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<sup>(1)</sup> Text with EEA relevance.

# EN

Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

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**This issue closes the L series for 2018.**



## II

(Non-legislative acts)

## REGULATIONS

## 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)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC <sup>(1)</sup>, and in particular Article 14(1) thereof,

Whereas:

- (1) This Regulation should enter into force as a matter of urgency to take account of the First Edition of the International Standards and Recommended Practices on Environmental Protection - Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) (Annex 16, Volume IV to the Chicago Convention) adopted by the ICAO Council at the tenth meeting of its 214th session on 27 June 2018, that are intended to apply from 2019.
- (2) The complete, consistent, transparent and accurate monitoring and reporting of greenhouse gas emissions, in accordance with the harmonised requirements laid down in this Regulation, are fundamental for the effective operation of the system for greenhouse gas emission allowance trading ('EU ETS') established pursuant to Directive 2003/87/EC.
- (3) In the third trading period of the EU ETS (2013 to 2020), industrial operators, aviation operators, verifiers and competent authorities have gained experience of monitoring and reporting pursuant to Commission Regulation (EU) No 601/2012 <sup>(2)</sup>. That experience has shown the need for improvement, clarification and simplification of the monitoring and reporting rules so as to promote further harmonisation and make the system more efficient. Regulation (EU) No 601/2012 has been substantially amended several times. Since further amendments are to be made, it should be replaced in the interests of clarity.
- (4) The definition of 'biomass' in this Regulation should be consistent with the definitions of 'biomass', 'bioliquids' and 'biofuels' in Article 2 of Directive 2009/28/EC of the European Parliament and of the Council <sup>(3)</sup>, in particular since preferential treatment with regard to allowance surrender obligations under the EU ETS constitutes a 'support scheme' within the meaning of point (k) of Article 2, and consequently financial support within the meaning of Article 17(1)(c), of that Directive.

<sup>(1)</sup> OJ L 275, 25.10.2003, p. 32.

<sup>(2)</sup> 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 Council (OJ L 181, 12.7.2012, p. 30).

<sup>(3)</sup> Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (OJ L 140, 5.6.2009, p. 16).

- (5) For reasons of consistency, definitions laid down in Commission Decision 2009/450/EC <sup>(1)</sup> and Directive 2009/31/EC of the European Parliament and of the Council <sup>(2)</sup> should apply to this Regulation.
- (6) To ensure the best possible operation of the monitoring and reporting system, Member States that designate more than one competent authority should ensure that those competent authorities coordinate their work in line with the principles set out in this Regulation.
- (7) The monitoring plan setting out detailed, complete and transparent documentation concerning the methodology of a specific installation or aircraft operator should be a core element of the system established by this Regulation. Regular updates of the plan should be required, both to respond to the verifier's findings and on the operator's or aircraft operator's own initiative. The main responsibility for the implementation of the monitoring methodology, parts of which are specified by procedures required by this Regulation, should remain with the operator or the aircraft operator.
- (8) As the monitoring plan constitutes the core element of the monitoring and reporting rules, any significant change to it should be subject to the competent authority's approval. However, in order to reduce the administrative burden on competent authorities and operators, certain types of change to the plan should not be considered significant and therefore not require formal approval.
- (9) It is necessary to establish basic monitoring methodologies to minimise the burden on operators and aircraft operators, and facilitate the effective monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC. Those methodologies should include basic calculation and measurement methodologies. The calculation methodologies should consist of a standard methodology and a mass-balance methodology. It should be possible to combine measurement methodologies, standard calculation methodology and mass-balance methodology within the same installation, provided the operator ensures that there are no omissions or double counting.
- (10) To minimise the burden on operators and aircraft operators, simplification with regard to the uncertainty assessment requirement, without reducing accuracy, should be provided. Considerably reduced requirements with regard to uncertainty assessment should be applied where measuring instruments are used under type-conform conditions, in particular where those instruments are under national legal metrological control.
- (11) It is necessary to define calculation factors which can be either default factors or determined by analysis. Requirements for analysis should retain the preference for use of laboratories accredited in accordance with the harmonised standard General requirements for the competence of testing and calibration laboratories (EN ISO/IEC 17025) for the relevant analytical methods, and provide requirements for demonstrating robust equivalence in the case of non-accredited laboratories, including in conformity with the harmonised standard Quality management systems – Requirements (EN ISO/IEC 9001) or other relevant certified quality management systems.
- (12) A transparent and consistent methodology for determining unreasonable costs should be laid down.
- (13) Further equivalence between calculation-based and measurement-based methodologies should be established. This will require better alignment of tier requirements. For the purpose of determining biomass fractions of CO<sub>2</sub> when using continuous emissions measurement systems (CEMS), recent technological progress should be taken into account. Therefore, more flexible rules should be set for determining the biomass fraction, in particular allowing methods other than calculation-based approaches for this purpose.
- (14) Since emissions stemming from biomass are commonly rated as zero for the purpose of the EU ETS, simplified monitoring rules for pure biomass source streams should be laid down. Where fuels or materials are mixtures of biomass and fossil constituents, the monitoring requirements should be clarified. A better distinction should be made between the preliminary emission factor referring to the total carbon content and the emission factor referring only to the fossil CO<sub>2</sub> fraction. For this purpose, separate tier definitions should be provided for the

<sup>(1)</sup> Commission Decision 2009/450/EC of 8 June 2009 on the detailed interpretation of the aviation activities listed in Annex I to Directive 2003/87/EC of the European Parliament and of the Council (OJ L 149, 12.6.2009, p. 69).

<sup>(2)</sup> Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (OJ L 140, 5.6.2009, p. 114).

preliminary emission factor and the biomass/fossil fraction. As with other calculation factors, requirements should take into account the size of the installation and the greenhouse gas emissions associated with the fuel or material. To this end, minimum requirements should be defined.

- (15) Imposing a disproportionate monitoring effort on installations with lower, less consequential annual emissions should be avoided, while ensuring that an acceptable degree of accuracy is maintained. In that regard, special conditions should be laid down for installations considered to have low emissions and aircraft operators considered to be small emitters.
- (16) Article 27 of Directive 2003/87/EC allows Member States to exclude small installations from the EU ETS, subject to equivalent measures and provided that the conditions in that Article are met. Article 27a of Directive 2003/87/EC allows Member States to exclude installations emitting less than 2 500 tonnes, from the EU ETS provided that the conditions in that Article are met. This Regulation should not apply directly to installations excluded pursuant to Article 27 or 27a of the Directive 2003/87/EC unless the Member State decides otherwise.
- (17) To close potential loopholes connected to the transfer of inherent or pure CO<sub>2</sub>, such transfers should only be allowed subject to very specific conditions. In its judgment of 19 January 2017 in Case C-460/15 <sup>(1)</sup>, the Court of Justice of the European Union found that the second sentence of Article 49(1) of Regulation (EU) No 601/2012 and point 10(B) of Annex IV to that Regulation are invalid in so far as they systematically include the carbon dioxide (CO<sub>2</sub>) transferred to another installation for the production of precipitated calcium carbonate in the emissions of the lime combustion installation, regardless of whether or not that CO<sub>2</sub> is released into the atmosphere. In order to take account of the Court's judgment in Case C-460/15, the CO<sub>2</sub> that is transferred for the production of precipitated calcium carbonate and ends up chemically bound in it should be recognised as not released into the atmosphere. However, those conditions should not exclude the possibility of future innovations. Regulation (EU) No 601/2012 should therefore be amended accordingly.
- (18) Since it is possible that not only CO<sub>2</sub>, but also N<sub>2</sub>O is transferred between installations, monitoring rules should be introduced for the transfer of N<sub>2</sub>O that are similar to those for the transfer of CO<sub>2</sub>. Furthermore, it is appropriate to extend the definition of inherent CO<sub>2</sub> beyond the limits of CO<sub>2</sub> contained in fuels to CO<sub>2</sub> contained in any source stream to be monitored.
- (19) Specific aviation-related provisions on monitoring plans and the monitoring of greenhouse gas emissions should be laid down.
- (20) The estimation of missing data should be made consistent by requiring the use of conservative estimation procedures recognised in the monitoring plan or, where this is not possible, through the approval of an appropriate procedure by the competent authority and its inclusion in the monitoring plan.
- (21) Operators should be required regularly to review their monitoring methodology for improvement and to consider recommendations made by verifiers as part of the verification process. Where they do not use a methodology based on the tier system or fail to meet the highest tier methodologies, operators should report regularly on the steps they are taking to meet a monitoring methodology based on the tier system and to reach the highest tier required. To reduce the administrative burden related to reporting on improvements, intervals and reasons for reporting on improvements should be adjusted taking into account experiences in the administrative practice by Member States.
- (22) Pursuant to Articles 3e(1) and 28a(2) of Directive 2003/87/EC, aircraft operators may apply for an allocation of emission allowances free of charge, in respect of activities listed in Annex I to that Directive, based on verified tonne-kilometre data.
- (23) The use of information technology, including requirements for data-exchange formats and the use of automated systems, should be promoted and the Member States should therefore be allowed to require economic operators to use such systems. The Member States should also be allowed to elaborate their own electronic templates and file-format specifications which should, however, conform to minimum standards published by the Commission.
- (24) Rules for substances containing other forms of carbon leading to CO<sub>2</sub> emissions than carbonate-containing materials should be laid down to provide more clarity on the monitoring and reporting rules for process emissions. The use of urea in flue-gas cleaning should be mentioned explicitly and a corresponding default emission factor should be listed.

<sup>(1)</sup> Judgment of the Court of Justice of 19 January 2017, *Schaefer Kalk GmbH & Co. KG v Bundesrepublik Deutschland*, C-460/15, ECLI:EU:C:2017:29.

- (25) Member States should be given sufficient time to adopt the necessary measures and establish the appropriate national institutional framework to ensure the effective application of this Regulation. This Regulation should therefore apply, including after another revision, before its start of applicability, in order to take further developments into account and to remove references to sources outside Union law where possible, from the beginning of the fourth trading period, except for the amendments to Regulation (EU) No 601/2012 that should apply as soon as possible.
- (26) Regulation (EU) No 601/2012 should be repealed from 1 January 2021. However, its effects should be maintained for the monitoring, reporting and verification of emissions and activity data occurring during the third EU ETS trading period.
- (27) This Regulation includes improvements to monitoring and reporting that take account of the First Edition of the International Standards and Recommended Practices on Environmental Protection - Carbon Offsetting and Reduction Scheme for International Aviation (CORSA) (Annex 16, Volume IV to the Agreement) adopted by the ICAO Council at the tenth meeting of its 214th session on 27 June 2018. The Regulation on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87/EC is also being amended to take account of the First Edition of the International Standards and Recommended Practices, and these two instruments are being complemented by a Delegated Act pursuant to Article 28c of Directive 2003/87/EC. Regulation (EU) No 601/2012 should therefore be amended accordingly.
- (28) The measures provided for in this Regulation are in accordance with the opinion of the Climate Change Committee,

HAS ADOPTED THIS REGULATION:

#### CHAPTER I

#### GENERAL PROVISIONS

#### SECTION 1

#### ***Subject matter and definitions***

#### *Article 1*

#### **Subject matter**

This Regulation lays down rules for the monitoring and reporting of greenhouse gas emissions and activity data pursuant to Directive 2003/87/EC in the trading period of the Union emissions trading system commencing on 1 January 2021 and subsequent trading periods.

#### *Article 2*

#### **Scope**

This Regulation shall apply to the monitoring and reporting of greenhouse gas emissions specified in relation to the activities listed in Annex I to Directive 2003/87/EC and activity data from stationary installations, from aviation activities and to the monitoring and reporting of tonne-kilometre data from aviation activities.

It shall apply to emissions and activity data occurring from 1 January 2021.

#### *Article 3*

#### **Definitions**

For the purposes of this Regulation, the following definitions shall apply:

- (1) 'activity data' means data on the amount of fuels or materials consumed or produced by a process relevant for the calculation-based monitoring methodology, expressed in terajoules, mass in tonnes or (for gases) volume in normal cubic metres, as appropriate;
- (2) 'trading period' means a period as referred to in Article 13 of Directive 2003/87/EC;
- (3) 'tonne-kilometre' means a tonne of payload carried a distance of one kilometre;

- (4) 'source stream' means any of the following:
  - (a) a specific fuel type, raw material or product giving rise to emissions of relevant greenhouse gases at one or more emission sources as a result of its consumption or production;
  - (b) a specific fuel type, raw material or product containing carbon and included in the calculation of greenhouse gas emissions using a mass-balance methodology;
- (5) 'emission source' means a separately identifiable part of an installation or a process within an installation, from which relevant greenhouse gases are emitted or, for aviation activities, an individual aircraft;
- (6) 'uncertainty' means a parameter, associated with the result of the determination of a quantity, that characterises the dispersion of the values that could reasonably be attributed to the particular quantity, including the effects of systematic as well as of random factors, expressed in per cent, and describes a confidence interval around the mean value comprising 95 % of inferred values taking into account any asymmetry of the distribution of values;
- (7) 'calculation factors' means net calorific value, emission factor, preliminary emission factor, oxidation factor, conversion factor, carbon content or biomass fraction;
- (8) 'tier' means a set requirement used for determining activity data, calculation factors, annual emission and annual average hourly emission, and payload;
- (9) 'inherent risk' means the susceptibility of a parameter in the annual emissions report or tonne-kilometre report to misstatements that could be material, individually or when aggregated with other misstatements, before taking into consideration the effect of any related control activities;
- (10) 'control risk' means the susceptibility of a parameter in the annual emissions report or tonne-kilometre report to misstatements that could be material, individually or when aggregated with other misstatements, and not prevented or detected and corrected on a timely basis by the control system;
- (11) 'combustion emissions' means greenhouse gas emissions occurring during the exothermic reaction of a fuel with oxygen;
- (12) 'reporting period' means a calendar year during which emissions have to be monitored and reported or, for tonne-kilometre data, the monitoring year as referred to in Articles 3e and 3f of Directive 2003/87/EC;
- (13) 'emission factor' means the average emission rate of a greenhouse gas relative to the activity data of a source stream assuming complete oxidation for combustion and complete conversion for all other chemical reactions;
- (14) 'oxidation factor' means the ratio of carbon oxidised to CO<sub>2</sub> as a consequence of combustion to the total carbon contained in the fuel, expressed as a fraction, considering carbon monoxide (CO) emitted to the atmosphere as the molar equivalent amount of CO<sub>2</sub>;
- (15) 'conversion factor' means the ratio of carbon emitted as CO<sub>2</sub> to the total carbon contained in the source stream before the emitting process takes place, expressed as a fraction, considering CO emitted to the atmosphere as the molar equivalent amount of CO<sub>2</sub>;
- (16) 'accuracy' means the closeness of the agreement between the result of a measurement and the true value of the particular quantity or a reference value determined empirically using internationally accepted and traceable calibration materials and standard methods, taking into account both random and systematic factors;
- (17) 'calibration' means the set of operations, which establishes, under specified conditions, the relations between values indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material and the corresponding values of a quantity realised by a reference standard;
- (18) 'flight' means flight as defined in point 1(1) of the Annex to Decision 2009/450/EC;
- (19) 'passengers' means the persons onboard the aircraft during a flight excluding its on duty crew members;
- (20) 'conservative' means that a set of assumptions is defined in order to ensure that no under-estimation of annual emissions or over-estimation of tonne-kilometres occurs;
- (21) 'biomass' means the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste; it includes bioliquids and biofuels;
- (22) 'bioliquids' means liquid fuel for energy purposes other than for transport, including electricity and heating and cooling, produced from biomass;

- (23) 'biofuels' means liquid or gaseous fuel for transport produced from biomass;
- (24) 'legal metrological control' means the control of the measurement tasks intended for the field of application of a measuring instrument, for reasons of public interest, public health, public safety, public order, protection of the environment, the levying of taxes and duties, the protection of consumers and fair trading;
- (25) 'maximum permissible error' means the error of measurement allowed as specified in Annex I and instrument-specific annexes to Directive 2014/32/EU of the European Parliament and of the Council <sup>(1)</sup>, or national rules on legal metrological control, as appropriate;
- (26) 'data-flow activities' mean activities related to the acquisition, processing and handling of data that are needed to draft an emissions report from primary source data;
- (27) 'tonnes of CO<sub>2(e)</sub>' means metric tonnes of CO<sub>2</sub> or CO<sub>2(e)</sub>;
- (28) 'CO<sub>2(e)</sub>' means any greenhouse gas, other than CO<sub>2</sub>, listed in Annex II to Directive 2003/87/EC with an equivalent global-warming potential as CO<sub>2</sub>;
- (29) 'measurement system' means a complete set of measuring instruments and other equipment, such as sampling and data-processing equipment, used to determine variables such as the activity data, the carbon content, the calorific value or the emission factor of the greenhouse gas emissions;
- (30) 'net calorific value' (NCV) means the specific amount of energy released as heat when a fuel or material undergoes complete combustion with oxygen under standard conditions, less the heat of vaporisation of any water formed;
- (31) 'process emissions' means greenhouse gas emissions other than combustion emissions occurring as a result of intentional and unintentional reactions between substances or their transformation, including the chemical or electrolytic reduction of metal ores, the thermal decomposition of substances and the formation of substances for use as product or feedstock;
- (32) 'commercial standard fuel' means the internationally standardised commercial fuels that exhibit a 95 % confidence interval of not more than 1 % for their specified calorific value, including gas oil, light fuel oil, gasoline, lamp oil, kerosene, ethane, propane, butane, jet kerosene (jet A1 or jet A), jet gasoline (jet B) and aviation gasoline (AvGas);
- (33) 'batch' means an amount of fuel or material representatively sampled and characterised, and transferred as one shipment or continuously over a specific period of time;
- (34) 'mixed fuel' means a fuel which contains both biomass and fossil carbon;
- (35) 'mixed material' means a material which contains both biomass and fossil carbon;
- (36) 'preliminary emission factor' means the assumed total emission factor of a fuel or material based on the carbon content of its biomass fraction and its fossil fraction before multiplying it by the fossil fraction to produce the emission factor;
- (37) 'fossil fraction' means the ratio of fossil carbon to the total carbon content of a fuel or material, expressed as a fraction;
- (38) 'biomass fraction' means the ratio of carbon stemming from biomass to the total carbon content of a fuel or material, expressed as a fraction;
- (39) 'energy balance method' means a method to estimate the amount of energy used as fuel in a boiler, calculated as the sum of utilisable heat and all relevant losses of energy by radiation, transmission and via the flue gas;
- (40) 'continuous emission measurement' means a set of operations having the objective of determining the value of a quantity by means of periodic measurements, applying either measurements in the stack or extractive procedures with a measuring instrument located close to the stack, whilst excluding measurement methodologies based on the collection of individual samples from the stack;
- (41) 'inherent CO<sub>2</sub>' means CO<sub>2</sub> which is part of a source stream;
- (42) 'fossil carbon' means inorganic and organic carbon that is not biomass;

<sup>(1)</sup> Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments (OJ L 96, 29.3.2014, p. 149).

- (43) 'measurement point' means the emission source for which continuous emission measurement systems (CEMS) are used for emission measurement, or the cross-section of a pipeline system for which the CO<sub>2</sub> flow is determined using continuous measurement systems;
- (44) 'mass and balance documentation' means the documentation specified in international or national implementation of the standards and recommended practices (SARPs) laid down in Annex 6 to the Convention on International Civil Aviation, signed in Chicago on 7 December 1944 and specified in Section 3 of Subpart C of Annex IV to Commission Regulation (EU) No 965/2012<sup>(1)</sup>, or equivalent applicable international rules;
- (45) 'distance' means the great-circle distance between the aerodrome of departure and the aerodrome of arrival, in addition to a fixed factor of 95 km;
- (46) 'aerodrome of departure' means the aerodrome at which a flight constituting an aviation activity listed in Annex I to Directive 2003/87/EC begins;
- (47) 'aerodrome of arrival' means the aerodrome at which a flight constituting an aviation activity listed in Annex I to Directive 2003/87/EC ends;
- (48) 'payload' means the total mass of freight, mail, passengers and baggage carried onboard an aircraft during a flight;
- (49) 'fugitive emissions' means irregular or unintended emissions from sources that are not localised, or too diverse or too small to be monitored individually;
- (50) 'aerodrome' means aerodrome as defined in point 1(2) of the Annex to Decision 2009/450/EC;
- (51) 'aerodrome pair' means a pair constituted by the aerodrome of departure and the aerodrome of arrival;
- (52) 'standard conditions' means temperature of 273,15 K and pressure conditions of 101 325 Pa defining normal cubic metres (Nm<sup>3</sup>);
- (53) 'storage site' means storage site as defined in Article 3(3) of Directive 2009/31/EC;
- (54) 'CO<sub>2</sub> capture' means the activity of capturing from gas streams CO<sub>2</sub> that would otherwise be emitted, for the purposes of transport and geological storage in a storage site permitted under Directive 2009/31/EC;
- (55) 'CO<sub>2</sub> transport' means the transport of CO<sub>2</sub> by pipelines for geological storage in a storage site permitted under Directive 2009/31/EC;
- (56) 'geological storage of CO<sub>2</sub>' means geological storage of CO<sub>2</sub> as defined in Article 3(1) of Directive 2009/31/EC;
- (57) 'vented emissions' means emissions deliberately released from an installation by provision of a defined point of emission;
- (58) 'enhanced hydrocarbon recovery' means the recovery of hydrocarbons in addition to those extracted by water injection or other means;
- (59) 'proxy data' means annual values which are empirically substantiated or derived from accepted sources and which an operator uses to substitute the activity data or the calculation factors for the purpose of ensuring complete reporting when it is not possible to generate all the required activity data or calculation factors in the applicable monitoring methodology;
- (60) 'water column' means water column as defined in Article 3(2) of Directive 2009/31/EC;
- (61) 'leakage' means leakage as defined in Article 3(5) of Directive 2009/31/EC;
- (62) 'storage complex' means storage complex as defined in Article 3(6) of Directive 2009/31/EC;
- (63) 'transport network' means transport network as defined in Article 3(22) of Directive 2009/31/EC.

<sup>(1)</sup> Commission Regulation (EU) No 965/2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1).

## SECTION 2

**General principles***Article 4***General obligation**

Operators and aircraft operators shall carry out their obligations related to the monitoring and reporting of greenhouse gas emissions under Directive 2003/87/EC in accordance with the principles laid down in Articles 5 to 9.

*Article 5***Completeness**

Monitoring and reporting shall be complete and cover all process and combustion emissions from all emission sources and source streams belonging to activities listed in Annex I to Directive 2003/87/EC and other relevant activities included pursuant to Article 24 of that Directive, and of all greenhouse gases specified in relation to those activities, while avoiding double-counting.

Operators and aircraft operators shall take appropriate measures to prevent any data gaps within the reporting period.

*Article 6***Consistency, comparability and transparency**

1. Monitoring and reporting shall be consistent and comparable over time. To that end, operators and aircraft operators shall use the same monitoring methodologies and data sets, subject to changes and derogations approved by the competent authority.
2. Operators and aircraft operators shall obtain, record, compile, analyse and document monitoring data, including assumptions, references, activity data and calculation factors, in a transparent manner that enables the reproduction of the determination of emissions by the verifier and the competent authority.

*Article 7***Accuracy**

Operators and aircraft operators shall ensure that emission determination is neither systematically nor knowingly inaccurate.

