities covered by Annex I to Directive 2003/87/EC that is not emitted from the installation, but:

- a transferred out of the installation to any of the following:
 - (i) a capture installation for the purpose of transport and long-term geological storage in a storage site permitted under Directive 2009/31/EC;
 - (ii) a transport network with the purpose of long-term geological storage in a storage site permitted under Directive 2009/31/EC;
 - (iii) a storage site permitted under Directive 2009/31/EC for the purpose of long-term geological storage;
- b transferred out of the installation and used to produce precipitated calcium carbonate, in which the used CO₂ is chemically bound.

2 In its annual emissions report, the operator of the transferring installation shall provide the receiving installation's installation identification code recognised in accordance with the acts adopted pursuant to Article 19(3) of Directive 2003/87/EC, if the receiving installation is covered by that Directive. In all other cases, the operator of the transferring installation shall provide the name, address and contact information of a contact person for the receiving installation.

The first subparagraph shall also apply to the receiving installation with respect to the transferring installation's installation identification code.

3 For the determination of the quantity of CO₂ transferred from one installation to another, the operator shall apply a measurement-based methodology, including in accordance with Articles 43, 44 and 45. The emission source shall correspond to the measurement point and the emissions shall be expressed as the quantity of CO₂ transferred.

For the purpose of point (b) of paragraph 1, the operator shall apply a calculation-based methodology.

4 For determining the quantity of CO₂ transferred from one installation to another, the operator shall apply the highest tier as defined in section 1 of Annex VIII.

However, the operator may apply the next lower tier provided that it establishes that applying the highest tier as defined in section 1 of Annex VIII is technically not feasible or incurs unreasonable costs.

Changes to legislation: There are currently no known outstanding effects for the Commission Regulation (EU) No 601/2012 (repealed), CHAPTER III. (See end of Document for details)

For determining the quantity of CO₂ chemically bound in precipitated calcium carbonate, the operator shall use data sources representing highest achievable accuracy.

5 The operators may determine quantities of CO₂ transferred out of the installation both at the transferring and at the receiving installation. In such cases, Article 48(3) shall apply.]

Textual Amendments

- F1** Substituted by [Commission Implementing Regulation \(EU\) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation \(EU\) No 601/2012 \(Text with EEA relevance\).](#)

Changes to legislation:

There are currently no known outstanding effects for the Commission Regulation (EU) No 601/2012 (repealed), CHAPTER III.