They shall identify and reduce any source of inaccuracies as far as possible.

They shall exercise due diligence to ensure that the calculation and measurement of emissions exhibit the highest achievable accuracy.

*Article 8***Integrity of the methodology and of the emissions report**

Operators and aircraft operators shall enable reasonable assurance of the integrity of emission data to be reported. They shall determine emissions using the appropriate monitoring methodologies set out in this Regulation.

Reported emission data and related disclosures shall be free from material misstatement as defined in Article 3(6) of Commission Implementing Regulation (EU) 2018/2067 <sup>(1)</sup>, avoid bias in the selection and presentation of information, and provide a credible and balanced account of an installation's or aircraft operator's emissions.

In selecting a monitoring methodology, the improvements from greater accuracy shall be balanced against additional costs. Monitoring and reporting of emissions shall aim for the highest achievable accuracy, unless this is technically not feasible or incurs unreasonable costs.

<sup>(1)</sup> Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council (see page 94 of this Official Journal).

*Article 9***Continuous improvement**

Operators and aircraft operators shall take account of the recommendations included in the verification reports issued pursuant to Article 15 of Directive 2003/87/EC in their consequent monitoring and reporting.

*Article 10***Coordination**

Where a Member State designates more than one competent authority pursuant to Article 18 of Directive 2003/87/EC, it shall coordinate the work carried out by those authorities pursuant to this Regulation.

## CHAPTER II

**MONITORING PLAN**

## SECTION 1

**General rules***Article 11***General obligation**

1. Each operator or aircraft operator shall monitor greenhouse gas emissions on the basis of a monitoring plan approved by the competent authority in accordance with Article 12, taking into account the nature and functioning of the installation or aviation activity to which it applies.

The monitoring plan shall be supplemented by written procedures which the operator or aircraft operator establishes, documents, implements and maintains for activities under the monitoring plan, as appropriate.

2. The monitoring plan referred to in paragraph 1 shall describe the instructions to the operator or aircraft operator in a logical and simple manner, avoiding duplication of effort and taking into account existing systems in place at the installation or used by the operator or aircraft operator.

*Article 12***Content and submission of the monitoring plan**

1. Each operator or aircraft operator shall submit a monitoring plan to the competent authority for approval.

The monitoring plan shall consist of a detailed, complete and transparent documentation of the monitoring methodology of a specific installation or aircraft operator and shall contain at least the elements laid down in Annex I.

Together with the monitoring plan, the operator or aircraft operator shall submit the following supporting documents:

- (a) for installations, evidence for each major and minor source stream demonstrating compliance with the uncertainty thresholds for activity data and calculation factors, where applicable, for the applied tiers as defined in Annexes II and IV, and for each emission source demonstrating compliance with the uncertainty thresholds for the applied tiers as defined in Annex VIII, where applicable;
- (b) the results of a risk assessment providing evidence that the proposed control activities and procedures for control activities are commensurate with the inherent risks and control risks identified.

2. Where Annex I refers to a procedure, an operator or aircraft operator shall establish, document, implement and maintain such a procedure separately from the monitoring plan.

The operator or aircraft operator shall summarise the procedures in the monitoring plan providing the following information:

- (a) the title of the procedure;
- (b) a traceable and verifiable reference for identification of the procedure;
- (c) identification of the post or department responsible for implementing the procedure and for the data generated from or managed by the procedure;

- (d) a brief description of the procedure, allowing the operator or aircraft operator, the competent authority and the verifier to understand the essential parameters and operations performed;
- (e) the location of relevant records and information;
- (f) the name of the computerised system used, where applicable;
- (g) a list of EN standards or other standards applied, where relevant.

The operator or aircraft operator shall make any written documentation of the procedures available to the competent authority upon request. The operator or aircraft operator shall also make them available for the purposes of verification pursuant to Implementing Regulation (EU) 2018/2067.

3. In addition to the elements referred to in paragraphs 1 and 2 of this Article, Member States may require the inclusion of further elements in the monitoring plan of installations to meet the requirements of delegated acts adopted pursuant to Article 10a(1) of Directive 2003/87/EC and implementing acts adopted in accordance with Article 10a(21) of that Directive.

#### Article 13

##### Standardised and simplified monitoring plans

1. Member States may allow operators and aircraft operators to use standardised or simplified monitoring plans, without prejudice to Article 12(3).

For that purpose, Member States may publish templates for those monitoring plans, including the description of data flow and control procedures referred to in Articles 58 and 59, based on the templates and guidelines published by the Commission.

2. Before the approval of any simplified monitoring plan, as referred to in paragraph 1, the competent authority shall carry out a simplified risk assessment as to whether the proposed control activities and procedures for control activities are commensurate with the inherent risks and control risks identified, and justify the use of such a simplified monitoring plan.

Member States may require the operator or aircraft operator to carry out the risk assessment pursuant to the previous subparagraph itself, where appropriate.

#### Article 14

##### Modifications of the monitoring plan

1. Each operator or aircraft operator shall regularly check whether the monitoring plan reflects the nature and functioning of the installation or aviation activity in accordance with Article 7 of Directive 2003/87/EC, and whether the monitoring methodology can be improved.

2. The operator or aircraft operator shall modify the monitoring plan, at least, in any of the following situations:

- (a) new emissions occur due to new activities being carried out or due to the use of new fuels or materials not yet contained in the monitoring plan;
- (b) a change in the availability of data, due to the use of new types of measuring instrument, sampling methods or analysis methods, or for other reasons, leads to higher accuracy in the determination of emissions;
- (c) data resulting from the monitoring methodology applied previously has been found to be incorrect;
- (d) changing the monitoring plan improves the accuracy of the reported data, unless this is technically not feasible or incurs unreasonable costs;
- (e) the monitoring plan is not in conformity with the requirements of this Regulation and the competent authority requests the operator or aircraft operator to modify it;
- (f) it is necessary to respond to the suggestions for improvement of the monitoring plan contained in a verification report.

#### Article 15

##### Approval of modifications of the monitoring plan

1. The operator or aircraft operator shall notify the competent authority of any proposals for modification of the monitoring plan without undue delay.

However, the competent authority may allow the operator or aircraft operator to notify modifications of the monitoring plan that are not significant within the meaning of paragraphs 3 and 4 by 31 December of the same year.

2. Any significant modification of the monitoring plan within the meaning of paragraphs 3 and 4 shall be subject to approval by the competent authority.

Where the competent authority considers a modification not to be significant, it shall inform the operator or aircraft operator thereof without undue delay.

3. Significant modifications to the monitoring plan of an installation include:

- (a) changes to the category of the installation where such changes require a change to the monitoring methodology or lead to a change of the applicable materiality level pursuant to Article 23 of Implementing Regulation (EU) 2018/2067;
- (b) notwithstanding Article 47(8), changes regarding whether the installation is considered an 'installation with low emissions';
- (c) changes to emission sources;
- (d) a change from calculation-based to measurement-based methodologies, or *vice versa*, or from a fall-back methodology to a tier-based methodology for determining emissions or *vice versa*;
- (e) a change in the tier applied;
- (f) the introduction of new source streams;
- (g) a change in the categorisation of source streams – between major, minor or *de-minimis* source streams where such a change requires a change to the monitoring methodology;
- (h) a change to the default value for a calculation factor, where the value is to be laid down in the monitoring plan;
- (i) the introduction of new methods or changes to existing methods related to sampling, analysis or calibration, where this has a direct impact on the accuracy of emissions data;
- (j) the implementation or adaption of a quantification methodology for emissions from leakage at storage sites.

4. Significant changes to the monitoring plans of an aircraft operator include:

- (a) with regard to the emission monitoring plan:
  - (i) a change of emission factor values laid down in the monitoring plan;
  - (ii) a change between calculation methods as laid down in Annex III, or a change from the use of a calculation method to the use of estimation methodology in accordance with Article 55(2) or *vice versa*;
  - (iii) the introduction of new source streams;
  - (iv) changes in the status of the aircraft operator as a small emitter within the meaning of Article 55(1) or with regard to one of the thresholds provided by Article 28a(6) of Directive 2003/87/EC;
- (b) with regard to the tonne-kilometre data monitoring plan:
  - (i) a change between a non-commercial and commercial status of the air transport service provided;
  - (ii) a change in the object of the air transport service, the object being passengers, freight or mail.

#### Article 16

#### **Implementation and record-keeping of modifications**

1. Before receiving approval or information in accordance with Article 15(2), the operator or aircraft operator may carry out monitoring and reporting using the modified monitoring plan where it can reasonably assume that the proposed modifications are not significant, or where monitoring in accordance with the original monitoring plan would lead to incomplete emission data.

In cases of doubt, the operator or aircraft operator shall carry out all monitoring and reporting, and in the interim documentation, in parallel, using both the modified and the original monitoring plan.

2. Upon receipt of approval or information in accordance with Article 15(2), the operator or aircraft operator shall only use the data relating to the modified monitoring plan and carry out all monitoring and reporting using only the modified monitoring plan from the date from which that version of the monitoring plan is applicable.

3. The operator or aircraft operator shall keep records of all modifications of the monitoring plan. Each record shall contain:
- a transparent description of the modification;
  - a justification for the modification;
  - the date of notification of the modification to the competent authority pursuant to Article 15(1);
  - the date on which the competent authority acknowledged receipt of the notification referred to in Article 15(1), where available, and the date of the approval or information referred to in Article 15(2);
  - the starting date of implementation of the modified monitoring plan in accordance with paragraph 2 of this Article.

## SECTION 2

### **Technical feasibility and unreasonable costs**

#### *Article 17*

#### **Technical feasibility**

Where an operator or aircraft operator claims that applying a specific monitoring methodology is technically not feasible, the competent authority shall assess the technical feasibility taking the operator's or aircraft operator's justification into account. That justification shall be based on the operator or aircraft operator having technical resources capable of meeting the needs of a proposed system or requirement that can be implemented in the required time for the purposes of this Regulation. Those technical resources shall include the availability of the requisite techniques and technology.

#### *Article 18*

#### **Unreasonable costs**

1. Where an operator or aircraft operator claims that applying a specific monitoring methodology would incur unreasonable costs, the competent authority shall assess whether the costs are unreasonable, taking into account the operator's justification.

The competent authority shall consider costs unreasonable where the cost estimate exceeds the benefit. To that end, the benefit shall be calculated by multiplying an improvement factor by a reference price of EUR 20 per allowance and costs shall include an appropriate depreciation period based on the economic lifetime of the equipment.

2. When assessing the unreasonable nature of the costs with regard to the operator's choice of tier levels for activity data, the competent authority shall use as the improvement factor referred to in paragraph 1 the difference between the uncertainty currently achieved and the uncertainty threshold of the tier that would be achieved by the improvement multiplied by the average annual emissions caused by that source stream over the three most recent years.

In the absence of such data on the average annual emissions caused by that source stream over the three most recent years, the operator or aircraft operator shall provide a conservative estimate of the annual average emissions, with the exclusion of CO<sub>2</sub> stemming from biomass and before subtraction of transferred CO<sub>2</sub>. For measuring instruments under national legal metrological control, the uncertainty currently achieved may be substituted by the maximum permissible error in service allowed by the relevant national legislation.

3. When assessing the unreasonable nature of the costs with regard to measures increasing the quality of reported emissions but without direct impact on the accuracy of activity data, the competent authority shall use an improvement factor of 1 % of the average annual emissions of the respective source streams in the three most recent reporting periods. Those measures may include:

- switching from default values to analyses to determine calculation factors;
- an increase of the number of analyses per source stream;
- where the specific measuring task does not fall under national legal metrological control, the substitution of measuring instruments with instruments complying with relevant requirements of legal metrological control of the Member State in similar applications, or to measuring instruments meeting national rules adopted pursuant to Directive 2014/31/EU of the European Parliament and of the Council <sup>(1)</sup> or Directive 2014/32/EU;

<sup>(1)</sup> Directive 2014/31/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of non-automatic weighing instruments (OJ L 96, 29.3.2014, p. 107).

- (d) shortening calibration and maintenance intervals of measuring instruments;
  - (e) improvements to data-flow activities and control activities that significantly reduce the inherent or control risk.
4. Measures relating to the improvement of an installation's monitoring methodology shall not be deemed to incur unreasonable costs up to an accumulated amount of EUR 2 000 per reporting period. For installations with low emissions that threshold shall be EUR 500 per reporting period.

### CHAPTER III

## MONITORING OF EMISSIONS FROM STATIONARY INSTALLATIONS

### SECTION 1

#### General provisions

#### Article 19

#### Categorisation of installations, source streams and emission sources

1. For the purpose of monitoring emissions and determining the minimum requirements for tiers, each operator shall determine the category of its installation pursuant to paragraph 2, and, where relevant, of each source stream pursuant to paragraph 3 and of each emission source pursuant to paragraph 4.
2. The operator shall classify each installation in one of the following categories:
  - (a) a category A installation, where the average verified annual emissions in the trading period immediately preceding the current trading period, with the exclusion of CO<sub>2</sub> stemming from biomass and before subtraction of transferred CO<sub>2</sub>, are equal to or less than 50 000 tonnes of CO<sub>2(e)</sub>;
  - (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 CO<sub>2</sub> stemming from biomass and before subtraction of transferred CO<sub>2</sub>, are more than 50 000 tonnes of CO<sub>2(e)</sub> and equal to or less than 500 000 tonnes of CO<sub>2(e)</sub>;
  - (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 CO<sub>2</sub> stemming from biomass and before subtraction of transferred CO<sub>2</sub>, are more than 500 000 tonnes of CO<sub>2(e)</sub>.

By way of derogation from Article 14(2), the competent authority may allow the operator not to modify the monitoring plan where, on the basis of verified emissions, the threshold for the classification of the installation referred to in the first subparagraph is exceeded, but the operator demonstrates to the satisfaction of the competent authority that this threshold has not already been exceeded within the past five reporting periods and will not be exceeded again in subsequent reporting periods.

3. The operator shall classify each source stream in one of the following categories, comparing it against the sum of all absolute values of fossil CO<sub>2</sub> and CO<sub>2(e)</sub> 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 CO<sub>2</sub>:
  - (a) minor source streams, where the source streams selected by the operator jointly account for less than 5 000 tonnes of fossil CO<sub>2</sub> per year or less than 10 %, up to a total maximum of 100 000 tonnes of fossil CO<sub>2</sub> per year, whichever is greater in terms of absolute value;
  - (b) *de minimis* source streams, where the source streams selected by the operator jointly account for less than 1 000 tonnes of fossil CO<sub>2</sub> per year or less than 2 %, up to a total maximum of 20 000 tonnes of fossil CO<sub>2</sub> per year, whichever is greater in terms of absolute value;
  - (c) major source streams, where the source streams do not fall within the categories referred to in points (a) and (b).

By way of derogation from Article 14(2), the competent authority may allow the operator not to modify the monitoring plan where, on the basis of verified emissions, the threshold for the classification of a source stream as a minor source stream or a *de minimis* source stream referred to in the first subparagraph is exceeded, but the operator demonstrates to the satisfaction of the competent authority that this threshold has not already been exceeded within the past five reporting periods and will not be exceeded again in subsequent reporting periods.

4. The operator shall classify each emission source for which a measurement-based methodology is applied in one of the following categories:
  - (a) minor emission sources, where the emission source emits less than 5 000 tonnes of fossil CO<sub>2(e)</sub> per year or less than 10 % of the installation's total fossil emissions, up to a maximum of 100 000 tonnes of fossil CO<sub>2(e)</sub> per year, whichever is greater in terms of absolute value;
  - (b) major emission sources, where the emission source does not classify as a minor emission source.

By way of derogation from Article 14(2), the competent authority may allow the operator not to modify the monitoring plan where, on the basis of verified emissions, the threshold for the classification of an emission source as a minor emission source referred to in the first subparagraph is exceeded, but the operator demonstrates to the satisfaction of the competent authority that this threshold has not already been exceeded within the past five reporting periods and will not be exceeded again in subsequent reporting periods.

5. Where the average annual verified emissions in the trading period immediately preceding the current trading period for the installation are not available or no longer representative for the purpose of paragraph 2, the operator shall use a conservative estimate of annual average emissions, with the exclusion of CO<sub>2</sub> stemming from biomass and before subtraction of transferred CO<sub>2</sub>, to determine the category of the installation.

#### Article 20

### Monitoring boundaries

1. Operators 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, and from activities and greenhouse gases included by the Member State in which the installation is situated, pursuant to Article 24 of that Directive.

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

2. When determining 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 within the meaning of Directive 2009/31/EC are identified and lead to emissions or release of CO<sub>2</sub> to the water column, they shall be considered as emission sources for the installation in question 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 on the basis of activity data obtained by means of measurement systems and additional parameters from laboratory analyses or default values. The calculation-based methodology may be implemented according to 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 CO<sub>2</sub> transfers between installations where the CO<sub>2</sub> concentration and the flow of the transferred gas are measured.

Where the calculation-based methodology is applied, the operator shall determine for each source stream, 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. Subject to approval by the competent authority, the operator may combine 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 sector-specific requirements laid down in Annex IV require the use of a specific monitoring methodology, the operator shall use that methodology or a measurement-based methodology. The operator may choose a different methodology only if it provides the competent authority with evidence that the use of the required methodology is technically not feasible or incurs unreasonable costs, or that the alternative 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 monitoring plan as approved by the competent authority, the operator concerned shall apply the highest achievable tier, or a conservative no-tier approach if application of a tier is not achievable, until the conditions for application of the tier approved in the monitoring plan have been restored.

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

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

- (a) the reasons for deviating from the monitoring plan as approved by the competent authority;
- (b) the details of the interim monitoring methodology that the operator is using to determine the emissions until the conditions for the application of the monitoring plan as approved by the competent authority have been restored;
- (c) the measures the operator is taking to restore the conditions for the application of the monitoring plan as approved by the competent authority;
- (d) the anticipated point in time when application of the monitoring plan 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 source stream by multiplying the activity data related to the amount of fuel combusted, expressed as terajoules based on net calorific value (NCV), by the corresponding emission factor, expressed as tonnes of CO<sub>2</sub> per terajoule (t CO<sub>2</sub>/TJ) consistent with the use of NCV, and the corresponding oxidation factor.

The competent authority may allow the use of emission factors for fuels expressed as t CO<sub>2</sub>/t or t CO<sub>2</sub>/Nm<sup>3</sup>. In such cases, 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, by 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, by the corresponding emission factor, expressed in t CO<sub>2</sub>/t or t CO<sub>2</sub>/Nm<sup>3</sup>, 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.

#### Article 25

### Calculation of emissions under the mass balance methodology

1. Under the mass balance methodology, the operator shall calculate the quantity of CO<sub>2</sub> corresponding to each source stream included in the mass balance by multiplying the activity data related to the amount of fuel or material entering or leaving the boundaries of the mass balance, with the fuel's or material's carbon content multiplied by 3,664 t CO<sub>2</sub>/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 CO<sub>2</sub> 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 CO<sub>2</sub>.

#### Article 26

### Applicable tiers

1. When defining the relevant tiers for major and minor source streams 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 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, for major source streams 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 agreed with the operator, allow an operator to apply tiers for major source streams that are lower than those referred to in the second subparagraph, with a minimum of tier 1, provided that:

- (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; and
- (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 minor source streams, the operator may apply a lower tier than required in accordance with the first subparagraph of paragraph 1, 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 of paragraph 1 is technically not feasible or incurs unreasonable costs.

3. For *de minimis* source streams, the operator may determine activity data and each calculation factor by using conservative estimates 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 CO<sub>2</sub>/t or t CO<sub>2</sub>/Nm<sup>3</sup> 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 a conservative estimate instead of using tiers, unless a defined tier is achievable without additional effort.

#### 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) on the basis of continual metering at the process which causes the emissions;
- (b) on the basis of aggregation of metering of quantities delivered separately, 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 received during the reporting period, minus the quantity of fuel or material moved out of 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 on the basis of one of the following:

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

Where it is technically not feasible or would incur unreasonable costs to determine activity data for the entire calendar year, the operator may choose the next most appropriate day to separate one reporting year from the subsequent year, 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.

#### Article 28

### Measurement systems under the operator's control

1. To determine 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 a year and after each calibration of a measuring instrument that the calibration results multiplied by a conservative adjustment factor are compared with the relevant uncertainty thresholds. The conservative adjustment factor shall be 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.

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

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

The assessment shall cover 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. The uncertainty assessment shall cover uncertainty related to stock changes 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, are 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.

#### 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, as compared with 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.

The operator shall be required to determine the biomass fraction only for mixed fuels or materials. For other fuels or materials the default value of 0 % for the biomass fraction of fossil fuels or materials shall be used, and a default value of 100 % biomass fraction for biomass fuels or materials consisting exclusively of biomass.

*Article 31***Default values for calculation factors**

1. Where the operator determines calculation factors as default values, it shall use one of the following values, in accordance with the requirement of the applicable tier as set out in Annexes II and VI:
  - (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 representative of more disaggregated sources of fuel streams;
  - (d) values specified and guaranteed by the supplier of a fuel or 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 fuel or 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 approve a change of default values for a calculation factor in the monitoring plan pursuant to Article 15(2) only 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.
5. Upon application by the operator, the competent authority may accept that the stoichiometric carbon content of a pure chemical substance be considered as meeting a tier that would otherwise require analyses carried out in accordance with Articles 32 to 35, if the operator can demonstrate to the satisfaction of the competent authority that using analyses would lead to unreasonable costs and that using the stoichiometric value will not lead to underestimation of the emissions.

*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 to determine emissions, the operator shall obtain the competent authority's approval 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 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.

When determining a specific parameter, the operator shall use the results of all analyses made with regard 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 Implementing Regulation (EU) 2018/2067.

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 be used for the determination of calculation factors only 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 requirements equivalent to EN ISO/IEC 17025 within the meaning of paragraph 2 where the operator provides, to the extent feasible, in the form 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 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.
2. The competent authority may allow the operator to use a frequency that differs from 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.

Where an installation operates for part of the year only, or where fuels or materials are delivered in batches that are consumed over more than one calendar year, the competent authority may agree with the operator a more appropriate schedule for analyses, provided that it results in a comparable uncertainty as under point (a) of the first subparagraph.

#### Subsection 4

### Specific calculation factors

#### Article 36

### Emission factors for CO<sub>2</sub>

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

The competent authority may allow the operator to use an emission factor for a fuel expressed as t CO<sub>2</sub>/t or t CO<sub>2</sub>/Nm<sup>3</sup> for combustion emissions, where the use of an emission factor expressed as t CO<sub>2</sub>/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 CO<sub>2</sub> related emission factor or *vice versa*, the operator shall use the factor 3,664 t CO<sub>2</sub>/t C.

#### Article 37

### Oxidation and conversion factors

1. The operator shall use tier 1 as a minimum 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 under-estimation of emissions.

## Subsection 5

**Treatment of biomass**

## Article 38

**Biomass source streams**

1. The operator may determine the activity data of a biomass source stream 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 each 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.

## Article 39

**Determination of biomass and fossil fraction**

1. For mixed fuels or materials, the operator may either assume the absence of biomass and apply a default fossil fraction of 100 %, or determine a biomass fraction in accordance with paragraph 2, applying tiers as defined in section 2.4 of Annex II.
2. Where, subject to the tier level required, the operator has to carry out analyses to determine the biomass fraction, it shall do so on the basis of a relevant standard and the analytical methods therein, provided that the use of that standard and analytical method are approved by the competent authority.

Where, subject to the tier level required, the operator has to carry out analyses to determine the biomass fraction, but the application of the first subparagraph is technically not feasible or would incur unreasonable costs, the operator shall submit an alternative 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 the estimation on a mass balance of fossil and biomass carbon entering and leaving the process.

The Commission may provide guidelines on further applicable estimation methods.

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 biogas injected into and subsequently removed from a gas network, the operator shall not use analyses to determine 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 (N<sub>2</sub>O) as laid down in Annex IV, and to quantify CO<sub>2</sub> transferred pursuant to Article 49.

In addition, the operator may use measurement-based methodologies for CO<sub>2</sub> 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 major emission source, the operator shall apply the following:
  - (a) in the case of a category A installation, at least the tiers listed in section 2 of Annex VIII;
  - (b) in other cases, the highest tier listed in section 1 of Annex VIII.

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.

2. For emissions from minor emission sources, the operator may apply a lower tier than required in accordance with the first subparagraph of paragraph 1, 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 of paragraph 1 is technically not feasible or incurs unreasonable costs.

*Article 42***Measurement standards and laboratories**

1. All measurements shall be carried out applying methods based on:
  - (a) EN 14181 (Stationary source emissions — Quality assurance of automated measuring systems);
  - (b) EN 15259 (Air quality — Measurement of stationary source emissions — Requirements for measurement sections and sites and for the measurement objective, plan and report);
  - (c) other relevant EN standards, in particular EN ISO 16911-2 (Stationary source emissions — Manual and automatic determination of velocity and volume flow rate in ducts).

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.

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 CEMS are 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 CO<sub>2</sub> emissions, the operator shall determine annual emissions on the basis of equation 1 in Annex VIII. CO emitted to the atmosphere shall be treated as the molar equivalent amount of CO<sub>2</sub>.

In the case of nitrous oxide (N<sub>2</sub>O), 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 gas in question 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 high concentration in the flue gas, calculation of the concentration using an indirect concentration measurement applying equation 3 in 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 CO<sub>2</sub> amount stemming from biomass and subtract it from the total measured CO<sub>2</sub> emissions. For this purpose the operator may use:

- (a) a calculation based approach, including approaches using analyses and sampling based on EN ISO 13833 (Stationary source emissions — Determination of the ratio of biomass (biogenic) and fossil-derived carbon dioxide — Radiocarbon sampling and determination);
- (b) another method based on a relevant standard, including ISO 18466 (Stationary source emissions — Determination of the biogenic fraction in CO<sub>2</sub> in stack gas using the balance method);
- (c) an estimation method published by the Commission.

Where the method proposed by the operator involves continuous sampling from the flue gas stream, EN 15259 (Air quality — Measurement of stationary source emissions — Requirements for measurement sections and sites and for the measurement objective, plan and report) shall be applied.

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 CO<sub>2</sub> emissions at least input material loads, input airflow and process efficiency, and on the output side, including at least the product output and the concentration of oxygen (O<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>);
- (b) determination by continuous flow measurement at a representative point.

#### 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, the operator 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 fewer 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 a CEMS 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 CEMS in question.

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 substituting 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 a 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.

#### Article 46

### Corroborating with calculation of emissions

The operator shall corroborate emissions determined by a measurement-based methodology, with the exception of N<sub>2</sub>O emissions from nitric acid production and greenhouse gases transferred to a transport network or a storage site, by calculating the annual emissions of each greenhouse gas in question 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 N<sub>2</sub>O 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 emissions reports during the trading period immediately preceding the current trading period, with the exclusion of CO<sub>2</sub> stemming from biomass and before subtraction of transferred CO<sub>2</sub>, were less than 25 000 tonnes of CO<sub>2(e)</sub> per year;
- (b) the average annual emissions referred to in point (a) are not available or are no longer applicable because of changes to 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 CO<sub>2</sub> stemming from biomass and before subtraction of transferred CO<sub>2</sub>, will be, based on a conservative estimation method, less than 25 000 tonnes of CO<sub>2(e)</sub> 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 submitting an improvement report as referred to in Article 69(4) in response to recommendations for improvement reported by the verifier in the verification report.

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.

5. The operator of an installation with low emissions shall be exempt from the requirement in Article 28(2) to include uncertainty related to stock changes in an uncertainty assessment.

6. By way of derogation from Articles 26(1) and 41(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 and for determining emissions by measurement-based methodologies, 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 CO<sub>2</sub>**

1. Inherent CO<sub>2</sub> that is transferred into an installation, including that contained in natural gas, a waste gas (including blast furnace or coke oven gas) or in process inputs (including synthesis gas), shall be included in the emission factor for that source stream.

2. Where inherent CO<sub>2</sub> 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 source stream 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> shall be identical.

Where the quantities of transferred and received inherent CO<sub>2</sub> are not identical, the arithmetical average of both determined values shall be used in both the transferring and receiving installations' emissions reports, where the deviation between the values can be explained by the uncertainty of the measurement systems or the determination method. In such cases, the emissions 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 or the determination method, the operators of the transferring and receiving installations shall align the values by applying conservative adjustments approved by the competent authority.

#### Article 49

##### **Transferred CO<sub>2</sub>**

1. The operator shall subtract from the emissions of the installation any amount of CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> transferred.

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

4. For determining the quantity of CO<sub>2</sub> 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.

For determining the quantity of CO<sub>2</sub> chemically bound in precipitated calcium carbonate, the operator shall use data sources representing highest achievable accuracy.

5. The operators may determine quantities of CO<sub>2</sub> transferred out of the installation both at the transferring and at the receiving installation. In such cases, Article 48(3) shall apply.

#### Article 50

### Use or transfer of N<sub>2</sub>O

1. Where N<sub>2</sub>O originates from activities covered by Annex I to Directive 2003/87/EC for which that Annex specifies N<sub>2</sub>O as relevant and an installation does not emit the N<sub>2</sub>O but transfers it to another installation that monitors and reports emissions in accordance with this Regulation, it shall not be counted as emissions of the installation where it originates.

An installation that receives N<sub>2</sub>O from an installation and activity in accordance with the first subparagraph shall monitor the relevant gas streams using the same methodologies, as required by this Regulation, as if the N<sub>2</sub>O were generated within the receiving installation itself.

However, where N<sub>2</sub>O is bottled or used as a gas in products so that it is emitted outside the installation, or where it is transferred out of the installation to entities not covered by Directive 2003/87/EC, it shall be counted as emissions of the installation where it originates, except for quantities of N<sub>2</sub>O in respect of which the operator of the installation where the N<sub>2</sub>O originates can demonstrate to the competent authority that the N<sub>2</sub>O is destroyed using suitable emissions abatement equipment.

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 relevant.

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

3. To determine the quantity of N<sub>2</sub>O 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 N<sub>2</sub>O transferred.

4. To determine the quantity of N<sub>2</sub>O transferred from one installation to another, the operator shall apply the highest tier as defined in section 1 of Annex VIII for emissions of N<sub>2</sub>O.

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.

5. The operators may determine quantities of N<sub>2</sub>O transferred out of the installation both at the transferring and at the receiving installation. In such cases, Article 48(3) shall apply *mutatis mutandis*.

#### CHAPTER IV

### MONITORING OF EMISSIONS AND TONNE-KILOMETRE DATA FROM AVIATION

#### Article 51

### General provisions

1. Each aircraft operator shall monitor and report emissions from aviation activities for all flights included in Annex I to Directive 2003/87/EC that are performed by that aircraft operator during the reporting period and for which the aircraft operator is responsible.

To that end, the aircraft operator shall attribute all flights to the calendar year according to the time of departure measured in Coordinated Universal Time.

2. The aircraft operator intending to apply for an allocation of allowances free of charge pursuant to Articles 3e or 3f of Directive 2003/87/EC shall also monitor tonne-kilometre data for the same flights during the respective monitoring years.

3. For the purpose of identifying the unique aircraft operator referred to in point (o) of Article 3 of Directive 2003/87/EC that is responsible for a flight, the call sign used for air traffic control purposes, shall be used. The call sign shall be one of the following:

- (a) the ICAO designator laid down in box 7 of the flight plan;
- (b) where the ICAO designator of the aircraft operator is not available, the registration markings of the aircraft.

4. Where the identity of the aircraft operator is not known, the competent authority shall consider the owner of the aircraft as aircraft operator unless it proves the identity the aircraft operator responsible.

#### Article 52

##### **Submission of monitoring plans**

1. At the latest four months before an aircraft operator commences aviation activities covered by Annex I to Directive 2003/87/EC, it shall submit to the competent authority a monitoring plan for the monitoring and reporting of emissions in accordance with Article 12.

By way of derogation from the first subparagraph, an aircraft operator that performs an aviation activity covered by Annex I to Directive 2003/87/EC for the first time that could not be foreseen four months in advance of the activity shall submit a monitoring plan to the competent authority without undue delay, but no later than six weeks after performance of that activity. The aircraft operator shall provide adequate justification to the competent authority why a monitoring plan could not be submitted four months in advance of the activity.

Where the administering Member State referred to in Article 18a of Directive 2003/87/EC is not known in advance, the aircraft operator shall without undue delay submit the monitoring plan when information on the competent authority of the administering Member State becomes available.

2. Where the aircraft operator is intending to apply for an allocation of allowances free of charge pursuant to Article 3e or 3f of Directive 2003/87/EC, it shall also submit a monitoring plan for the monitoring and reporting of tonne-kilometre data. That monitoring plan shall be submitted at the latest four months prior to the start of one of the following:

- (a) the monitoring year mentioned in Article 3e(1) of Directive 2003/87/EC for applications pursuant to that Article;
- (b) the second calendar year of the period referred to in Article 3c(2) of Directive 2003/87/EC for applications pursuant to Article 3f of that Directive.

#### Article 53

##### **Monitoring methodology for emissions from aviation activities**

1. Each aircraft operator shall determine the annual CO<sub>2</sub> emissions from aviation activities by multiplying the annual consumption of each fuel (expressed in tonnes) by the respective emission factor.

2. Each aircraft operator shall determine the fuel consumption for each flight and for each fuel, including fuel consumed by the auxiliary power unit. For that purpose, the aircraft operator shall use one of the methods laid down in section 1 of Annex III. The aircraft operator shall choose the method that provides for the most complete and timely data combined with the lowest uncertainty without incurring unreasonable costs.

3. Each aircraft operator shall determine the fuel uplift referred to in section 1 of Annex III based on one of the following:

- (a) the measurement by the fuel supplier, as documented in the fuel delivery notes or invoices for each flight;
- (b) data from aircraft onboard measurement systems recorded in the mass and balance documentation, in the aircraft technical log or transmitted electronically from the aircraft to the aircraft operator.

4. The aircraft operator shall determine fuel contained in the tank using data from aircraft onboard measurement systems and recorded in the mass and balance documentation, in the aircraft technical log or transmitted electronically from the aircraft to the aircraft operator.

5. Where the amount of fuel uplift or the amount of fuel remaining in the tanks is determined in units of volume, expressed in litres, the aircraft operator shall convert that amount from volume to mass by using density values. The aircraft operator shall use the fuel density (which may be an actual or a standard value of 0,8 kg per litre) that is used for operational and safety reasons.

The procedure for informing the use of actual or standard density shall be described in the monitoring plan along with a reference to the relevant aircraft operator documentation.

6. For the purposes of the calculation referred to in paragraph 1, the aircraft operator shall use the default emission factors set out in table 1 in Annex III.

For fuels not listed in that table, the aircraft operator shall determine the emission factor in accordance with Article 32. For such fuels, the net calorific value shall be determined and reported as a memo-item.

7. By way of derogation from paragraph 6, the aircraft operator may, upon approval by the competent authority, derive the emission factor or the carbon content, on which it is based, or the net calorific value for commercially traded fuels from the purchasing records for the fuel in question, as provided by the fuel supplier, provided that those have been derived on the basis of internationally accepted standards and the emission factors listed in table 1 of Annex III cannot be applied.

#### Article 54

### Specific provisions for biomass

Article 39 shall apply accordingly to the determination of the biomass fraction of a mixed fuel.

Notwithstanding Article 39(2), the competent authority shall allow the use of a methodology uniformly applicable in all Member States for the determination of the biomass fraction, as appropriate.

Under that methodology, the biomass fraction, net calorific value and emission factor or carbon content of the fuel used in an EU ETS aviation activity listed in Annex I to Directive 2003/87/EC shall be determined using fuel purchase records.

The methodology shall be based on the guidelines provided by the Commission to facilitate its consistent application in all Member States.

The use of biofuels for aviation shall be assessed in accordance with Article 18 of Directive 2009/28/EC.

#### Article 55

### Small emitters

1. Aircraft operators operating fewer than 243 flights per period for three consecutive four-month periods and aircraft operators operating flights with total annual emissions lower than 25 000 tonnes CO<sub>2</sub> per year shall be considered small emitters.

2. By way of derogation from Article 53, small emitters may estimate the fuel consumption using tools implemented by Eurocontrol or another relevant organisation, which can process all relevant air traffic information and avoid any underestimations of emissions.

The applicable tools may only be used if they are approved by the Commission including the application of correction factors to compensate for any inaccuracies in the modelling methods.

3. By way of derogation from Article 12, a small emitter that intends to make use of any of the tools referred to in paragraph 2 of this Article may submit only the following information in the monitoring plan for emissions:

(a) information required pursuant to point 1 of section 2 of Annex I;

- (b) evidence that the thresholds for small emitters set out in paragraph 1 of this Article are met;
- (c) the name of or reference to the tool as referred to in paragraph 2 of this Article that will be used for estimating the fuel consumption.

A small emitter shall be exempted from the requirement to submit the supporting documents referred to in the third subparagraph of Article 12(1).

4. Where an aircraft operator uses any of the tools referred to in paragraph 2 and exceeds the thresholds referred to in paragraph 1 during a reporting year, the aircraft operator shall notify the competent authority thereof without undue delay.

The aircraft operator shall, without undue delay, submit a significant modification of the monitoring plan within the meaning of point (iv) of Article 15(4)(a) to the competent authority for approval.

However, the competent authority shall allow that the aircraft operator continues to use a tool referred to in paragraph 2 provided that that aircraft operator demonstrates to the satisfaction of the competent authority that the thresholds referred to in paragraph 1 have not already been exceeded within the past five reporting periods and will not be exceeded again from the following reporting period onwards.

#### *Article 56*

##### **Sources of uncertainty**

1. The aircraft operator shall consider sources of uncertainty and their associated levels of uncertainty when selecting the monitoring methodology pursuant to Article 53(2).
2. The aircraft operator shall regularly perform suitable control activities, including cross-checks between the fuel uplift quantity as provided by invoices and the fuel uplift quantity indicated by on-board measurement, and take corrective action if notable deviations are observed.

#### *Article 57*

##### **Determination of tonne-kilometre data**

1. Aircraft operators intending to apply for an allocation of allowances free of charge pursuant to Article 3e or 3f of Directive 2003/87/EC shall monitor tonne-kilometre data for all flights covered by Annex I to Directive 2003/87/EC in the monitoring years relevant for such applications.
2. The aircraft operator shall calculate tonne-kilometre data by multiplying the distance, calculated in accordance with section 3 of Annex III and expressed in kilometres (km), by the payload, calculated as the sum of the mass of freight, mail, passengers and checked baggage expressed in tonnes (t).
3. The aircraft operator shall determine the mass of freight and mail on the basis of the actual or standard mass contained in the mass and balance documentation for the relevant flights.

Aircraft operators not required to have a mass and balance documentation shall propose in the monitoring plan a suitable methodology for determining the mass of freight and mail, while excluding the tare weight of all pallets and containers that are not payload and the service weight.

4. The aircraft operator shall determine the mass of passengers using one of the following tiers:
  - (a) tier 1: consisting in a default value of 100 kg for each passenger including their checked baggage;
  - (b) tier 2: consisting in the mass for passengers and checked baggage contained in the mass and balance documentation for each flight.

However, the tier selected shall apply to all flights in the monitoring years relevant for applications pursuant to Article 3e or 3f of Directive 2003/87/EC.

## CHAPTER V

**DATA MANAGEMENT AND CONTROL***Article 58***Data flow activities**

1. The operator or aircraft operator shall establish, document, implement and maintain written procedures for data flow activities for the monitoring and reporting of greenhouse gas emissions and ensure that the annual emissions report resulting from data flow activities does not contain misstatements and is in conformance with the monitoring plan, those written procedures and this Regulation.

Where the aircraft operator intends to apply for an allocation of allowances free of charge pursuant to Article 3e or 3f of Directive 2003/87/EC, the first subparagraph shall also apply to the monitoring and reporting of tonne-kilometre data.

2. Descriptions of written procedures for data flow activities in the monitoring plan shall at least cover the following elements:

- (a) the items of information listed in Article 12(2);
- (b) identification of the primary data sources;
- (c) each step in the data flow from primary data to annual emissions or tonne-kilometre data which shall reflect the sequence and interaction between the data flow activities, including relevant formulas and data aggregation steps applied;
- (d) the relevant processing steps related to each specific data flow activity, including the formulas and data used to determine the emissions or tonne-kilometre data;
- (e) relevant electronic data processing and storage systems used and the interaction between such systems and other inputs, including manual input;
- (f) the way outputs of data flow activities are recorded.

*Article 59***Control system**

1. The operator or aircraft operator shall establish, document, implement and maintain an effective control system to ensure that the annual emissions report and, where applicable, the tonne-kilometre report resulting from data flow activities does not contain misstatements and is in conformity with the monitoring plan and this Regulation.

2. The control system referred to in paragraph 1 shall consist of the following:

- (a) an operator's or aircraft operator's assessment of inherent risks and control risks based on a written procedure for carrying out the assessment;
- (b) written procedures related to control activities that are to mitigate the risks identified.

3. Written procedures related to control activities as referred to in point (b) of paragraph 2 shall at least include:

- (a) quality assurance of the measurement equipment;
- (b) quality assurance of the information technology system used for data flow activities, including process control computer technology;
- (c) segregation of duties in the data flow activities and control activities, and management of necessary competencies;
- (d) internal reviews and validation of data;
- (e) corrections and corrective action;
- (f) control of out-sourced processes;
- (g) keeping records and documentation including the management of document versions.

4. The operator or aircraft operator shall monitor the effectiveness of the control system, including by carrying out internal reviews and taking into account the findings of the verifier during the verification of annual emissions reports and, where applicable, tonne-kilometre reports, carried out pursuant to Implementing Regulation (EU) 2018/2067.

Whenever the control system is found to be ineffective or not commensurate with the risks identified, the operator or aircraft operator shall seek to improve the control system and update the monitoring plan or the underlying written procedures for data flow activities, risk assessments and control activities as appropriate.

#### *Article 60*

##### **Quality assurance**

1. For the purposes of point (a) of Article 59(3), the operator shall ensure that all relevant measuring equipment is calibrated, adjusted and checked at regular intervals, including prior to use, and checked against measurement standards traceable to international measurement standards, where available, in accordance with the requirements of this Regulation and proportionate to the risks identified.

Where components of the measuring systems cannot be calibrated, the operator shall identify those in the monitoring plan and propose alternative control activities.

When the equipment is found not to comply with required performance, the operator shall promptly take necessary corrective action.

2. With regard to continuous emission measurement systems, the operator shall apply quality assurance based on the standard Quality assurance of automated measuring systems (EN 14181), including parallel measurements with standard reference methods at least once per year, performed by competent staff.

Where such quality assurance requires emission limit values (ELVs) as necessary parameters for the basis of calibration and performance checks, the annual average hourly concentration of the greenhouse gas shall be used as a substitute for such ELVs. Where the operator finds a non-compliance with the quality assurance requirements, including that recalibration has to be performed, it shall report that circumstance to the competent authority and take corrective action without undue delay.

#### *Article 61*

##### **Quality assurance of information technology**

For the purposes of point (b) of Article 59(3), the operator or aircraft operator shall ensure that the information technology system is designed, documented, tested, implemented, controlled and maintained in a way to process reliable, accurate and timely data in accordance with the risks identified in accordance with point (a) of Article 59(2).

The control of the information technology system shall include access control, control of back up, recovery, continuity planning and security.

#### *Article 62*

##### **Segregation of duties**

For the purposes of point (c) of Article 59(3), the operator or aircraft operator shall assign responsible persons for all data flow activities and for all control activities in a way to segregate conflicting duties. In the absence of other control activities, it shall ensure for all data flow activities commensurate with the identified inherent risks that all relevant information and data shall be confirmed by at least one person who has not been involved in the determination and recording of that information or data.

The operator or aircraft operator shall manage the necessary competencies for the responsibilities involved, including the appropriate assignment of responsibilities, training, and performance reviews.

#### *Article 63*

##### **Internal reviews and validation of data**

1. For the purposes of point (d) of Article 59(3) and on the basis of the inherent risks and control risks identified in the risk assessment referred to in point (a) of Article 59(2), the operator or aircraft operator shall review and validate data resulting from the data flow activities referred to in Article 58.

Such review and validation of the data shall at least include:

- (a) a check as to whether the data are complete;
  - (b) a comparison of the data that the operator or aircraft operator has obtained, monitored and reported over several years;
  - (c) a comparison of data and values resulting from different operational data collection systems, including the following comparisons, where applicable:
    - (i) a comparison of fuel or material purchasing data with data on stock changes and data on consumption for the applicable source streams;
    - (ii) a comparison of calculation factors that have been determined by analysis, calculated or obtained from the supplier of the fuel or material, with national or international reference factors of comparable fuels or materials;
    - (iii) a comparison of emissions obtained from measurement-based methodologies and the results of the corroborating calculation pursuant to Article 46;
    - (iv) a comparison of aggregated data and raw data.
2. The operator or aircraft operator shall, to the extent possible, ensure the criteria for rejecting data as part of the review and validation are known in advance. For that purpose the criteria for rejecting data shall be laid down in the documentation of the relevant written procedures.

#### Article 64

##### Corrections and corrective action

1. Where any part of the data flow activities referred to in Article 58 or control activities referred to in Article 59 is found not to function effectively, or to function outside boundaries that are set in documentation of procedures for those data flow activities and control activities, the operator or aircraft operator shall make appropriate corrections and correct rejected data while avoiding underestimation of emissions.
2. For the purpose of paragraph 1, the operator or aircraft operator shall at least proceed to all of the following:
  - (a) assessment of the validity of the outputs of the applicable steps in the data flow activities referred to in Article 58 or control activities referred to in Article 59;
  - (b) determination of the cause of the malfunctioning or error concerned;
  - (c) implementation of appropriate corrective action, including correcting any affected data in the emission report or tonne-kilometre report, as appropriate.
3. The operator or aircraft operator shall carry out the corrections and corrective actions pursuant to paragraph 1 of this Article such that they are responsive to the inherent risks and control risks identified in the risk assessment referred to in Article 59.

#### Article 65

##### Out-sourced processes

Where the operator or aircraft operator outsources one or more data flow activities referred to in Article 58 or control activities referred to in Article 59, the operator or aircraft operator shall proceed to all of the following:

- (a) check the quality of the outsourced data flow activities and control activities in accordance with this Regulation;
- (b) define appropriate requirements for the outputs of the outsourced processes and the methods used in those processes;
- (c) check the quality of the outputs and methods referred to in point (b) of this Article;
- (d) ensure that outsourced activities are carried out such that those are responsive to the inherent risks and control risks identified in the risk assessment referred to in Article 59.

*Article 66***Treatment of data gaps**

1. Where data relevant for the determination of the emissions of an installation are missing, the operator shall use an appropriate estimation method to determine conservative surrogate data for the respective time period and missing parameter.

Where the operator has not laid down the estimation method in a written procedure, it shall establish such a written procedure and submit to the competent authority for approval an appropriate modification of the monitoring plan in accordance with Article 15.

2. Where data relevant for the determination of an aircraft operator's emissions for one or more flights are missing, the aircraft operator shall use surrogate data for the respective time period calculated in accordance with the alternative method defined in the monitoring plan.

Where surrogate data cannot be determined in accordance with the first subparagraph of this paragraph, the emissions for that flight or those flights may be estimated by the aircraft operator from the fuel consumption determined by using a tool referred to in Article 55(2).

Where the number of flights with data gaps referred to in the first two sub-paragraphs exceed 5 % of the annual flights that are reported, the operator shall inform the competent authority thereof without undue delay and shall take remedial action for improving the monitoring methodology.

*Article 67***Records and documentation**

1. The operator or aircraft operator shall keep records of all relevant data and information, including information as listed in Annex IX, for at least 10 years.

The documented and archived monitoring data shall allow for the verification of the annual emissions reports or tonne-kilometre reports in accordance with Implementing Regulation (EU) 2018/2067. Data reported by the operator or aircraft operator contained in an electronic reporting and data management system set up by the competent authority may be considered to be retained by the operator or aircraft operator, if they can access those data.

2. The operator or aircraft operator shall ensure that relevant documents are available when and where they are needed to perform the data flow activities and control activities.

The operator or aircraft operator shall, upon request, make those documents available to the competent authority and to the verifier verifying the emissions report or tonne-kilometre report in accordance with Implementing Regulation (EU) 2018/2067.

## CHAPTER VI

**REPORTING REQUIREMENTS***Article 68***Timing and obligations for reporting**

1. The operator or aircraft operator shall submit to the competent authority by 31 March of each year an emissions report that covers the annual emissions in the reporting period and that is verified in accordance with Implementing Regulation (EU) 2018/2067.

However, competent authorities may require operators or aircraft operators to submit the verified annual emission report earlier than by 31 March, but by 28 February at the earliest.

2. Where the aircraft operator chooses to apply for the allocation of emission allowances free of charge pursuant to Article 3e or 3f of Directive 2003/87/EC, the aircraft operator shall submit to the competent authority by 31 March of the year following the monitoring year referred to in Article 3e or 3f of that Directive a tonne-kilometre report that covers the tonne-kilometre data of the monitoring year and that is verified in accordance with Implementing Regulation (EU) 2018/2067.

3. The annual emissions reports and tonne-kilometre reports shall contain at least the information listed in Annex X.

## Article 69

**Reporting on improvements to the monitoring methodology**

1. Each operator or aircraft operator shall regularly check whether the monitoring methodology applied can be improved.

An operator of an installation shall submit to the competent authority for approval a report containing the information referred to in paragraph 2 or 3, where appropriate, by the following deadlines:

- (a) for a category A installation, by 30 June every four years;
- (b) for a category B installation, by 30 June every two years;
- (c) for a category C installation, by 30 June every year.

However, the competent authority may set an alternative date for submission of the report, but no later date than 30 September of the same year.

By way of derogation from the second and third subparagraphs, and without prejudice to the first subparagraph, the competent authority may approve, together with the monitoring plan or the improvement report, an extension of the deadline applicable pursuant to the second subparagraph, if the operator provides evidence to the satisfaction of the competent authority upon submission of a monitoring plan in accordance with Article 12 or upon notification of updates in accordance with Article 15, or upon submission of an improvement report in accordance with this Article, that the reasons for unreasonable costs or for improvement measures being technically not feasible will remain valid for a longer period of time. That extension shall take into account the number of years for which the operator provides evidence. The total time period between improvement reports shall not exceed three years for a category C installation, four years for a category B installation or five years for a category A installation.

2. Where the operator does not apply at least the tiers required pursuant to the first subparagraph of Article 26(1) to major source streams and minor source streams and pursuant to Article 41 to emission sources, the operator shall provide a justification as to why it is technically not feasible or would incur unreasonable costs to apply the required tiers.

However, where evidence is found that measures needed for reaching those tiers have become technically feasible and do not any more incur unreasonable costs, the operator shall notify the competent authority of appropriate modifications of the monitoring plan in accordance with Article 15, and submit proposals for implementing the related measures and its timing.

3. Where the operator applies a fall-back monitoring methodology referred to in Article 22, the operator shall provide: a justification as to why it is technically not feasible or would incur unreasonable costs to apply at least tier 1 for one or more major or minor source streams.

However, where evidence is found that measures needed for reaching at least tier 1 for those source streams have become technically feasible and do not any more incur unreasonable costs, the operator shall notify the competent authority of appropriate modifications of the monitoring plan in accordance with Article 15 and submit proposals for implementing the related measures and its timing.

4. Where the verification report established in accordance with Implementing Regulation (EU) 2018/2067 states outstanding non-conformities or recommendations for improvements, in accordance with Articles 27, 29 and 30 of that Implementing Regulation, the operator or aircraft operator shall submit to the competent authority for approval a report by 30 June of the year in which that verification report is issued by the verifier. That report shall describe how and when the operator or aircraft operator has rectified or plans to rectify the non-conformities identified by the verifier and to implement recommended improvements.

The competent authority may set an alternative date for submission of the report as referred to in this paragraph, but no later date than 30 September of the same year. Where applicable, such report may be combined with the report referred to in paragraph 1 of this Article.

Where recommended improvements would not lead to an improvement of the monitoring methodology, the operator or aircraft operator shall provide a justification of why that is the case. Where the recommended improvements would incur unreasonable costs, the operator or aircraft operator shall provide evidence of the unreasonable nature of the costs.

5. Paragraph 4 of this Article shall not apply where the operator or aircraft operator has already resolved all non-conformities and recommendations for improvement and has submitted related modifications of the monitoring plan to the competent authority for approval in accordance with Article 15 of this Regulation before the date set pursuant to paragraph 4.

*Article 70***Determination of emissions by the competent authority**

1. The competent authority shall make a conservative estimate of the emissions of an installation or aircraft operator in any of the following situations:
  - (a) no verified annual emission report has been submitted by the operator or aircraft operator by the deadline required pursuant to Article 68(1);
  - (b) the verified annual emissions report referred to in Article 68(1) is not in compliance with this Regulation;
  - (c) the annual emissions report of an operator or aircraft operator has not been verified in accordance with Implementing Regulation (EU) 2018/2067.
2. Where a verifier has stated, in the verification report pursuant to Implementing Regulation (EU) 2018/2067, the existence of non-material misstatements which have not been corrected by the operator or aircraft operator before issuing the verification report, the competent authority shall assess those misstatements, and make a conservative estimate of the emissions of the installation or aircraft operator where appropriate. The competent authority shall inform the operator or aircraft operator whether and which corrections are required to the annual emissions report. The operator or aircraft operator shall make that information available to the verifier.
3. Member States shall establish an efficient exchange of information between competent authorities responsible for approval of monitoring plans and competent authorities responsible for acceptance of annual emissions reports.

*Article 71***Access to information**

Emission reports held by the competent authority shall be made available to the public by that authority subject to national rules adopted pursuant to Directive 2003/4/EC of the European Parliament and of the Council<sup>(1)</sup>. With regard to the application of the exception, as specified in Article 4(2)(d) of Directive 2003/4/EC, operators or aircraft operators may indicate in their reports what information they consider commercially sensitive.

*Article 72***Rounding of data**

1. Total annual emissions shall be reported as rounded tonnes of CO<sub>2</sub> or CO<sub>2(e)</sub>.  
Tonne-kilometres shall be reported as rounded values of tonne-kilometres.
2. All variables used to calculate the emissions shall be rounded to include all significant digits for the purpose of calculating and reporting emissions.
3. All data per flights shall be rounded to include all significant digits for the purpose of calculating the distance and payload pursuant to Article 57 and reporting the tonne-kilometre data.

*Article 73***Ensuring consistency with other reporting**

Each activity listed in Annex I to Directive 2003/87/EC that is carried out by an operator or aircraft operator shall be labelled using the codes, where applicable, from the following reporting schemes:

- (a) the common reporting format for national greenhouse gas inventory systems, as approved by the respective bodies of the United Nations Framework Convention on Climate Change;
- (b) the installation's identification number in the European pollutant release and transfer register in accordance with Regulation (EC) No 166/2006 of the European Parliament and of the Council<sup>(2)</sup>;

<sup>(1)</sup> Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC (OJ L 41, 14.2.2003, p.26).

<sup>(2)</sup> Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC (OJ L 33, 4.2.2006, p. 1).

- (c) the activity of Annex I to Regulation (EC) No 166/2006;
- (d) the NACE code in accordance with Regulation (EC) No 1893/2006 of the European Parliament and of the Council <sup>(1)</sup>.

## CHAPTER VII

**INFORMATION TECHNOLOGY REQUIREMENTS***Article 74***Electronic data exchange formats**

1. Member States may require the operator and aircraft operator to use electronic templates or specific file formats for submission of monitoring plans and changes to the monitoring plan, as well as for submission of annual emissions reports, tonne-kilometre reports, verification reports and improvement reports.

Those templates or file format specifications established by the Member States shall, at least, contain the information contained in electronic templates or file format specifications published by the Commission.

2. When establishing the templates or file-format specifications referred to in the second subparagraph of paragraph 1, Member States may choose one or both of the following options:

- (a) file-format specifications based on XML, such as the EU ETS reporting language published by the Commission for use in connection with advanced automated systems;
- (b) templates published in a form usable by standard office software, including spreadsheets and word processor files.

*Article 75***Use of automated systems**

1. Where a Member State chooses to use automated systems for electronic data exchange based on file-format specifications in accordance with point (a) of Article 74(2), those systems shall ensure in a cost efficient way, through the implementation of technological measures in accordance with the current state of technology:

- (a) integrity of data, preventing modification of electronic messages during transmission;
- (b) confidentiality of data, through the use of security techniques, including encryption techniques, such that the data is only accessible to the party for which it was intended and that no data can be intercepted by unauthorised parties;
- (c) authenticity of data, such that the identity of both the sender and receiver of data is known and verified;
- (d) non-repudiation of data, such that one party of a transaction cannot deny having received a transaction nor can the other party deny having sent a transaction, by applying methods such as signing techniques, or independent auditing of system safeguards.

2. Any automated systems used by Member States based on file-format specifications in accordance with point (a) of Article 74(2) for communication between the competent authority, operator and aircraft operator, as well as verifier and national accreditation body within the meaning of Implementing Regulation (EU) 2018/2067, shall meet the following non-functional requirements, through implementation of technological measures in accordance with the current state of technology:

- (a) access control, such that the system is only accessible to authorised parties and no data can be read, written or updated by unauthorised parties, through implementation of technological measures in order to achieve the following:
  - (i) restriction of physical access to the hardware on which automated systems run through physical barriers;
  - (ii) restriction of logical access to the automated systems through the use of technology for identification, authentication and authorisation;

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<sup>(1)</sup> Regulation (EC) No 1893/2006 of the European Parliament and of the Council of 20 December 2006 establishing the statistical classification of economic activities NACE Revision 2 and amending Council Regulation (EEC) No 3037/90 as well as certain EC Regulations on specific statistical domains (OJ L 393, 30.12.2006, p. 1).

- (b) availability, such that data accessibility is ensured, even after significant time and the introduction of possible new software;
- (c) audit trail, such that it is ensured that changes to data can always be found and analysed in retrospect.

## CHAPTER VIII

## FINAL PROVISIONS

## Article 76

**Amendments to Regulation (EU) No 601/2012**

Regulation (EU) No 601/2012 is amended as follows:

- (1) In Article 12(1), third subparagraph, point (a) is replaced by the following:

‘(a) for installations, evidence for each major and minor source stream demonstrating compliance with the uncertainty thresholds for activity data and calculation factors, where applicable, for the applied tiers as defined in Annexes II and IV, as well as for each emission source demonstrating compliance with the uncertainty thresholds for the applied tiers as defined in Annex VIII, where applicable;’

- (2) In Article 15, paragraph 4, subparagraph (a) is replaced by the following:

‘(a) with regard to the emission monitoring plan:

- (i) a change of emission factor values laid down in the monitoring plan;
- (ii) a change between calculation methods as laid down in Annex III, or a change from the use of a calculation method to the use of estimation methodology in accordance with Article 55(2) or *vice versa*;
- (iii) the introduction of new source streams;
- (iv) changes in the status of the aircraft operator as a small emitter within the meaning of Article 55(1) or with regard to one of the thresholds provided by Article 28a(6) of Directive 2003/87/EC;’

- (3) Article 49 is replaced by the following:

‘Article 49

**Transferred CO<sub>2</sub>**

1. The operator shall subtract from the emissions of the installation any amount of CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> transferred.

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

4. For determining the quantity of CO<sub>2</sub> 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.

For determining the quantity of CO<sub>2</sub> chemically bound in precipitated calcium carbonate, the operator shall use data sources representing highest achievable accuracy.

5. The operators may determine quantities of CO<sub>2</sub> transferred out of the installation both at the transferring and at the receiving installation. In such cases, Article 48(3) shall apply.'

(4) Article 52 is amended as follows:

(a) paragraph 5 is deleted;

(b) paragraph 6 is replaced by the following:

'6. Where the amount of fuel uplift or the amount of fuel remaining in the tanks is determined in units of volume, expressed in litres, the aircraft operator shall convert that amount from volume to mass by using density values. The aircraft operator shall use the fuel density (which may be an actual or a standard value of 0,8 kg per litre) that is used for operational and safety reasons.

The procedure for informing the use of actual or standard density shall be described in the monitoring plan along with a reference to the relevant aircraft operator documentation.'

(c) paragraph 7 is replaced by the following:

'7. For the purposes of the calculation referred to in paragraph 1, the aircraft operator shall use the default emission factors set out in Table 2 in Annex III. For fuels not listed in that table, the aircraft operator shall determine the emission factor in accordance with Article 32. For such fuels, the net calorific value shall be determined and reported as a memo-item.'

(5) In Article 54, paragraph 2, subparagraph 1 is replaced by the following:

'2. By way of derogation from Article 52, small emitters may estimate the fuel consumption using tools implemented by Eurocontrol or another relevant organisation, which can process all relevant air traffic information and avoid any underestimations of emissions.'

(6) Article 55 is amended as follows:

(a) paragraph 1 is replaced by the following:

'1. The aircraft operator shall consider sources of uncertainty and their associated levels of uncertainty when selecting the monitoring methodology pursuant to Article 52(2).'

(b) paragraphs 2, 3 and 4 are deleted

(7) In Article 59, paragraph 1 is replaced by the following:

'For the purposes of point (a) of Article 58(3), the operator shall ensure that all relevant measuring equipment is calibrated, adjusted and checked at regular intervals including prior to use, and checked against measurement standards traceable to international measurement standards, where available, in accordance with the requirements of this Regulation and proportionate to the risks identified.

Where components of the measuring systems cannot be calibrated, the operator shall identify those in the monitoring plan and propose alternative control activities.

When the equipment is found not to comply with required performance, the operator shall promptly take necessary corrective action.'

(8) In Article 65(2), a third subparagraph is added:

'Where the number of flights with data gaps referred to in the first two sub-paragraphs exceed 5 % of the annual flights that are reported, the operator shall inform the competent authority thereof without undue delay and shall take remedial action for improving the monitoring methodology.'

- (9) In Annex I, section 2 is amended as follows:
- (a) point (2)(b)(ii) is replaced by the following:
    - '(ii) procedures for the measurement of fuel uplifts and fuel in tanks, a description of the measuring instruments involved and the procedures for recording, retrieving, transmitting and storing information regarding measurements, as applicable;'
  - (b) point (2)(b)(iii) is replaced by the following:
    - '(iii) the method for the determination of density, where applicable;'
  - (c) point (2)(b)(iv) is replaced by the following:
    - '(iv) justification of the chosen monitoring methodology, in order to ensure lowest levels of uncertainty, according to Article 55 (1);'
  - (d) point (2)(d) is deleted
  - (e) point (2)(f) is replaced by the following:
    - '(f) a description of the procedures and systems for identifying, assessing and handling data gaps pursuant to Article 65(2).'
- (10) In Annex III, section 2 is deleted.
- (11) Annex IV is amended as follows:
- (a) in section 10, subsection B, the fourth paragraph is deleted;
  - (b) in section 14, subsection B, the third paragraph is deleted.
- (12) Annex IX is amended as follows:
- (a) section 1, point (2) is replaced by the following:
    - 'Documents justifying the selection of the monitoring methodology and the documents justifying temporal or non-temporal changes of monitoring methodologies and, where applicable, tiers approved by the competent authority;'
  - (b) section 3, point (5) is replaced by the following:
    - '(5) Documentation on the methodology for data gaps where applicable, the number of flights where data gaps occurred, the data used for closing the data gaps, where they occurred, and, where the number of flights with data gaps exceeded 5 % of flights that were reported, reasons for the data gaps as well as documentation of remedial actions taken.'
- (13) In Annex X, section 2 is amended as follows:
- (a) point (7) is replaced by the following:
    - '(7) The total number of flights per State pair covered by the report;'
  - (b) the following point is added below point (7):
    - '(7a) Mass of fuel (in tonnes) per fuel type per State pair;'
  - (c) point (10)(a) is replaced by the following:
    - '(a) the number of flights expressed as percentage of annual flights for which data gaps occurred; and the circumstances and reasons for data gaps that apply;'
  - (d) point (11)(a) is replaced by the following:
    - '(a) the number of flights expressed as percentage of annual flights (rounded to the nearest 0,1 %) for which data gaps occurred; and the circumstances and reasons for data gaps that apply;'

#### Article 77

### Repeal of Regulation (EU) No 601/2012

1. Regulation (EU) No 601/2012 is repealed with effect from 1 January 2021.

References to the repealed Regulation shall be construed as references to this Regulation and read in accordance with the correlation table in Annex XI.

2. The provisions of Regulation (EU) No 601/2012 shall continue to apply to the monitoring, reporting and verification of emissions and, where applicable, activity data, occurring prior to 1 January 2021.

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*Article 78***Entry into force and application**

This Regulation shall enter into force on the day following that of its publication in the *Official Journal of the European Union*.

It shall apply from 1 January 2021.

However, Article 76 shall apply from 1 January 2019 or the date of entry into force of this Regulation, whichever is the later.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 19 December 2018.

*For the Commission*  
*The President*  
Jean-Claude JUNCKER

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## ANNEX I

**Minimum content of the monitoring plan (Article 12(1))**

## 1. MINIMUM CONTENT OF THE MONITORING PLAN FOR INSTALLATIONS

The monitoring plan for an installation shall contain at least the following information:

## (1) general information on the installation:

- (a) a description of the installation and activities carried out by the installation to be monitored, containing a list of emissions sources and source streams to be monitored for each activity carried out within the installation and meeting the following criteria:
  - (i) the description must be sufficient for demonstrating that neither data gaps nor double counting of emissions occur;
  - (ii) a simple diagram of the emission sources, source streams, sampling points and metering equipment must be added where requested by the competent authority or where such diagram simplifies describing the installation or referencing emission sources, source streams, measuring instruments and any other parts of the installation relevant for the monitoring methodology including data flow activities and control activities;
- (b) a description of the procedure for managing the assignment of responsibilities for monitoring and reporting within the installation, and for managing the competences of responsible personnel;
- (c) a description of the procedure for regular evaluation of the monitoring plan's appropriateness, covering at least the following:
  - (i) checking the list of emissions sources and source streams, ensuring completeness of the emission sources and source streams and that all relevant changes in the nature and functioning of the installation will be included in the monitoring plan;
  - (ii) assessing compliance with the uncertainty thresholds for activity data and other parameters, where applicable, for the applied tiers for each source stream and emission source;
  - (iii) assessing potential measures for improvement of the monitoring methodology applied;
- (d) a description of the written procedures of the data flow activities pursuant to Article 58, including a diagram where appropriate for clarification;
- (e) a description of the written procedures for the control activities established pursuant to Article 59;
- (f) where applicable, information on relevant links with activities undertaken in the framework of the Community eco-management and audit scheme (EMAS) established pursuant to Regulation (EC) No 1221/2009 of the European Parliament and of the Council<sup>(1)</sup>, systems covered by harmonised standard ISO 14001:2004 and other environmental management systems including information on procedures and controls with relevance to greenhouse gas emissions monitoring and reporting;
- (g) the version number of the monitoring plan and the date from which that version of the monitoring plan is applicable;
- (h) the category of the installation;

## (2) a detailed description of the calculation-based methodologies where applied, consisting of the following:

- (a) a detailed description of the calculation-based methodology applied, including a list of input data and calculation formulae used, a list of the tiers applied for activity data and all relevant calculation factors for each of the source streams to be monitored;
- (b) where applicable and where the operator intends to make use of simplification for minor and de-minimis source streams, a categorisation of the source streams into major, minor and de-minimis source streams;
- (c) a description of the measurement systems used, and their measurement range, specified uncertainty and exact location of the measuring instruments to be used for each of the source streams to be monitored;

<sup>(1)</sup> OJ L 342, 22.12.2009, p. 1.

- (d) where applicable, the default values used for calculation factors indicating the source of the factor, or the relevant source, from which the default factor will be retrieved periodically, for each of the source streams;
  - (e) where applicable, a list of the analysis methods to be used for the determination of all relevant calculation factors for each of the source streams, and a description of the written procedures for those analyses;
  - (f) where applicable, a description of the procedure underpinning the sampling plan for the sampling of fuel and materials to be analysed, and the procedure used to revise the appropriateness of the sampling plan;
  - (g) where applicable, a list of laboratories engaged in carrying out relevant analytical procedures and, where the laboratory is not accredited as referred to in Article 34(1) a description of the procedure used for demonstrating the compliance with equivalent requirements in accordance with Article 34(2) and (3);
- (3) where a fall-back monitoring methodology is applied in accordance with Article 22, a detailed description of the monitoring methodology applied for all source streams or emission sources, for which no tier methodology is used, and a description of the written procedure used for the associated uncertainty analysis to be carried out;
- (4) a detailed description of the measurement-based methodologies, where applied, including the following:
- (a) a description of the measurement method including descriptions of all written procedures relevant for the measurement and the following:
    - (i) any calculation formulae used for data aggregation and used to determine the annual emissions of each emission source;
    - (ii) the method for determining whether valid hours or shorter reference periods for each parameter can be calculated, and for substitution of missing data in accordance with Article 45;
  - (b) a list of all relevant emission points during typical operation, and during restrictive and transition phases, including breakdown periods or commissioning phases, supplemented by a process diagram where requested by the competent authority;
  - (c) where flue gas flow is derived by calculation, a description of the written procedure for that calculation for each emission source monitored using a measurement-based methodology;
  - (d) a list of all relevant equipment, indicating its measurement frequency, operating range and uncertainty;
  - (e) a list of applied standards and of any deviations from those standards;
  - (f) a description of the written procedure for carrying out the corroborating calculations in accordance with Article 46, where applicable;
  - (g) a description of the method, how CO<sub>2</sub> stemming from biomass is to be determined and subtracted from the measured CO<sub>2</sub> emissions, and of the written procedure used for that purpose, where applicable;
  - (h) where applicable and where the operator intends to make use of simplification for minor emission sources, a categorisation of the emission sources into major and minor emission sources;
- (5) in addition to elements listed in point 4, a detailed description of the monitoring methodology where N<sub>2</sub>O emissions are monitored, where appropriate in the form of description of the written procedures applied, including a description of the following:
- (a) the method and parameters used to determine the quantity of materials used in the production process and the maximum quantity of material used at full capacity;
  - (b) the method and parameters used to determine the quantity of product produced as an hourly output, expressed as nitric acid (100 %), adipic acid (100 %), caprolactam, glyoxal and glyoxylic acid per hour respectively;
  - (c) the method and parameters used to determine the N<sub>2</sub>O concentration in the flue gas from each emission source, its operating range, and its uncertainty, and details of any alternative methods to be applied where concentrations fall outside the operating range and the situations when this may occur;
  - (d) the calculation method used to determine N<sub>2</sub>O emissions from periodic, unabated sources in nitric acid, adipic acid, caprolactam, glyoxal and glyoxylic acid production;

- (e) the way in which or the extent to which the installation operates with variable loads, and the manner in which the operational management is carried out;
  - (f) the method and any calculation formulae used to determine the annual  $N_2O$  emissions and the corresponding  $CO_{2(e)}$  values of each emission source;
  - (g) information on process conditions that deviate from normal operations, an indication of the potential frequency and the duration of such conditions, as well as an indication of the volume of the  $N_2O$  emissions during the deviating process conditions such as abatement equipment malfunction;
- (6) a detailed description of the monitoring methodology as far as perfluorocarbons from primary aluminium production are monitored, where appropriate in the form of a description of the written procedures applied, including the following:
- (a) where applicable, the dates of measurement for the determination of the installation-specific emission factors  $SEF_{CF_4}$  or OVC, and  $F_{C_2F_6}$ , and a schedule for future repetitions of that determination;
  - (b) where applicable, the protocol describing the procedure used to determine the installation-specific emission factors for  $CF_4$  and  $C_2F_6$ , showing also that the measurements have been and will be carried out for a sufficiently long time for measured values to converge, but at least for 72 hours;
  - (c) where applicable, the methodology for determining the collection efficiency for fugitive emissions at installations for primary aluminium production;
  - (d) a description of cell type and type of anode;
- (7) a detailed description of the monitoring methodology where transfer of inherent  $CO_2$  as part of a source stream in accordance with Article 48, transfer of  $CO_2$  in accordance with Article 49, or transfer of  $N_2O$  in accordance with Article 50 are carried out, where appropriate in the form of a description of the written procedures applied, including the following:
- (a) where applicable, the location of equipment for temperature and pressure measurement in a transport network;
  - (b) where applicable, procedures for preventing, detecting and quantification of leakage events from transport networks;
  - (c) in the case of transport networks, procedures effectively ensuring that  $CO_2$  is transferred only to installations which have a valid greenhouse gas emission permit, or where any emitted  $CO_2$  is effectively monitored and accounted for in accordance with Article 49;
  - (d) identification of the receiving and transferring installations according to the installation identification code recognised in accordance with Regulation (EU) No 1193/2011;
  - (e) where applicable, a description of continuous measurement systems used at the points of transfer of  $CO_2$  or  $N_2O$  between installations transferring  $CO_2$  or  $N_2O$  or the determination method in accordance with Articles 48, 49 or 50;
  - (f) where applicable, a description of the conservative estimation method used for determining the biomass fraction of transferred  $CO_2$  in accordance with Article 48 or 49;
  - (g) where applicable, quantification methodologies for emissions or  $CO_2$  released to the water column from potential leakages as well as the applied and possibly adapted quantification methodologies for actual emissions or  $CO_2$  released to the water column from leakages, as specified in section 23 of Annex IV.

## 2. MINIMUM CONTENT OF MONITORING PLANS FOR AVIATION EMISSIONS

### 1. The monitoring plan shall contain the following information for all aircraft operators:

- (a) the identification of the aircraft operator, call sign or other unique designator used for air traffic control purposes, contact details of the aircraft operator and of a responsible person at the aircraft operator, contact address, the administering Member State, the administering competent authority;
- (b) an initial list of aircraft types in its fleet operated at the time of the submission of the monitoring plan and the number of aircraft per type, and an indicative list of additional aircraft types expected to be used including, where available, an estimated number of aircraft per type as well as the source streams (fuel types) associated with each aircraft type;

- (c) a description of procedures, systems and responsibilities used to update the completeness of the list of emission sources over the monitoring year for the purpose of ensuring the completeness of monitoring and reporting of the emissions of owned aircraft as well as leased-in aircraft;
  - (d) a description of the procedures used to monitor the completeness of the list of flights operated under the unique designator by aerodrome pair, and the procedures used for determining whether flights are covered by Annex I to Directive 2003/87/EC for the purpose of ensuring completeness of flights and avoiding double counting;
  - (e) a description of the procedure for managing and assigning responsibilities for monitoring and reporting, and for managing the competences of responsible personnel;
  - (f) a description of the procedure for regular evaluation of the monitoring plan's appropriateness, including any potential measures for the improvement of the monitoring methodology and related procedures applied;
  - (g) a description of the written procedures of the data flow activities as required by Article 58, including a diagram, where appropriate, for clarification;
  - (h) a description of the written procedures for the control activities established under Article 59;
  - (i) where applicable, information on relevant links with activities undertaken in the framework of EMAS, systems covered by harmonised standard ISO 14001:2004 and other environmental management systems, including information on procedures and controls with relevance to greenhouse gas emissions monitoring and reporting;
  - (j) the version number of the monitoring plan and the date from which that version of the monitoring plan is applicable;
  - (k) confirmation if the aircraft operator intends to make use of the simplification pursuant to Article 28a(6) of Directive 2003/87/EC.
2. The monitoring plan shall contain the following information for aircraft operators which are not small emitters in accordance with Article 55(1) or which do not intend to use a small emitter tool in accordance with Article 55(2):
- (a) a description of the written procedure to be used for defining the monitoring methodology for additional aircraft types which an aircraft operator expects to use;
  - (b) a description of the written procedures for monitoring fuel consumption in every aircraft, including:
    - (i) the chosen methodology (Method A or Method B) for calculating the fuel consumption; and where the same method is not applied for all aircraft types, a justification for that methodology, as well as a list specifying which method is used under which conditions;
    - (ii) procedures for the measurement of fuel uplifts and fuel in tanks, a description of the measuring instruments involved and the procedures for recording, retrieving, transmitting and storing information regarding measurements, as applicable;
    - (iii) the method for the determination of density, where applicable;
    - (iv) justification of the chosen monitoring methodology, in order to ensure lowest levels of uncertainty, according to Article 56 (1);
  - (c) a list of deviations for specific aerodromes from the general monitoring methodology as described in point (b) where it is not possible for the aircraft operator due to special circumstances to provide all the required data for the required monitoring methodology;
  - (d) emission factors used for each fuel type, or in the case of alternative fuels, the methodologies for determining the emission factors, including the methodology for sampling, methods of analysis, a description of the laboratories used and of their accreditation and/or of their quality assurance procedures;
  - (e) a description of the procedures and systems for identifying, assessing and handling data gaps pursuant to Article 66(2).

### 3. MINIMUM CONTENT OF MONITORING PLANS FOR TONNE-KILOMETRE DATA

The monitoring plan for tonne-kilometre data shall contain the following information:

- (a) the elements listed in point 1 of section 2 of this Annex;

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- (b) a description of the written procedures used for determining tonne-kilometre data per flight, including:
- (i) the procedures, responsibilities, data sources and calculation formulae for determining and recording the distance per aerodrome pair;
  - (ii) the tier used for determining the mass of passengers including the checked in baggage; in the case of tier 2, a description of the procedure for obtaining the mass of passengers and baggage is to be provided;
  - (iii) a description of the procedures used to determine the mass of freight and mail, where applicable;
  - (iv) a description of the measurement devices used for measuring the mass of passengers, freight and mail as applicable.
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## ANNEX II

**Tier definitions 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
<b>Combustion of fuels and fuels used as process input</b>					
Commercial standard fuels	Amount of fuel [t] or [Nm <sup>3</sup> ]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Other gaseous and liquid fuels	Amount of fuel [t] or [Nm <sup>3</sup> ]	± 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 [Nm <sup>3</sup> ]	± 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 %			
Scrubbing: urea	Amount urea consumed	± 7,5 %			
<b>Refining of mineral oil</b>					
Catalytic cracker regeneration (*)	Uncertainty requirements apply separately for each emission source	± 10 %	± 7,5 %	± 5 %	± 2,5 %
<b>Production of coke</b>					
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
<b>Metal ore roasting and sintering</b>					
Carbonate input and process residues	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 %

Activity/source stream type	Parameter to which the uncertainty is applied	Tier 1	Tier 2	Tier 3	Tier 4
<b>Production of iron and steel</b>					
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 %
<b>Production of cement clinker</b>					
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. (**)	± 7,5 %		
Non-carbonate carbon	Each raw material [t]	± 15 %	± 7,5 %		
<b>Production of lime and calcination of dolomite and magnesite</b>					
Carbonates and other process materials (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. (**)	± 7,5 %		
<b>Manufacture of glass and mineral wool</b>					
Carbonates and other process materials (input)	Each carbonate raw material or additives associated with CO <sub>2</sub> emissions [t]	± 2,5 %	± 1,5 %		
<b>Manufacture of ceramic products</b>					
Carbon inputs (Method A)	Each carbonate raw material or additive associated with CO <sub>2</sub> 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 <sub>3</sub> consumed [t]	± 7,5 %			
<b>Production of pulp and paper</b>					
Make up chemicals	Amount of CaCO <sub>3</sub> and Na <sub>2</sub> CO <sub>3</sub> [t]	± 2,5 %	± 1,5 %		
<b>Production of carbon black</b>					
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %

Activity/source stream type	Parameter to which the uncertainty is applied	Tier 1	Tier 2	Tier 3	Tier 4
<b>Production of ammonia</b>					
Fuel as process input	Amount fuel used as process input [t] or [Nm <sup>3</sup> ]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
<b>Production of hydrogen and synthesis gas</b>					
Fuel as process input	Amount fuel used as process input for hydrogen production [t] or [Nm <sup>3</sup> ]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
<b>Production of bulk organic chemicals</b>					
Mass balance methodology	Each input and output material [t]	± 7,5 %	± 5 %	± 2,5 %	± 1,5 %
<b>Production or processing of ferrous and non-ferrous metals, including secondary aluminium</b>					
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 %
<b>Primary aluminium production</b>					
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 minutes/ occurrence]	± 2,5 %	± 1,5 %		
PFC emissions (overvoltage method)	primary aluminium production in [t], anode effect overvoltage [mV] and current efficiency [-]	± 2,5 %	± 1,5 %		
(*) 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.					
(**) 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<sub>2</sub> 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 system under Article 24 of that Directive using the tier definitions laid down in this section. Where fuels or combustible materials which give rise to CO<sub>2</sub> emissions are used as a process input, section 5 of this Annex 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.

For process emissions from related exhaust gas scrubbing tier definitions according to sections 4 and 5 of this Annex shall be used, as applicable.

## 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 point (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) or values in accordance with point (d) 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 apply one of the following:

- (a) determination of the emission factor in accordance with the relevant provisions of Articles 32 to 35;
- (b) the empirical correlation as specified for Tier 2b, where the operator demonstrates to the satisfaction of the competent authority that the uncertainty of the empirical correlation 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.

## 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 point (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 point (b) or (c) of Article 31(1) or values in accordance with point (d) 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 point (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 an applicable value published by the competent authority or the Commission, or values in accordance with Article 31(1).

**Tier 2:** The operator shall apply an estimation method approved in accordance with the second subparagraph of Article 39(2).

**Tier 3:** The operator shall apply analyses in accordance with the first sub-paragraph of Article 39 (2), and in accordance with Articles 32 to 35.

Where an operator assumes a fossil fraction of 100 % in accordance with Article 39(1), no tier shall be assigned for the biomass fraction.

## 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<sub>2</sub>/TJ:  $C = (EF \times NCV) / f$

(b) for emission factors expressed as t CO<sub>2</sub>/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 point (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 point (b) or (c) of Article 31(1) or values in accordance with point (d) 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 apply one of the following:

- (a) determination of the carbon content in accordance with the relevant provisions of Articles 32 to 35;
- (b) the empirical correlation as specified for Tier 2b, where the operator demonstrates to the satisfaction of the competent authority that the uncertainty of the empirical correlation 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.

### 3.2 Tiers for net calorific values

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

### 3.3 Tiers for biomass fraction

The tiers defined in section 2.4 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 and the conversion 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 operator shall apply one of the following:

- (a) the standard factors listed in Annex VI section 2 Table 2;
- (b) other constant values in accordance with point (e) of Article 31(1), where no applicable value is contained in Annex VI.

**Tier 2:** The operator shall apply a country specific emission factor in accordance with point (b) or (c) of Art. 31(1), or values in accordance with point (d) of Article 31(1).

**Tier 3:** The operator shall determine the emission factor in accordance with Articles 32 to 35. Stoichiometric ratios as listed in section 2 of Annex VI shall be used to convert composition data into emission factors, where relevant.

### 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 one of the following:

- (a) the standard factors listed in Annex VI section 2 Table 3.
- (b) other constant values in accordance with point (e) of Article 31(1), where no applicable value is contained in Annex VI.

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

**Tier 3:** The operator shall determine the emission factor 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. For this purpose the operator shall take into account at least CaO and MgO, and shall provide evidence to the competent authority as to which further metal oxides relate to carbonates in the raw materials.

### 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.

5. DEFINITION OF TIERS FOR CALCULATION FACTORS FOR CO<sub>2</sub> PROCESS EMISSIONS FROM OTHER MATERIALS THAN CARBONATES

Process materials giving rise to CO<sub>2</sub> emissions, including urea, coke, graphite and other non-carbonate carbon containing materials, shall be monitored using an input-based approach according to this section, unless included in a mass balance.

5.1 **Tiers for emission factors**

The tiers defined in section 2.1 of this Annex shall be used.

5.2 **Tiers for net calorific value (NCV)**

If the process material contains combustible carbon, the operator shall report the NCV value. The tiers defined in section 2.2 of this Annex shall be used.

5.3 **Tiers for conversion / oxidation factors**

If the process material contains combustible carbon, the operator shall apply an oxidation factor. For this purpose the tiers defined in section 2.3 of this Annex shall be used.

In all other cases the operator shall apply a conversion factor. For this purpose the following tier definitions shall apply:

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

**Tier 2:** 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.

5.4 **Tiers for biomass fraction**

The tiers defined in section 2.4 of this Annex shall be used.

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## ANNEX III

**Monitoring methodologies for aviation (Article 53 and Article 57)**

## 1. CALCULATION METHODOLOGIES FOR THE DETERMINATION OF GHGS IN THE AVIATION SECTOR

**Method A:**

The operator shall use the following formula:

Actual fuel consumption for each flight [t] = Amount of fuel contained in aircraft tanks once fuel uplift for the flight is complete [t] – Amount of fuel contained in aircraft tanks once fuel uplift for subsequent flight is complete [t] + Fuel uplift for that subsequent flight [t]

Where there is no fuel uplift for the flight or subsequent flight, the amount of fuel contained in aircraft tanks shall be determined at block-off for the flight or subsequent flight. In the exceptional case that an aircraft performs activities other than a flight, including undergoing major maintenance involving the emptying of the tanks, after the flight for which fuel consumption is being monitored, the aircraft operator may substitute the quantity 'Amount of fuel contained in aircraft tanks once fuel uplift for subsequent flight is complete + Fuel uplift for that subsequent flight' with the 'Amount of fuel remaining in tanks at the start of the subsequent activity of the aircraft', as recorded by technical logs.

**Method B:**

The operator shall use the following formula:

Actual fuel consumption for each flight [t] = Amount of fuel remaining in aircraft tanks at block-on at the end of the previous flight [t] + Fuel uplift for the flight [t] - Amount of fuel contained in tanks at block-on at the end of the flight [t]

The moment of block-on may be considered equivalent to the moment of engine shut down. Where an aircraft does not perform a flight previous to the flight for which fuel consumption is being monitored, the aircraft operator may substitute the quantity 'Amount of fuel remaining in aircraft tanks at block-on at the end of the previous flight' with the 'Amount of fuel remaining in aircraft tanks at the end of the previous activity of the aircraft', as recorded by technical logs.

## 2. EMISSION FACTORS FOR STANDARD FUELS

Table 1

**Aviation fuel CO<sub>2</sub> emission factors**

Fuel	Emission factor (t CO <sub>2</sub> /t fuel)
Aviation gasoline (AvGas)	3,10
Jet gasoline (Jet B)	3,10
Jet kerosene (Jet A1 or Jet A)	3,15

## 3. CALCULATION OF GREAT CIRCLE DISTANCE

Distance [km] = Great Circle Distance [km] + 95 km

The Great Circle Distance shall be the shortest distance between any two points on the surface of the Earth, which shall be approximated using the system referred to in Article 3.7.1.1 of Annex 15 to the Chicago Convention (WGS 84).

The latitude and longitude of aerodromes shall be taken either from aerodrome location data published in Aeronautical Information Publications (AIP) in compliance with Annex 15 to the Chicago Convention or from a source using AIP data.

Distances calculated by software or by a third party may also be used, provided that the calculation methodology is based on the formula set out in this section, AIP data and WGS 84 requirements.

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## ANNEX IV

**Activity-specific monitoring methodologies related to installations (Article 20(2))**

## 1. SPECIFIC MONITORING RULES FOR EMISSIONS FROM COMBUSTION PROCESSES

**A. Scope**

Operators shall monitor CO<sub>2</sub> 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 system under Article 24 of that Directive including the related scrubbing processes using the rules laid down in this Annex. Any emissions from fuels used as process input shall be treated like combustion emissions with regard to monitoring and reporting methodologies, without prejudice to other classifications applied to emissions.

The operator shall not monitor and report emissions from internal combustion engines for transportation purposes. The operator shall assign all emissions from the combustion of fuels at the installation to the installation, regardless of exports of heat or electricity to other installations. The operator shall not assign emissions associated with the production of heat or electricity that is imported from other installations to the importing installation.

The operator shall include at least the following emission sources: boilers, burners, turbines, heaters, furnaces, incinerators, calciners, kilns, ovens, dryers, engines, fuel cells, chemical looping combustion units, flares, thermal or catalytic post-combustion units, and scrubbers (process emissions) and any other equipment or machinery that uses fuel, excluding equipment or machinery with combustion engines that are used for transportation purposes.

**B. Specific monitoring rules**

The emissions from combustion processes shall be calculated in accordance with Article 24(1), unless the fuels are included in a mass balance in accordance with Article 25. The tiers defined in section 2 of Annex II shall apply. In addition, process emissions from flue gas scrubbing shall be monitored using the provisions laid down in subsection C.

For emissions from flares special requirements shall apply, as laid down in subsection D of this section.

Combustion processes taking place in gas processing terminals may be monitored using a mass balance in accordance with Article 25.

**C. Flue gas scrubbing****C.1 Desulphurisation**

Process CO<sub>2</sub> emissions from the use of carbonate for acid gas scrubbing from the flue gas stream shall be calculated in accordance with Article 24(2) on the basis of carbonate consumed, Method A as follows, or gypsum produced, Method B as follows. The following applies by way of derogation from section 4 of Annex II.

**Method A: Emission factor**

**Tier 1:** The emission factor shall be determined from stoichiometric ratios as laid down in section 2 of Annex VI. The determination of the amount of CaCO<sub>3</sub> and MgCO<sub>3</sub> or other carbonates in the relevant input material shall be carried out using industry best practice guidelines.

**Method B: Emission factor**

**Tier 1:** The emission factor shall be the stoichiometric ratio of dry gypsum (CaSO<sub>4</sub> × 2H<sub>2</sub>O) to CO<sub>2</sub> emitted: 0,2558 t CO<sub>2</sub>/t gypsum.

Conversion Factor:

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

## C.2 De-NO<sub>x</sub>

By way of derogation from section 5 of Annex II, process CO<sub>2</sub> emissions from the use of urea for scrubbing of the flue gas stream shall be calculated in accordance with Article 24(2) applying the following tiers.

Emission factor:

Tier 1: The determination of the amount of urea in the relevant input material shall be carried out using industry best practice guidelines. The emission factor shall be determined using a stoichiometric ratio of 0,7328 t CO<sub>2</sub>/t urea.

Conversion Factor:

Only tier 1 shall be applicable.

## D. Flares

When calculating emissions from flares the operator shall include routine flaring and operational flaring (trips, start-up and shutdown as well as emergency relieves). The operator shall also include inherent CO<sub>2</sub> in accordance with Article 48.

By way of derogation from section 2.1 of Annex II, tiers 1 and 2b for the emission factor shall be defined as follows:

**Tier 1:** The operator shall use a reference emission factor of 0,00393 t CO<sub>2</sub>/Nm<sup>3</sup> derived from the combustion of pure ethane used as a conservative proxy for flare gases.

**Tier 2b:** Installation-specific emission factors shall be derived from an estimate of the molecular weight of the flare stream, using process modelling based on industry standard models. By considering the relative proportions and the molecular weights of each of the contributing streams, a weighted annual average figure shall be derived for the molecular weight of the flare gas.

By way of derogation from section 2.3 of Annex II, only tiers 1 and 2 shall be applied for the oxidation factor in the case of flares.

## 2. REFINING OF MINERAL OIL AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

### A. Scope

The operator shall monitor and report all CO<sub>2</sub> emissions from combustion and production processes as occurring in refineries.

The operator shall include at least the following potential sources of CO<sub>2</sub> emissions: boilers, process heaters/treaters, internal combustion engines/turbines, catalytic and thermal oxidisers, coke calcining kilns, firewater pumps, emergency/standby generators, flares, incinerators, crackers, hydrogen production units, Claus process units, catalyst regeneration (from catalytic cracking and other catalytic processes) and cokers (flexi-coking, delayed coking).

### B. Specific monitoring rules

The monitoring of mineral oil refining activities shall be carried out in accordance with section 1 of this Annex for combustion emissions including flue gas scrubbing. The operator may choose to use the mass balance methodology in accordance with Article 25 for the whole refinery or individual process units such as heavy oil gasification or calcinations plants. Where combinations of standard methodology and mass balance are used, the operator shall provide evidence to the competent authority demonstrating the completeness of emissions covered, and that no double counting of emissions occurs.

Emissions from dedicated hydrogen production units shall be monitored in accordance with section 19 of this Annex.

By way of derogation from Article 24 and 25, emissions from catalytic cracker regeneration, other catalyst regeneration and flexi-cokers shall be monitored using a mass balance, taking into account the state of the input air and the flue gas. All CO in the flue gas shall be accounted for as CO<sub>2</sub>, applying the mass relation: t CO<sub>2</sub> = t CO \* 1,571. The analysis of input air and flue gases and the choice of tiers shall be in accordance with the provisions of Articles 32 to 35. The specific calculation methodology shall be approved by the competent authority.

### 3. PRODUCTION OF COKE AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

#### A. Scope

The operator shall include at least the following potential sources of CO<sub>2</sub> emissions: raw materials (including coal or petroleum coke), conventional fuels (including natural gas), process gases (including blast furnace gas – BFG), other fuels and waste gas scrubbing.

#### B. Specific monitoring rules

For the monitoring of emissions from the production of coke, the operator may choose to use a mass balance in accordance with Article 25 and section 3 of Annex II, or the standard methodology in accordance with Article 24 and sections 2 and 4 of Annex II.

### 4. METAL ORE ROASTING AND SINTERING AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

#### A. Scope

The operator shall include at least the following potential sources of CO<sub>2</sub> emissions: raw materials (calcination of limestone, dolomite and carbonatic iron ores, including FeCO<sub>3</sub>), conventional fuels (including natural gas and coke/coke breeze), process gases (including coke oven gas – COG, and blast furnace gas – BFG), process residues used as input material including filtered dust from the sintering plant, the converter and the blast furnace, other fuels and flue gas scrubbing.

#### B. Specific monitoring rules

For the monitoring of emissions from metal ore roasting, sintering or pelletisation, the operator may choose to use a mass balance in accordance with Article 25 and section 3 of Annex II or the standard methodology in accordance with Article 24 and sections 2, 4 and 5 of Annex II.

### 5. PRODUCTION OF PIG IRON AND STEEL AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

#### A. Scope

The operator shall include at least the following potential sources of CO<sub>2</sub> emissions: raw materials (calcination of limestone, dolomite and carbonatic iron ores, including FeCO<sub>3</sub>), conventional fuels (natural gas, coal and coke), reducing agents (including coke, coal and plastics), process gases (coke oven gas – COG, blast furnace gas – BFG and basic oxygen furnace gas – BOFG), consumption of graphite electrodes, other fuels and waste gas scrubbing.

#### B. Specific monitoring rules

For the monitoring of emissions from production of pig iron and steel, the operator may choose to use a mass balance in accordance with Article 25 and section 3 of Annex II, or the standard methodology in accordance with Article 24 and sections 2 and 4 of Annex II, at least for a part of the source streams, avoiding any gaps or double counting of emissions.

By way of derogation from section 3.1 of Annex II, tier 3 for the carbon content is defined as follows:

**Tier 3:** The operator shall derive the carbon content of input or output stream following Articles 32 to 35 in respect to the representative sampling of fuels, products and by-products, the determination of their carbon contents and biomass fraction. The operator shall base the carbon content of products or semi-finished products on annual analyses following Articles 32 to 35 or derive the carbon content from mid-range composition values as specified by relevant international or national standards.

### 6. PRODUCTION OR PROCESSING OF FERROUS AND NON-FERROUS METALS AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

#### A. Scope

The operator shall not apply the provisions in this section for the monitoring and reporting of CO<sub>2</sub> emissions from the production of pig iron and steel and primary aluminium.

The operator shall consider at least the following potential emission sources for CO<sub>2</sub> emissions: conventional fuels; alternative fuels including plastics granulated material from post shredder plants; reducing agents including coke, graphite electrodes; raw materials including limestone and dolomite; carbon containing metal ores and concentrates; and secondary feed materials.

#### **B. Specific monitoring rules**

Where carbon stemming from fuels or input materials used at this installation remains in the products or other outputs of the production, the operator shall use a mass balance in accordance with Article 25 and section 3 of Annex II. Where this is not the case the operator shall calculate combustion and process emission separately using the standard methodology in accordance with Article 24 and sections 2 and 4 of Annex II.

Where a mass balance is used, the operator may choose to include emissions from combustion processes in the mass balance or to use the standard methodology in accordance with Article 24 and section 1 of this Annex for a part of the source streams, avoiding any gaps or double counting of emissions.

### **7. CO<sub>2</sub> EMISSIONS FROM PRODUCTION OR PROCESSING OF PRIMARY ALUMINIUM AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC**

#### **A. Scope**

The operator shall apply the provisions of this section to the monitoring and reporting of CO<sub>2</sub> emissions from the production of electrodes for primary aluminium smelting, including stand-alone plants for the production of such electrodes, and the consumption of electrodes during electrolysis.

The operator shall consider at least the following potential sources for CO<sub>2</sub> emissions: fuels for the production of heat or steam, electrode production, reduction of Al<sub>2</sub>O<sub>3</sub> during electrolysis which is related to electrode consumption, and use of soda ash or other carbonates for waste gas scrubbing.

The associated emissions of perfluorocarbons – PFCs, resulting from anode effects, including fugitive emissions, shall be monitored in accordance with section 8 of this Annex.

#### **B. Specific monitoring rules**

The operator shall determine CO<sub>2</sub> emissions from the production or processing of primary aluminium using the mass balance methodology in accordance with Article 25. The mass balance methodology shall consider all carbon in inputs, stocks, products and other exports from the mixing, forming, baking and recycling of electrodes as well as from electrode consumption in electrolysis. Where pre-baked anodes are used, either separate mass balances for production and consumption may be applied, or one common mass balance taking into account both production and consumption of electrodes. In the case of Søderberg cells, the operator shall use one common mass balance.

For emissions from combustion processes the operator may choose to include them in the mass balance or to use the standard methodology in accordance with Article 24 and section 1 of this Annex at least for a part of the source streams, avoiding any gaps or double counting of emissions.

### **8. PFC EMISSIONS FROM PRODUCTION OR PROCESSING OF PRIMARY ALUMINIUM AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC**

#### **A. Scope**

The operator shall apply the following for emissions of perfluorocarbons (PFCs) resulting from anode effects including fugitive emissions of PFCs. For associated CO<sub>2</sub> emissions, including emissions from electrode production, the operator shall apply section 7 of this Annex. The operator shall furthermore calculate PFC emissions not related to anode effects based on estimation methods in accordance with industry best practice, and any guidelines published by the Commission for this purpose.

## B. Determination of PFC emissions

PFC emissions shall be calculated from the emissions measurable in a duct or stack ('point source emissions') as well as fugitive emissions using the collection efficiency of the duct:

PFC emissions (total) = PFC emissions (duct) / collection efficiency

The collection efficiency shall be measured when the installation-specific emission factors are determined. For its determination the most recent version of the guidance mentioned under Tier 3 of section 4.4.2.4 of the 2006 IPCC Guidelines shall be used.

The operator shall calculate emissions of CF<sub>4</sub> and C<sub>2</sub>F<sub>6</sub> emitted through a duct or stack using one of the following methods:

- (a) Method A where the anode effect minutes per cell-day are recorded;
- (b) Method B where the anode effect overvoltage is recorded.

### Calculation Method A – Slope Method:

The operator shall use the following equations for determining PFC emissions:

$$\text{CF}_4 \text{ emissions [t]} = \text{AEM} \times (\text{SEF}_{\text{CF}_4} / 1\ 000) \times \text{Pr}_{\text{Al}}$$

$$\text{C}_2\text{F}_6 \text{ emissions [t]} = \text{CF}_4 \text{ emissions} \times \text{F}_{\text{C}_2\text{F}_6}$$

Where:

AEM = Anode effect minutes / cell-day;

SEF<sub>CF<sub>4</sub></sub> = Slope emission factor [(kg CF<sub>4</sub> / t Al produced) / (anode effect minutes / cell-day)]. Where different cell-types are used, different SEF may be applied as appropriate;

Pr<sub>Al</sub> = Annual production of primary Aluminium [t];

F<sub>C<sub>2</sub>F<sub>6</sub></sub> = Weight fraction of C<sub>2</sub>F<sub>6</sub> (t C<sub>2</sub>F<sub>6</sub> / t CF<sub>4</sub>).

The anode effect minutes per cell-day shall express the frequency of anode effects (number anode effects / cell-day) multiplied by the average duration of anode effects (anode effect minutes / occurrence):

$$\text{AEM} = \text{frequency} \times \text{average duration}$$

**Emission factor:** The emission factor for CF<sub>4</sub> (slope emission factor, SEF<sub>CF<sub>4</sub></sub>) expresses the amount [kg] of CF<sub>4</sub> emitted per tonne of aluminium produced per anode effect minute / cell-day. The emission factor (weight fraction F<sub>C<sub>2</sub>F<sub>6</sub></sub>) of C<sub>2</sub>F<sub>6</sub> expresses the amount [t] of C<sub>2</sub>F<sub>6</sub> emitted proportionate to the amount [t] of CF<sub>4</sub> emitted.

**Tier 1:** The operator shall use technology-specific emission factors from Table 1 of this section of Annex IV.

**Tier 2:** The operator shall use installation-specific emission factors for CF<sub>4</sub> and C<sub>2</sub>F<sub>6</sub> established through continuous or intermittent field measurements. For the determination of those emission factors the operator shall use the most recent version of the guidance mentioned under Tier 3 of section 4.4.2.4 of the 2006 IPCC Guidelines<sup>(1)</sup>. The emission factor shall also take into account emissions related to non-anode effects. The operator shall determine each emission factor with a maximum uncertainty of ± 15 %.

The operator shall determine the emission factors at least every three years or earlier where necessary due to relevant changes at the installation. Relevant changes shall include a change in the distribution of anode effect duration, or a change in the control algorithm affecting the mix of the types of anode effects or the nature of the anode effect termination routine.

<sup>(1)</sup> International Aluminium Institute; The Aluminium Sector Greenhouse Gas Protocol; October 2006; US Environmental Protection Agency and International Aluminium Institute; Protocol for Measurement of Tetrafluoromethane (CF<sub>4</sub>) and Hexafluoroethane (C<sub>2</sub>F<sub>6</sub>) Emissions from Primary Aluminum Production; April 2008.

Table 1

**Technology-specific emission factors related to activity data for the slope method.**

Technology	Emission factor for CF <sub>4</sub> (SEF <sub>CF4</sub> ) [(kg CF <sub>4</sub> /t Al) / (AE-Mins/cell-day)]	Emission factor for C <sub>2</sub> F <sub>6</sub> (F <sub>C2F6</sub> ) [t C <sub>2</sub> F <sub>6</sub> / t CF <sub>4</sub> ]
Centre Worked Prebake (CWPB)	0,143	0,121
Vertical Stud Søderberg (VSS)	0,092	0,053

**Calculation Method B – Overvoltage Method:**

Where the anode effect overvoltage is measured, the operator shall use the following equations for the determination of PFC emissions:

$$\text{CF}_4 \text{ emissions [t]} = \text{OVC} \times (\text{AEO/CE}) \times \text{Pr}_{\text{Al}} \times 0,001$$

$$\text{C}_2\text{F}_6 \text{ emissions [t]} = \text{CF}_4 \text{ emissions} \times \text{F}_{\text{CF}_2\text{F}_6}$$

Where:

OVC = Overvoltage coefficient ('emission factor') expressed as kg CF<sub>4</sub> per tonne of aluminium produced per mV overvoltage;

AEO = Anode effect overvoltage per cell [mV] determined as the integral of (time × voltage above the target voltage) divided by the time (duration) of data collection;

CE = Average current efficiency of aluminium production [%];

Pr<sub>Al</sub> = Annual production of primary Aluminium [t];

F<sub>CF<sub>2</sub>F<sub>6</sub></sub> = Weight fraction of C<sub>2</sub>F<sub>6</sub> (t C<sub>2</sub>F<sub>6</sub> / t CF<sub>4</sub>);

The term AEO/CE (Anode effect overvoltage / current efficiency) expresses the time-integrated average anode effect overvoltage [mV overvoltage] per average current efficiency [%].

**Emission factor:** The emission factor for CF<sub>4</sub> ('overvoltage coefficient' OVC) shall express the amount [kg] of CF<sub>4</sub> emitted per tonne of aluminium produced per millivolt overvoltage [mV]. The emission factor of C<sub>2</sub>F<sub>6</sub> (weight fraction F<sub>C<sub>2</sub>F<sub>6</sub></sub>) shall express the amount [t] of C<sub>2</sub>F<sub>6</sub> emitted proportionate to the amount [t] of CF<sub>4</sub> emitted.

**Tier 1:** The operator shall apply technology-specific emission factors from Table 2 of this section of Annex IV.

**Tier 2:** The operator shall use installation-specific emission factors for CF<sub>4</sub> [(kg CF<sub>4</sub> / t Al) / (mV)] and C<sub>2</sub>F<sub>6</sub> [t C<sub>2</sub>F<sub>6</sub> / t CF<sub>4</sub>] established through continuous or intermittent field measurements. For the determination of those emission factors, the operator shall use the most recent version of the guidance mentioned under Tier 3 of section 4.4.2.4 of the 2006 IPCC Guidelines. The operator shall determine the emission factors with a maximum uncertainty of ± 15 % each.

The operator shall determine the emission factors at least every three years or earlier where necessary due to relevant changes at the installation. Relevant changes shall include a change in the distribution of anode effect duration or a change in the control algorithm affecting the mix of the types of anode effects or the nature of the anode effect termination routine.

Table 2

**Technology-specific emission factors related to overvoltage activity data.**

Technology	Emission factor for CF <sub>4</sub> [(kg CF <sub>4</sub> /t Al) / mV]	Emission factor for C <sub>2</sub> F <sub>6</sub> [t C <sub>2</sub> F <sub>6</sub> / t CF <sub>4</sub> ]
Centre Worked Prebake (CWPB)	1,16	0,121
Vertical Stud Søderberg (VSS)	N.A.	0,053

**C. Determination of CO<sub>2(e)</sub> emissions**

The operator shall calculate CO<sub>2(e)</sub> emissions from CF<sub>4</sub> and C<sub>2</sub>F<sub>6</sub> emissions as follows, using the global warming potentials listed in Annex VI section 3 Table 6:

$$\text{PFC emissions [t CO}_{2(e)}] = \text{CF}_4 \text{ emissions [t]} \times \text{GWP}_{\text{CF}_4} + \text{C}_2\text{F}_6 \text{ emissions [t]} \times \text{GWP}_{\text{C}_2\text{F}_6}$$

**9. PRODUCTION OF CEMENT CLINKER AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC****A. Scope**

The operator shall include at least the following potential sources of CO<sub>2</sub> emissions: calcination of limestone in the raw materials, conventional fossil kiln fuels, alternative fossil-based kiln fuels and raw materials, biomass kiln fuels (biomass wastes), non-kiln fuels, organic carbon content of limestone and shales and raw materials used for waste gas scrubbing.

**B. Specific monitoring rules**

Emissions from combustion shall be monitored in accordance with section 1 of this Annex. Process emissions from raw meal components shall be monitored in accordance with section 4 of Annex II based on the carbonate content of the process input (calculation Method A) or on the amount of clinker produced (calculation Method B). In case of Method A, carbonates to be taken into account shall at least include CaCO<sub>3</sub>, MgCO<sub>3</sub> and FeCO<sub>3</sub>. In case of Method B, the operator shall take into account at least CaO and MgO, and shall provide evidence to the competent authority as to which extent further carbon sources have to be taken into account.

CO<sub>2</sub> emissions related to dust removed from the process and organic carbon in the raw materials shall be added in accordance with subsections C and D of this section of Annex IV.

**Calculation Method A: Kiln Input Based**

Where cement kiln dust (CKD) and bypass dust leave the kiln system the operator shall not consider the related raw material as process input, but calculate emissions from CKD in accordance with subsection C.

Unless the raw meal is characterised, the operator shall apply the uncertainty requirements for activity data separately to each of the relevant carbon-bearing kiln inputs, avoiding double counting or omissions from returned or by-passed materials. Where activity data is determined based on the clinker produced, the net amount of raw meal may be determined by means of a site-specific empirical raw meal/clinker ratio. That ratio shall be updated at least once per year applying industry best practice guidelines.

**Calculation Method B: Clinker Output Based**

The operator shall determine activity data as the clinker production [t] over the reporting period in one of the following ways:

- (a) by direct weighing of clinker;

- (b) based on cement deliveries, by material balance taking into account dispatch of clinker, clinker supplies as well as clinker stock variation, using the following formula:

$$\text{clinker produced [t]} = ((\text{cement deliveries [t]} - \text{cement stock variation [t]}) \times \text{clinker / cement ratio [t clinker / t cement]}) - (\text{clinker supplied [t]} + (\text{clinker dispatched [t]} - (\text{clinker stock variation [t]})).$$

The operator shall either derive the clinker / cement ratio for each of the different cement products based on the provisions of Articles 32 to 35 or calculate the ratio from the difference of cement deliveries and stock changes and all materials used as additives to the cement including by-pass dust and cement kiln dust.

By way of derogation from section 4 of Annex II, tier 1 for the emission factor shall be defined as follows:

**Tier 1:** The operator shall apply an emission factor of 0,525 t CO<sub>2</sub>/t clinker.

### C. Emissions Related to Discarded Dust

The operator shall add CO<sub>2</sub> emissions, from bypass dust or cement kiln dust (CKD) leaving the kiln system, corrected for a partial calcination ratio of CKD calculated as process emissions in accordance with Article 24(2). By way of derogation from section 4 of Annex II, tiers 1 and 2 for the emission factor shall be defined as follows:

**Tier 1:** The operator shall apply an emission factor of 0,525 t CO<sub>2</sub>/t dust.

**Tier 2:** The operator shall determine the emission factor (EF) at least once annually following Articles 32 to 35 and using the following formula:

$$EF_{CKD} = \left( \frac{EF_{cli}}{1 + EF_{cli}} \cdot d \right) / \left( 1 - \frac{EF_{cli}}{1 + EF_{cli}} \cdot d \right)$$

Where:

$EF_{CKD}$  = Emission factor of partially calcined cement kiln dust [t CO<sub>2</sub>/t CKD];

$EF_{cli}$  = Installation-specific emission factor of clinker [t CO<sub>2</sub>/t clinker];

$d$  = Degree of CKD calcination (released CO<sub>2</sub> as % of total carbonate CO<sub>2</sub> in the raw mix).

Tier 3 for the emission factor is not applicable.

### D. Emissions from non-carbonate carbon in raw meal

The operator shall determine the emissions from non-carbonate carbon at least from limestone, shale or alternative raw materials (for example, fly ash) used in the raw meal in the kiln in accordance with Article 24(2).

The following tier definitions for the emission factor shall apply:

**Tier 1:** The content of non-carbonate carbon in the relevant raw material shall be estimated using industry best practice guidelines.

**Tier 2:** The content of non-carbonate carbon in the relevant raw material shall be determined at least annually following the provisions of Article 32 to 35.

The following tier definitions for the conversion factor shall apply:

**Tier 1:** A conversion factor of 1 shall be applied.

**Tier 2:** The conversion factor shall be calculated applying industry best practice.

## 10. PRODUCTION OF LIME OR CALCINATION OF DOLOMITE OR MAGNESITE AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

### A. Scope

The operator shall include at least the following potential sources of CO<sub>2</sub> emissions: calcination of limestone, dolomite or magnesite in the raw materials, conventional fossil kiln fuels, alternative fossil-based kiln fuels and raw materials, biomass kiln fuels (biomass wastes) and other fuels.

Where the burnt lime and the CO<sub>2</sub> stemming from the limestone are used for purification processes, such that approximately the same amount of CO<sub>2</sub> is bound again, the decomposition of carbonates as well as the purification process shall not be required to be included separately in the monitoring plan of the installation.

#### **B. Specific monitoring rules**

Emissions from combustion shall be monitored in accordance with section 1 of this Annex. Process emissions from raw materials shall be monitored in accordance with section 4 and section 5 of Annex II. Carbonates of calcium and magnesium shall be always taken into account. Other carbonates and organic carbon in the raw material shall be taken into account, whenever they are relevant for emission calculation.

For the input based methodology, carbonate content values shall be adjusted for the respective moisture and gangue content of the material. In the case of magnesia production, other magnesium bearing minerals than carbonates must be taken into account, as appropriate.

Double counting or omissions resulting from returned or by-pass material must be avoided. When applying Method B, lime kiln dust shall be considered a separate source stream where relevant.

### **11. MANUFACTURE OF GLASS, GLASS FIBRE OR MINERAL WOOL INSULATION MATERIAL AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC**

#### **A. Scope**

The operator shall apply the provisions in this section also to installations for the production of water glass and stone/rock wool.

The operator shall include at least the following potential sources of CO<sub>2</sub> emissions: decomposition of alkali- and alkali earth carbonates as the result of melting the raw material, conventional fossil fuels, alternative fossil-based fuels and raw materials, biomass fuels (biomass wastes), other fuels, carbon containing additives including coke, coal dust and graphite, post-combustion of flue gases and flue gas scrubbing.

#### **B. Specific monitoring rules**

Emissions from combustion, including flue gas scrubbing, shall be monitored in accordance with section 1 of this Annex. Process emissions from raw materials shall be monitored in accordance with section 4 of Annex II. Carbonates to be taken into account include at least CaCO<sub>3</sub>, MgCO<sub>3</sub>, Na<sub>2</sub>CO<sub>3</sub>, NaHCO<sub>3</sub>, BaCO<sub>3</sub>, Li<sub>2</sub>CO<sub>3</sub>, K<sub>2</sub>CO<sub>3</sub>, and SrCO<sub>3</sub>. Only Method A shall be used. Emissions from other process materials including coke, graphite and coal dust shall be monitored in accordance with section 5 of Annex II.

By way of derogation from section 4 of Annex II, the following tier definitions for the emission factor shall apply:

**Tier 1:** Stoichiometric ratios as listed in section 2 of Annex VI shall be used. The purity of relevant input materials shall be determined by means of industry best practice.

**Tier 2:** The determination of the amount of relevant carbonates in each relevant input material shall be carried out in accordance with Articles 32 to 35.

For the conversion factor, only tier 1 shall be applicable.

### **12. MANUFACTURE OF CERAMIC PRODUCTS AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC**

#### **A. Scope**

The operator shall include at least the following potential sources of CO<sub>2</sub> emissions: kiln fuels, calcination of limestone/dolomite and other carbonates in the raw material, limestone and other carbonates for reducing air pollutants and other flue gas cleaning, fossil/biomass additives used to induce porosity including polystyrol, residues from paper production or sawdust, fossil organic material in the clay and other raw materials.

#### **B. Specific monitoring rules**

Emissions from combustion including flue gas scrubbing shall be monitored in accordance with section 1 of this Annex. Process emissions from raw meal components and additives shall be monitored in accordance with sections 4 and 5 of Annex II. For ceramics based on purified or synthetic clays the operator may use either Method A or Method B. For ceramic products based on unprocessed clays and whenever clays or additives with significant organic content are used, the operator shall use Method A. Carbonates of calcium shall be always taken into account. Other carbonates and organic carbon in the raw material shall be taken into account, where they are relevant for emission calculation.

Activity data for input materials for Method A may be determined by a suitable back-calculation based on industry best practice and approved by the competent authority. Such back-calculation shall take into account what metering is available for dried green products or fired products, and appropriate data sources for moisture of clay and additives and annealing loss (loss on ignition) of the materials involved.

By way of derogation from section 4 of Annex II, the following tier definitions for emission factors for process emissions of raw materials containing carbonates shall apply:

**Method A (Input based):**

**Tier 1:** A conservative value of 0,2 tonnes CaCO<sub>3</sub> (corresponding to 0,08794 tonnes of CO<sub>2</sub>) per tonne of dry clay shall be applied for the calculation of the emission factor instead of results of analyses. All inorganic and organic carbon in the clay material shall be considered as included in this value. Additives shall be considered as not included in this value.

**Tier 2:** An emission factor for each source stream shall be derived and updated at least once per year using industry best practice reflecting site-specific conditions and the product mix of the installation.

**Tier 3:** The determination of the composition of the relevant raw materials shall be carried out in accordance with Articles 32 to 35. Stoichiometric ratios as listed in section 2 of Annex VI shall be used to convert composition data into emission factors, where relevant.

**Method B (Output based):**

**Tier 1:** A conservative value of 0,123 tonnes of CaO (corresponding to 0,09642 tonnes of CO<sub>2</sub>) per tonne of product shall be applied for the calculation of the emission factor instead of the results of analyses. All inorganic and organic carbon in the clay material shall be considered as included in this value. Additives shall be considered as not included in this value.

**Tier 2:** An emission factor shall be derived and updated at least once per year using industry best practice reflecting site-specific conditions and the product mix of the installation.

**Tier 3:** The determination of the composition of the products 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, where relevant.

By way of derogation from section 1 of this Annex, for the scrubbing of flue gases the following tier for the emission factor shall apply:

**Tier 1:** The operator shall apply the stoichiometric ratio of CaCO<sub>3</sub> as shown in section 2 of Annex VI.

For scrubbing, no other tier and no conversion factor shall be used. Double counting from used limestone recycled as raw material in the same installation shall be avoided.

13. PRODUCTION OF GYPSUM PRODUCTS AND PLASTER BOARDS AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

**A. Scope**

The operator shall include at least CO<sub>2</sub> emissions from all types of combustion activities.

**B. Specific monitoring rules**

Emissions from combustion shall be monitored in accordance with section 1 of this Annex.

14. PULP AND PAPER PRODUCTION AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

**A. Scope**

The operator shall include at least the following potential sources of CO<sub>2</sub> emissions: boilers, gas turbines, and other combustion devices producing steam or power, recovery boilers and other devices burning spent pulping liquors, incinerators, lime kilns and calciners, waste gas scrubbing and fuel-fired dryers (such as infrared dryers).

## B. Specific monitoring rules

The monitoring of emissions from combustion including flue gas scrubbing shall be carried out in accordance with section 1 of this Annex.

Process emissions from raw materials used as make-up chemicals, including at least limestone or soda ash, shall be monitored by Method A in accordance with section 4 of Annex II. CO<sub>2</sub> emissions from the recovery of limestone sludge in pulp production shall be assumed to be recycled biomass CO<sub>2</sub>. Only the amount of CO<sub>2</sub> proportional to the input from make-up chemicals shall be assumed to give rise to fossil CO<sub>2</sub> emissions.

For emissions from make-up chemicals, the following tier definitions for the emission factor shall apply:

**Tier 1:** Stoichiometric ratios as listed in section 2 of Annex VI shall be used. The purity of relevant input materials shall be determined by means of industry best practice. The derived values shall be adjusted in accordance with the moisture and gangue content of the applied carbonate materials.

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

For the conversion factor, only tier 1 shall be applicable.

## 15. PRODUCTION OF CARBON BLACK AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

### A. Scope

The operator shall include at least all fuels for combustion and all fuels used as process material as sources for CO<sub>2</sub> emissions.

### B. Specific monitoring rules

The monitoring of emissions from carbon black production may be monitored either as a combustion process, including flue gas scrubbing, in accordance with section 1 of this Annex or using a mass balance in accordance with Article 25 and section 3 of Annex II.

## 16. DETERMINATION OF NITROUS OXIDE (N<sub>2</sub>O) EMISSIONS FROM NITRIC ACID, ADIPIC ACID, CAPROLACTAM, GLYOXAL AND GLYOXYLIC ACID PRODUCTION AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

### A. Scope

Each operator shall consider for each activity from which N<sub>2</sub>O emissions result, all sources emitting N<sub>2</sub>O from production processes, including where N<sub>2</sub>O emissions from production are channelled through any abatement equipment. This includes any of the following:

- (a) nitric acid production – N<sub>2</sub>O emissions from the catalytic oxidation of ammonia and/or from the NO<sub>x</sub>/N<sub>2</sub>O abatement units;
- (b) adipic acid production – N<sub>2</sub>O emissions including from the oxidation reaction, any direct process venting and/or any emissions control equipment;
- (c) glyoxal and glyoxylic acid production – N<sub>2</sub>O emissions including from the process reactions, any direct process venting and/or any emissions control equipment;
- (d) caprolactam production – N<sub>2</sub>O emissions including from the process reactions, any direct process venting and/or any emissions control equipment.

These provisions shall not apply to any N<sub>2</sub>O emissions from the combustion of fuels.

### B. Determination of N<sub>2</sub>O emissions

#### B.1. Annual N<sub>2</sub>O emissions

The operator shall monitor emissions of N<sub>2</sub>O from nitric acid production using continuous emissions measurement. The operator shall monitor emissions of N<sub>2</sub>O from adipic acid, caprolactam, glyoxal and glyoxylic acid production using a measurement-based methodology for abated emissions and a calculation-based method (based on a mass balance methodology) for temporary occurrences of unabated emissions.

For each emission source where continuous emissions measurement is applied, the operator shall consider the total annual emissions to be the sum of all hourly emissions using equation 1 given in section 3 of Annex VIII.

### B.2. Hourly N<sub>2</sub>O emissions

The operator shall calculate annual average hourly N<sub>2</sub>O emissions for each source where continuous emission measurement is applied using equation 2 given in section 3 of Annex VIII.

The operator shall determine hourly N<sub>2</sub>O concentrations in the flue gas from each emission source using a measurement-based methodology at a representative point, after the NO<sub>x</sub>/N<sub>2</sub>O abatement equipment, where abatement is used. The operator shall apply techniques capable of measuring N<sub>2</sub>O concentrations of all emission sources during both abated and unabated conditions. Where uncertainties increase during such periods, the operator shall take them into account in the uncertainty assessment.

The operator shall adjust all measurements to a dry gas basis where required and report them consistently.

### B.3. Determination of flue gas flow

The operator shall use the methods for monitoring flue gas flow set out in Article 43(5) of this Regulation for measuring the flue gas flow for N<sub>2</sub>O emissions monitoring. For nitric acid production, the operator shall apply the method in accordance with point (a) of Article 43(5) unless it is technically not feasible. In that case and upon approval by the competent authority, the operator shall apply an alternative method, including by a mass balance methodology based on significant parameters such as ammonia input load, or determination of flow by continuous emissions flow measurement.

The flue gas flow shall be calculated in accordance with the following formula:

$$V_{\text{flue gas flow}} [\text{Nm}^3/\text{h}] = V_{\text{air}} * (1 - O_{2, \text{air}}) / (1 - O_{2, \text{flue gas}})$$

Where:

$V_{\text{air}}$  = Total input air flow in Nm<sup>3</sup>/h at standard conditions;

$O_{2, \text{air}}$  = Volume fraction of O<sub>2</sub> in dry air [= 0,2095];

$O_{2, \text{flue gas}}$  = Volume fraction of O<sub>2</sub> in the flue gas.

The  $V_{\text{air}}$  shall be calculated as the sum of all air flows entering the nitric acid production unit.

The operator shall apply the following formula, unless stated otherwise in its monitoring plan:

$$V_{\text{air}} = V_{\text{prim}} + V_{\text{sec}} + V_{\text{seal}}$$

Where:

$V_{\text{prim}}$  = Primary input air flow in Nm<sup>3</sup>/h at standard conditions;

$V_{\text{sec}}$  = Secondary input air flow in Nm<sup>3</sup>/h at standard conditions;

$V_{\text{seal}}$  = Seal input air flow in Nm<sup>3</sup>/h at standard conditions.

The operator shall determine  $V_{\text{prim}}$  by continuous flow measurement before the mixing with ammonia takes place. The operator shall determine  $V_{\text{sec}}$  by continuous flow measurement, including where the measurement is before the heat recovery unit. For  $V_{\text{seal}}$  the operator shall consider the purged airflow within the nitric acid production process.

For input air streams accounting for cumulatively less than 2,5 % of the total air flow, the competent authority may accept estimation methods for the determination of that air flow rate proposed by the operator based on industry best practices.

The operator shall provide evidence through measurements under normal operating conditions that the flue gas flow measured is sufficiently homogeneous to allow for the proposed measurement method. Where non-homogeneous flow is confirmed through these measurements, the operator shall take that into account when determining appropriate monitoring methods and when calculating the uncertainty in the N<sub>2</sub>O emissions.

The operator shall adjust all measurements to a dry gas basis and report them consistently.

#### B.4. Oxygen (O<sub>2</sub>) concentrations

The operator shall measure the oxygen concentrations in the flue gas where necessary for calculating the flue gas flow in accordance with subsection B.3 of this section of Annex IV. In doing so, the operator shall comply with the requirements for concentration measurements within Article 41(1) and (2). In determining the uncertainty of N<sub>2</sub>O emissions, the operator shall take the uncertainty of O<sub>2</sub> concentration measurements into account.

The operator shall adjust all measurements to a dry gas basis where required and report them consistently.

#### B.5. Calculation of N<sub>2</sub>O emissions

For specific periods of unabated emissions of N<sub>2</sub>O from adipic acid, caprolactam, glyoxal and glyoxylic acid production, including unabated emissions from venting for safety reasons and when abatement plant fails, and where continuous emissions monitoring of N<sub>2</sub>O is technically not feasible, the operator shall subject to the approval of the specific methodology by the competent authority calculate N<sub>2</sub>O emissions using a mass balance methodology. For this purpose the overall uncertainty shall be similar to the result of applying the tier requirements of Article 41(1) and (2). The operator shall base the calculation method on the maximum potential emission rate of N<sub>2</sub>O from the chemical reaction taking place at the time and the period of the emission.

The operator shall take the uncertainty in any calculated emissions for a specific emission source into account in determining the annual average hourly uncertainty for the emission source.

#### B.6. Determination of activity production rates

Production rates shall be calculated using daily production reports and hours of operation.

#### B.7. Sampling rates

Valid hourly averages or averages for shorter reference periods shall be calculated in accordance with Article 44 for:

- (a) concentration of N<sub>2</sub>O in the flue gas;
- (b) total flue gas flow where this is measured directly and where required;
- (c) all gas flows and oxygen concentrations necessary to determine the total flue gas flow indirectly.

### C. Determination of annual CO<sub>2</sub> equivalent – CO<sub>2(e)</sub>

The operator shall convert the total annual N<sub>2</sub>O emissions from all emissions sources, measured in tonnes to three decimal places, to annual CO<sub>2(e)</sub> in rounded tonnes, using the following formula and the GWP values in Annex VI section 3:

$$\text{CO}_{2(e)} [\text{t}] = \text{N}_2\text{O}_{\text{annual}}[\text{t}] \times \text{GWP}_{\text{N}_2\text{O}}$$

Where:

$\text{N}_2\text{O}_{\text{annual}}$  = total annual N<sub>2</sub>O emissions, calculated according to equation 1 given in section 3 of Annex VIII.

The total annual CO<sub>2(e)</sub> generated by all emission sources and any direct CO<sub>2</sub> emissions from other emission sources included under the greenhouse gas permit shall be added to the total annual CO<sub>2</sub> emissions generated by the installation and shall be used for reporting and surrendering allowances.

Total annual emissions of N<sub>2</sub>O shall be reported in tonnes to three decimal places and as CO<sub>2(e)</sub> in rounded tonnes.

## 17. PRODUCTION OF AMMONIA AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

### A. Scope

The operator shall include at least the following potential emission sources for CO<sub>2</sub> emissions: combustion of fuels supplying the heat for reforming or partial oxidation, fuels used as process input in the ammonia production process (reforming or partial oxidation), fuels used for other combustion processes including for the purpose of producing hot water or steam.

**B. Specific monitoring rules**

For monitoring of emissions from combustion processes and from fuels used as process inputs, the standard methodology in accordance with Article 24 and section 1 of this Annex shall be applied.

Where CO<sub>2</sub> from ammonia production is used as feedstock for the production of urea or other chemicals, or transferred out of the installation for any use not covered by Article 49(1), the related amount of CO<sub>2</sub> shall be considered as emitted by the installation producing the CO<sub>2</sub>.

**18. PRODUCTION OF BULK ORGANIC CHEMICALS AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC****A. Scope**

The operator shall take into account at least the following sources of CO<sub>2</sub> emissions: cracking (catalytic and non-catalytic), reforming, partial or full oxidation, similar processes which lead to CO<sub>2</sub> emissions from carbon contained in hydrocarbon based feedstock, combustion of waste gases and flaring, and the burning of fuel in other combustion processes.

**B. Specific monitoring rules**

Where the production of bulk organic chemicals is technically integrated in a mineral oil refinery, the operator of that installation shall apply the relevant provisions of section 2 of this Annex.

Notwithstanding the first subparagraph, the operator shall monitor emissions from combustion processes where the fuels used do not take part in or stem from chemical reactions for the production of bulk organic chemicals using the standard methodology in accordance with Article 24 and section 1 of this Annex. In all other cases, the operator may choose to monitor the emissions from bulk organic chemicals production by mass balance methodology in accordance with Article 25 or the standard methodology in accordance with Article 24. Where using the standard methodology, the operator shall provide evidence to the competent authority that the chosen methodology covers all relevant emissions that would also be covered by a mass-balance methodology.

For the determination of the carbon content under Tier 1, the reference emission factors as listed in Table 5 in Annex VI shall be applied. For substances not listed in Table 5 of Annex VI or other provisions of this Regulation, the operator shall calculate the carbon content from the stoichiometric carbon content in the pure substance and the concentration of the substance in the input or output stream.

**19. PRODUCTION OF HYDROGEN AND SYNTHESIS GAS AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC****A. Scope**

The operator shall include at least the following potential emission sources for CO<sub>2</sub> emissions: fuels used in the hydrogen or synthesis gas production process (reforming or partial oxidation), and fuels used for other combustion processes including for the purpose of producing hot water or steam. Synthesis gas produced shall be considered as source stream under the mass balance methodology.

**B. Specific monitoring rules**

For monitoring of emissions from combustion processes and from fuels used as process inputs in hydrogen production, the standard methodology in accordance with Article 24 and section 1 of this Annex shall be used.

For the monitoring of emissions from the production of synthesis gas, a mass balance in accordance with Article 25 shall be used. For emissions from separate combustion processes, the operator may choose to include them in the mass balance or to use the standard methodology in accordance with Article 24 at least for a part of the source streams, avoiding any gaps or double counting of emissions.

Where hydrogen and synthesis gas are produced at the same installation, the operator shall calculate CO<sub>2</sub> emissions using either separate methodologies for hydrogen and for synthesis gas as outlined in the first two paragraphs of this subsection, or using one common mass balance.

## 20. PRODUCTION OF SODA ASH AND SODIUM BICARBONATE AS LISTED IN ANNEX I TO DIRECTIVE 2003/87/EC

**A. Scope**

The emission sources and source streams for CO<sub>2</sub> emissions from installations for the production of soda ash and sodium bicarbonate shall include:

- (a) fuels used for combustion processes, including fuels used for the purpose of producing hot water or steam;
- (b) raw materials, including vent gas from calcination of limestone, to the extent it is not used for carbonation;
- (c) waste gases from washing or filtration steps after carbonation, to the extent it is not used for carbonation.

**B. Specific monitoring rules**

For the monitoring of emissions from the production of soda ash and sodium bicarbonate, the operator shall use a mass balance in accordance with Article 25. For emissions from combustion processes, the operator may choose to include them in the mass balance or to use the standard methodology in accordance with Article 24 at least for a part of the source streams, avoiding any gaps or double counting of emissions.

Where CO<sub>2</sub> from the production of soda ash is used for the production of sodium bicarbonate, the amount of CO<sub>2</sub> used for producing sodium bicarbonate from soda ash shall be considered as emitted by the installation producing the CO<sub>2</sub>.

21. DETERMINATION OF GREENHOUSE GAS EMISSIONS FROM CO<sub>2</sub> CAPTURE ACTIVITIES FOR THE PURPOSES OF TRANSPORT AND GEOLOGICAL STORAGE IN A STORAGE SITE PERMITTED UNDER DIRECTIVE 2009/31/EC**A. Scope**

CO<sub>2</sub> capture shall be performed either by a dedicated installation receiving CO<sub>2</sub> by transfer from one or more other installations, or by the same installation carrying out the activities producing the captured CO<sub>2</sub> under the same greenhouse gas emissions permit. All parts of the installation related to CO<sub>2</sub> capture, intermediate storage, transfer to a CO<sub>2</sub> transport network or to a site for geological storage of CO<sub>2</sub> greenhouse gas emissions shall be included in the greenhouse gas emissions permit and accounted for in the associated monitoring plan. In the case of the installation carrying out other activities covered by Directive 2003/87/EC, the emissions of those activities shall be monitored in accordance with the other relevant sections of this Annex.

The operator of a CO<sub>2</sub> capture activity shall at least include the following potential sources of CO<sub>2</sub> emission:

- (a) CO<sub>2</sub> transferred to the capture installation;
- (b) combustion and other associated activities at the installation that are related to the capture activity, including fuel and input material use.

**B. Quantification of transferred and emitted CO<sub>2</sub> amounts***B.1. Installation level quantification*

Each operator shall calculate the emissions by taking into account the potential CO<sub>2</sub> emissions from all emission relevant processes at the installation, as well as the amount of CO<sub>2</sub> captured and transferred to the transport network, using the following formula:

$$E_{\text{capture installation}} = T_{\text{input}} + E_{\text{without capture}} - T_{\text{for storage}}$$

Where:

$E_{\text{capture installation}}$  = Total greenhouse gas emissions of the capture installation;

$T_{\text{input}}$  = Amount of CO<sub>2</sub> transferred to the capture installation, determined in accordance with Article 40 to 46 and Article 49.

$E_{\text{without capture}}$  = Emissions of the installation assuming the CO<sub>2</sub> were not captured, meaning the sum of the emissions from all other activities at the installation, monitored in accordance with relevant sections of Annex IV;

$T_{\text{for storage}}$  = Amount of CO<sub>2</sub> transferred to a transport network or a storage site, determined in accordance with Article 40 to 46 and Article 49.

In cases where CO<sub>2</sub> capture is carried out by the same installation as the one from which the captured CO<sub>2</sub> originates, the operator shall use zero for  $T_{input}$ .

In cases of stand-alone capture installations, the operator shall consider  $E_{without\ capture}$  to represent the amount of emissions that occur from other sources than the CO<sub>2</sub> transferred to the installation for capture. The operator shall determine those emissions in accordance with this Regulation.

In the case of stand-alone capture installations, the operator of the installation transferring CO<sub>2</sub> to the capture installation shall deduct the amount  $T_{input}$  from the emissions of its installation in accordance with Article 49.

#### B.2. Determination of transferred CO<sub>2</sub>

Each operator shall determine the amount of CO<sub>2</sub> transferred from and to the capture installation in accordance with Article 49 by means of measurement methodologies carried out in accordance with Articles 40 to 46.

Only where the operator of the installation transferring CO<sub>2</sub> to the capture installation demonstrates to the satisfaction of the competent authority that CO<sub>2</sub> transferred to the capture installation is transferred in total and to at least equivalent accuracy, may the competent authority allow that operator to use a calculation-based methodology in accordance with Article 24 or 25 to determine the amount  $T_{input}$  instead of a measurement-based methodology in accordance with Article 40 to 46 and Article 49.

### 22. DETERMINATION OF GREENHOUSE GAS EMISSIONS FROM THE TRANSPORT OF CO<sub>2</sub> BY PIPELINES FOR GEOLOGICAL STORAGE IN A STORAGE SITE PERMITTED UNDER DIRECTIVE 2009/31/EC

#### A. Scope

The boundaries for monitoring and reporting emissions from CO<sub>2</sub> transport by pipeline shall be laid down in the transport network's greenhouse gas emissions permit, including all ancillary plant functionally connected to the transport network, including booster stations and heaters. Each transport network shall have a minimum of one start point and one end point, each connected to other installations carrying out one or more of the activities: capture, transport or geological storage of CO<sub>2</sub>. Start and end points may include bifurcations of the transport network and cross national borders. Start and end points as well as the installations they are connecting to, shall be laid down in the greenhouse gas emissions permit.

Each operator shall consider at least the following potential emission sources for CO<sub>2</sub> emissions: combustion and other processes at installations functionally connected to the transport network including booster stations; fugitive emissions from the transport network; vented emissions from the transport network; and emissions from leakage incidents in the transport network.

#### B. Quantification Methodologies for CO<sub>2</sub>

The operator of transport networks shall determine emissions using one of the following methods:

- (a) Method A (overall mass balance of all input and output streams) set out in subsection B.1;
- (b) Method B (monitoring of emission sources individually) set out in subsection B.2.

In choosing either Method A or Method B, each operator shall demonstrate to the competent authority that the chosen methodology will lead to more reliable results with lower uncertainty of the overall emissions, using best available technology and knowledge at the time of the application for the greenhouse gas emissions permit and approval of the monitoring plan, without incurring unreasonable costs. Where Method B is chosen each operator shall demonstrate to the satisfaction of the competent authority that the overall uncertainty for the annual level of greenhouse gas emissions for the operator's transport network does not exceed 7,5 %.

The operator of a transport network using Method B shall not add CO<sub>2</sub> received from another installation permitted in accordance with Directive 2003/87/EC to its calculated level of emissions, and shall not subtract from its calculated level of emissions any CO<sub>2</sub> transferred to another installation permitted in accordance with Directive 2003/87/EC.

Each operator of a transport network shall use Method A for the validation of the results of Method B at least once annually. For that validation, the operator may use lower tiers for the application of Method A.

**B.1. Method A**

Each operator shall determine emissions in accordance with the following formula:

$$\text{Emissions [t CO}_2\text{]} = E_{\text{own activity}} + \sum_i T_{\text{IN},i} - \sum_i T_{\text{OUT},i}$$

Where:

Emissions = Total CO<sub>2</sub> emissions of the transport network [t CO<sub>2</sub>];

$E_{\text{own activity}}$  = Emissions from the transport network's own activity, meaning not emissions stemming from the CO<sub>2</sub> transported, but including emissions from fuel used in booster stations, monitored in accordance with the relevant sections of Annex IV;

$T_{\text{IN},i}$  = Amount of CO<sub>2</sub> transferred to the transport network at entry point  $i$ , determined in accordance with Articles 40 to 46 and Article 49.

$T_{\text{OUT},i}$  = Amount of CO<sub>2</sub> transferred out of the transport network at exit point  $i$ , determined in accordance with Articles 40 to 46 and Article 49.

**B.2. Method B**

Each operator shall determine emissions considering all processes relevant to emissions at the installation as well as the amount of CO<sub>2</sub> captured and transferred to the transport facility using the following formula:

$$\text{Emissions [t CO}_2\text{]} = \text{CO}_2_{\text{fugitive}} + \text{CO}_2_{\text{vented}} + \text{CO}_2_{\text{leakage events}} + \text{CO}_2_{\text{installations}}$$

Where:

Emissions = Total CO<sub>2</sub> emissions of the transport network [t CO<sub>2</sub>];

$\text{CO}_2_{\text{fugitive}}$  = Amount of fugitive emissions [t CO<sub>2</sub>] from CO<sub>2</sub> transported in the transport network, including from seals, valves, intermediate compressor stations and intermediate storage facilities;

$\text{CO}_2_{\text{vented}}$  = Amount of vented emissions [t CO<sub>2</sub>] from CO<sub>2</sub> transported in the transport network;

$\text{CO}_2_{\text{leakage events}}$  = Amount of CO<sub>2</sub> [t CO<sub>2</sub>] transported in the transport network, which is emitted as the result of the failure of one or more components of the transport network;

$\text{CO}_2_{\text{installations}}$  = Amount of CO<sub>2</sub> [t CO<sub>2</sub>] being emitted from combustion or other processes functionally connected to the pipeline transport in the transport network, monitored in accordance with the relevant sections of Annex IV.

**B.2.1. Fugitive emissions from the transport network**

The operator shall consider fugitive emissions from any of the following types of equipment:

- (a) seals;
- (b) measurement devices;
- (c) valves;
- (d) intermediate compressor stations;
- (e) intermediate storage facilities.

The operator shall determine average emission factors  $EF$  (expressed in g CO<sub>2</sub>/unit time) per piece of equipment per occurrence where fugitive emissions can be anticipated at the beginning of operation, and by the end of the first reporting year in which the transport network is in operation at the latest. The operator shall review those factors at least every 5 years in the light of the best available techniques and knowledge.

The operator shall calculate fugitive emissions by multiplying the number of pieces of equipment in each category by the emission factor and adding up the results for the single categories as shown in the following equation:

$$\text{Fugitive Em [t CO}_2\text{]} = \left( \sum_{\text{Category}} \text{EF [g CO}_2\text{/occurrence]} \cdot N_{\text{occurrence}} \right) / 10^6$$

The number of occurrences ( $N_{\text{occurrence}}$ ) shall be the number of pieces of the given equipment per category, multiplied by the number of time units per year.

#### B.2.2. Emissions from leakage events

The operator of a transport network shall provide evidence of the network integrity by using representative (spatial and time-related) temperature and pressure data. Where the data indicates that a leakage has occurred, the operator shall calculate the amount of CO<sub>2</sub> leaked with a suitable methodology documented in the monitoring plan, based on industry best practice guidelines, including by use of the differences in temperature and pressure data compared to integrity related average pressure and temperature values.

#### B.2.3. Vented emissions

Each operator shall provide in the monitoring plan an analysis regarding potential situations of venting emissions, including for maintenance or emergency reasons, and provide a suitable documented methodology for calculating the amount of CO<sub>2</sub> vented, based on industry best practice guidelines.

### 23. GEOLOGICAL STORAGE OF CO<sub>2</sub> IN A STORAGE SITE PERMITTED UNDER DIRECTIVE 2009/31/EC

#### A. Scope

The competent authority shall base the boundaries for monitoring and reporting of emissions from geological storage of CO<sub>2</sub> on the delimitation of the storage site and storage complex as specified in the permit pursuant to Directive 2009/31/EC. Where leakages from the storage complex are identified and lead to emissions or release of CO<sub>2</sub> into the water column, the operator shall immediately carry out all of the following:

- (a) notify the competent authority;
- (b) include the leakage as an emission source for the respective installation;
- (c) monitor and report the emissions.

Only when corrective measures in accordance with 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 shall the operator delete the respective leakage as emission source from the monitoring plan and no longer monitor and report those emissions.

Each operator of a geological storage activity shall consider at least the following potential emission sources for CO<sub>2</sub> overall: fuel use by associated booster stations and other combustion activities including on-site power plants; venting from injection or enhanced hydrocarbon recovery operations; fugitive emissions from injection; breakthrough CO<sub>2</sub> from enhanced hydrocarbon recovery operations; and leakages.

#### B. Quantification of CO<sub>2</sub> emissions

The operator of the geological storage activity shall not add CO<sub>2</sub> received from another installation to its calculated level of emissions, and shall not subtract from its calculated level of emissions any CO<sub>2</sub> which is geologically stored in the storage site or which is transferred to another installation.

##### B.1. Vented and fugitive emissions from injection

The operator shall determine emissions from venting and fugitive emissions as follows:

$$\text{CO}_2 \text{ emitted [t CO}_2\text{]} = \text{V CO}_2 \text{ [t CO}_2\text{]} + \text{F CO}_2 \text{ [t CO}_2\text{]}$$

Where:

V CO<sub>2</sub> = amount of CO<sub>2</sub> vented;

F CO<sub>2</sub> = amount of CO<sub>2</sub> from fugitive emissions.

Each operator shall determine V CO<sub>2</sub> using measurement-based methodologies in accordance with Articles 41 to 46 of this Regulation. By way of derogation from the first sentence and upon approval by the competent authority, the operator may include in the monitoring plan an appropriate methodology for determining V CO<sub>2</sub> based on industry best practice, where the application of measurement-based methodologies would incur unreasonable costs.

The operator shall consider F CO<sub>2</sub> as one source, meaning that the uncertainty requirements associated with the tiers in accordance with section 1 of Annex VIII are applied to the total value instead of the individual emission points. Each operator shall provide in the monitoring plan an analysis regarding potential sources of fugitive emissions, and provide a suitable documented methodology to calculate or measure the amount of F CO<sub>2</sub>, based on industry best practice guidelines. For the determination of F CO<sub>2</sub> the operator may use data collected in accordance with Article 32 to 35 and Annex II(1.1)(e) to (h) of Directive 2009/31/EC for the injection facility, where they comply with the requirements of this Regulation.

#### B.2. Vented and fugitive emissions from enhanced hydrocarbon recovery operations

Each operator shall consider the following potential additional emission sources from enhanced hydrocarbon recovery (EHR):

- (a) the oil-gas separation units and gas recycling plant, where fugitive emissions of CO<sub>2</sub> could occur;
- (b) the flare stack, where emissions might occur due to the application of continuous positive purge systems and during depressurisation of the hydrocarbon production installation;
- (c) the CO<sub>2</sub> purge system, to avoid high concentrations of CO<sub>2</sub> extinguishing the flare.

Each operator shall determine fugitive emissions or vented CO<sub>2</sub> in accordance with subsection B.1 of this section of Annex IV.

Each operator shall determine emissions from the flare stack in accordance with subsection D of section 1 of this Annex, taking into account potential inherent CO<sub>2</sub> in the flare gas in accordance with Article 48.

#### B.3. Leakage from the storage complex

Emissions and release to the water column shall be quantified as follows:

$$CO_2\text{emitted [t CO}_2\text{]} = \sum_{T_{\text{Start}}}^{T_{\text{End}}} L\text{ CO}_2\text{ [t CO}_2\text{/d]}$$

Where:

L CO<sub>2</sub> = the mass of CO<sub>2</sub> emitted or released per calendar day due to the leakage in accordance with all of the following:

- (a) for each calendar day for which leakage is monitored, each operator shall calculate L CO<sub>2</sub> as the average of the mass leaked per hour [t CO<sub>2</sub>/h] multiplied by 24;
- (b) each operator shall determine the mass leaked per hour in accordance with the provisions in the approved monitoring plan for the storage site and the leakage;
- (c) for each calendar day prior to commencement of monitoring, the operator shall take the mass leaked per day to equal the mass leaked per day for the first day of monitoring ensuring no under-estimation occurs;

T<sub>start</sub> = the latest of:

- (a) the last date when no emissions or release of CO<sub>2</sub> into the water column from the source under consideration were reported;
- (b) the date the CO<sub>2</sub> injection started;
- (c) another date such that there is evidence demonstrating to the satisfaction of the competent authority that the emission or release into the water column cannot have started before that date.

T<sub>end</sub> = the date by which corrective measures in accordance with Article 16 of Directive 2009/31/EC have been taken and emissions or release of CO<sub>2</sub> into the water column can no longer be detected.

The competent authority shall approve and allow the use of other methods for the quantification of emissions or release of CO<sub>2</sub> into the water column from leakages where the operator can show to the satisfaction of the competent authority that such methods lead to a higher accuracy than the methodology set out in this subsection.

The operator shall quantify the amount of emissions leaked from the storage complex for each of the leakage events with a maximum overall uncertainty over the reporting period of 7,5 %. Where the overall uncertainty of the applied quantification methodology exceeds 7,5 %, each operator shall apply an adjustment, as follows:

$$\text{CO}_{2,\text{Reported}} [\text{t CO}_2] = \text{CO}_{2,\text{Quantified}} [\text{t CO}_2] \times (1 + (\text{Uncertainty}_{\text{System}} [\%]/100) - 0,075)$$

Where:

$\text{CO}_{2,\text{Reported}}$  = the amount of CO<sub>2</sub> to be included in the annual emission report with regards to the leakage event in question;

$\text{CO}_{2,\text{Quantified}}$  = the amount of CO<sub>2</sub> determined through the used quantification methodology for the leakage event in question;

$\text{Uncertainty}_{\text{System}}$  = the level of uncertainty associated with the quantification methodology used for the leakage event in question.

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## ANNEX V

**Minimum tier requirements for calculation-based methodologies involving category A installations and calculation factors for commercial standard fuels used by category B and C installations (Article 26(1))**

Table 1

**Minimum tiers to be applied for calculation-based methodologies in the case of category A installations and in the case of calculation factors for commercial standard fuels for all installations in accordance with point (a) of Article 26(1)**

Activity/Source stream type	Activity data		Emission factor (*)	Composition data (carbon content) (*)	Oxidation factor	Conversion factor
	Amount of fuel or material	Net calorific value				
<b>Combustion of fuels</b>						
Commercial standard fuels	2	2a/2b	2a/2b	n.a.	1	n.a.
Other gaseous and liquid fuels	2	2a/2b	2a/2b	n.a.	1	n.a.
Solid fuels	1	2a/2b	2a/2b	n.a.	1	n.a.
Mass balance methodology for Gas Processing Terminals	1	n.a.	n.a.	1	n.a.	n.a.
Flares	1	n.a.	1	n.a.	1	n.a.
Scrubbing (carbonate)	1	n.a.	1	n.a.	n.a.	1
Scrubbing (gypsum)	1	n.a.	1	n.a.	n.a.	1
Scrubbing (urea)	1	1	1	n.a.	1	n.a.
<b>Refining of mineral oil</b>						
Catalytic cracker regeneration	1	n.a.	n.a.	n.a.	n.a.	n.a.
<b>Production of coke</b>						
Mass balance	1	n.a.	n.a.	2	n.a.	n.a.
Fuel as process input	1	2	2	n.a.	n.a.	n.a.
<b>Metal ore roasting and sintering</b>						
Mass balance	1	n.a.	n.a.	2	n.a.	n.a.
Carbonate input	1	n.a.	1	n.a.	n.a.	1
<b>Production of iron and steel</b>						
Mass balance	1	n.a.	n.a.	2	n.a.	n.a.
Fuel as process input	1	2a/2b	2	n.a.	n.a.	n.a.

Activity/Source stream type	Activity data		Emission factor (*)	Composition data (carbon content) (*)	Oxidation factor	Conversion factor
	Amount of fuel or material	Net calorific value				
<b>Production or processing of ferrous and non-ferrous metals, including secondary aluminium</b>						
Mass balance	1	n.a.	n.a.	2	n.a.	n.a.
Process emissions	1	n.a.	1	n.a.	n.a.	1
<b>Primary aluminium production</b>						
Mass balance for CO <sub>2</sub> emissions	1	n.a.	n.a.	2	n.a.	n.a.
PFC emissions (slope method)	1	n.a.	1	n.a.	n.a.	n.a.
PFC emissions (overtoltage method)	1	n.a.	1	n.a.	n.a.	n.a.
<b>Production of cement clinker</b>						
Kiln input based (Method A)	1	n.a.	1	n.a.	n.a.	1
Clinker output (Method B)	1	n.a.	1	n.a.	n.a.	1
CKD	1	n.a.	1	n.a.	n.a.	n.a.
Non-carbonate carbon input	1	n.a.	1	n.a.	n.a.	1
<b>Production of lime and calcination of dolomite and magnesite</b>						
Carbonates (Method A)	1	n.a.	1	n.a.	n.a.	1
Other process inputs	1	n.a.	1	n.a.	n.a.	1
Alkali earth oxide (Method B)	1	n.a.	1	n.a.	n.a.	1
<b>Manufacture of glass and mineral wool</b>						
Carbonate inputs	1	n.a.	1	n.a.	n.a.	n.a.
Other process inputs	1	n.a.	1	n.a.	n.a.	1
<b>Manufacture of ceramic products</b>						
Carbon inputs (Method A)	1	n.a.	1	n.a.	n.a.	1
Other process inputs	1	n.a.	1	n.a.	n.a.	1
Alkali oxide (Method B)	1	n.a.	1	n.a.	n.a.	1
Scrubbing	1	n.a.	1	n.a.	n.a.	n.a.

Activity/Source stream type	Activity data		Emission factor (*)	Composition data (carbon content) (*)	Oxidation factor	Conversion factor
	Amount of fuel or material	Net calorific value				
<b>Production of gypsum and plasterboard: see combustion of fuels</b>						
<b>Production of pulp and paper</b>						
Make up chemicals	1	n.a.	1	n.a.	n.a.	n.a.
<b>Production of carbon black</b>						
Mass balance methodology	1	n.a.	n.a.	1	n.a.	n.a.
<b>Production of ammonia</b>						
Fuel as process input	2	2a/2b	2a/2b	n.a.	n.a.	n.a.
<b>Production of bulk organic chemicals</b>						
Mass balance	1	n.a.	n.a.	2	n.a.	n.a.
<b>Production of hydrogen and synthesis gas</b>						
Fuel as process input	2	2a/2b	2a/2b	n.a.	n.a.	n.a.
Mass balance	1	n.a.	n.a.	2	n.a.	n.a.
<b>Production of soda ash and sodium bicarbonate</b>						
Mass balance	1	n.a.	n.a.	2	n.a.	n.a.

('n.a.' means 'not applicable')

(\*) Tiers for the emission factor relate to the preliminary emission factor, and carbon content relates to the total carbon content. For mixed materials, the biomass fraction must be determined separately. Tier 1 shall be the minimum tier to be applied for the biomass fraction in the case of category A installations and in the case of commercial standard fuels for all installations in accordance with point (a) of Article 26(1).

## ANNEX VI

**Reference values for calculation factors (Article 31(1)(a))**

## 1. FUEL EMISSION FACTORS RELATED TO NET CALORIFIC VALUES (NCV)

Table 1

**Fuel emission factors related to net calorific value (NCV) and net calorific values per mass of fuel.**

Fuel type description	Emission factor (t CO <sub>2</sub> /TJ)	Net calorific value (TJ/Gg)	Source
Crude oil	73,3	42,3	IPCC 2006 GL
Orimulsion	77,0	27,5	IPCC 2006 GL
Natural gas liquids	64,2	44,2	IPCC 2006 GL
Motor gasoline	69,3	44,3	IPCC 2006 GL
Kerosene (other than jet kerosene)	71,9	43,8	IPCC 2006 GL
Shale oil	73,3	38,1	IPCC 2006 GL
Gas/Diesel oil	74,1	43,0	IPCC 2006 GL
Residual fuel oil	77,4	40,4	IPCC 2006 GL
Liquefied petroleum gases	63,1	47,3	IPCC 2006 GL
Ethane	61,6	46,4	IPCC 2006 GL
Naphtha	73,3	44,5	IPCC 2006 GL
Bitumen	80,7	40,2	IPCC 2006 GL
Lubricants	73,3	40,2	IPCC 2006 GL
Petroleum coke	97,5	32,5	IPCC 2006 GL
Refinery feedstocks	73,3	43,0	IPCC 2006 GL
Refinery gas	57,6	49,5	IPCC 2006 GL
Paraffin waxes	73,3	40,2	IPCC 2006 GL
White spirit and SBP	73,3	40,2	IPCC 2006 GL
Other petroleum products	73,3	40,2	IPCC 2006 GL
Anthracite	98,3	26,7	IPCC 2006 GL
Coking coal	94,6	28,2	IPCC 2006 GL
Other bituminous coal	94,6	25,8	IPCC 2006 GL
Sub-bituminous coal	96,1	18,9	IPCC 2006 GL
Lignite	101,0	11,9	IPCC 2006 GL
Oil shale and tar sands	107,0	8,9	IPCC 2006 GL
Patent fuel	97,5	20,7	IPCC 2006 GL
Coke oven coke and lignite coke	107,0	28,2	IPCC 2006 GL

Fuel type description	Emission factor (t CO <sub>2</sub> /TJ)	Net calorific value (TJ/Gg)	Source
Gas coke	107,0	28,2	IPCC 2006 GL
Coal tar	80,7	28,0	IPCC 2006 GL
Gas works gas	44,4	38,7	IPCC 2006 GL
Coke oven gas	44,4	38,7	IPCC 2006 GL
Blast furnace gas	260	2,47	IPCC 2006 GL
Oxygen steel furnace gas	182	7,06	IPCC 2006 GL
Natural gas	56,1	48,0	IPCC 2006 GL
Industrial wastes	143	n.a.	IPCC 2006 GL
Waste oils	73,3	40,2	IPCC 2006 GL
Peat	106,0	9,76	IPCC 2006 GL
Wood/wood waste	—	15,6	IPCC 2006 GL
Other primary solid biomass	—	11,6	IPCC 2006 GL (only NCV)
Charcoal	—	29,5	IPCC 2006 GL (only NCV)
Biogasoline	—	27,0	IPCC 2006 GL (only NCV)
Biodiesels	—	27,0	IPCC 2006 GL (only NCV)
Other liquid biofuels	—	27,4	IPCC 2006 GL (only NCV)
Landfill gas	—	50,4	IPCC 2006 GL (only NCV)
Sludge gas	—	50,4	IPCC 2006 GL (only NCV)
Other biogas	—	50,4	IPCC 2006 GL (only NCV)
Waste tyres	85,0 <sup>(1)</sup>	n.a.	WBCSD CSI
Carbon monoxide	155,2 <sup>(2)</sup>	10,1	J. Falbe and M. Regitz, Römpp Chemie Lexikon, Stuttgart, 1995
Methane	54,9 <sup>(3)</sup>	50,0	J. Falbe and M. Regitz, Römpp Chemie Lexikon, Stuttgart, 1995

<sup>(1)</sup> This value is the preliminary emission factor, i.e. before application of a biomass fraction, if applicable.

<sup>(2)</sup> Based on NCV of 10,12 TJ/t

<sup>(3)</sup> Based on NCV of 50,01 TJ/t

## 2. EMISSION FACTORS RELATED TO PROCESS EMISSIONS

Table 2

### Stoichiometric emission factor for process emissions from carbonate decomposition (Method A)

Carbonate	Emission factor [t CO <sub>2</sub> / t Carbonate]
CaCO <sub>3</sub>	0,440
MgCO <sub>3</sub>	0,522
Na <sub>2</sub> CO <sub>3</sub>	0,415

Carbonate	Emission factor [t CO <sub>2</sub> / t Carbonate]
BaCO <sub>3</sub>	0,223
Li <sub>2</sub> CO <sub>3</sub>	0,596
K <sub>2</sub> CO <sub>3</sub>	0,318
SrCO <sub>3</sub>	0,298
NaHCO <sub>3</sub>	0,524
FeCO <sub>3</sub>	0,380
General	Emission factor = $[M(\text{CO}_2)] / \{Y * [M(x)] + Z * [M(\text{CO}_3^{2-})]\}$ X = metal M(x) = molecular weight of X in [g/mol] M(CO <sub>2</sub> ) = molecular weight of CO <sub>2</sub> in [g/mol] M(CO <sub>3</sub> <sup>2-</sup> ) = molecular weight of CO <sub>3</sub> <sup>2-</sup> in [g/mol] Y = stoichiometric number of X Z = stoichiometric number of CO <sub>3</sub> <sup>2-</sup>

Table 3

**Stoichiometric emission factor for process emissions from carbonate decomposition based on alkali earth oxides (Method B)**

Oxide	Emission factor [t CO <sub>2</sub> / t Oxide]
CaO	0,785
MgO	1,092
BaO	0,287
general: X <sub>Y</sub> O <sub>Z</sub>	Emission factor = $[M(\text{CO}_2)] / \{Y * [M(x)] + Z * [M(\text{O})]\}$ X = alkali earth or alkali metal M(x) = molecular weight of X in [g/mol] M(CO <sub>2</sub> ) = molecular weight of CO <sub>2</sub> [g/mol] M(O) = molecular weight of O [g/mol] Y = stoichiometric number of X = 1 (for alkali earth metals) = 2 (for alkali metals) Z = stoichiometric number of O = 1

Table 4

**Emission factors for process emissions from other process materials (production of iron and steel, and processing of ferrous metals) <sup>(1)</sup>**

Input or output material	Carbon content (t C/t)	Emission factor (t CO <sub>2</sub> /t)
Direct reduced iron (DRI)	0,0191	0,07
EAF carbon electrodes	0,8188	3,00

<sup>(1)</sup> IPCC 2006 Guidelines for National Greenhouse Gas Inventories

Input or output material	Carbon content (t C/t)	Emission factor (t CO <sub>2</sub> /t)
EAF charge carbon	0,8297	3,04
Hot briquetted iron	0,0191	0,07
Oxygen steel furnace gas	0,3493	1,28
Petroleum coke	0,8706	3,19
Pig iron	0,0409	0,15
Iron / iron scrap	0,0409	0,15
Steel / steel scrap	0,0109	0,04

Table 5

**Stoichiometric emission factors for process emissions from other process materials (Bulk organic chemicals) <sup>(1)</sup>**

Substance	Carbon content (t C/t)	Emission factor (t CO <sub>2</sub> / t)
Acetonitril	0,5852	2,144
Acrylonitrile	0,6664	2,442
Butadiene	0,888	3,254
Carbon black	0,97	3,554
Ethylene	0,856	3,136
Ethylene dichloride	0,245	0,898
Ethylene glycol	0,387	1,418
Ethylene oxide	0,545	1,997
Hydrogen cyanide	0,4444	1,628
Methanol	0,375	1,374
Methane	0,749	2,744
Propane	0,817	2,993
Propylene	0,8563	3,137
Vinyl chloride monomer	0,384	1,407

<sup>(1)</sup> IPCC 2006 Guidelines for National Greenhouse Gas Inventories

3. GLOBAL WARMING POTENTIALS FOR NON-CO<sub>2</sub> GREENHOUSE GASES

Table 6

**Global warming potentials**

Gas	Global warming potential
N <sub>2</sub> O	298 t CO <sub>2(e)</sub> / t N <sub>2</sub> O
CF <sub>4</sub>	7 390 t CO <sub>2(e)</sub> / t CF <sub>4</sub>
C <sub>2</sub> F <sub>6</sub>	12 200 t CO <sub>2(e)</sub> / t C <sub>2</sub> F <sub>6</sub>

## ANNEX VII

**Minimum frequency of analyses (Article 35)**

Fuel/material	Minimum frequency of analyses
Natural gas	At least weekly
Other gases, in particular synthesis gas and process gases such as refinery mixed gas, coke oven gas, blast-furnace gas, convertor gas, oilfield and gasfield gas	At least daily — using appropriate procedures at different parts of the day
Fuel oils (for example light, medium, heavy fuel oil, bitumen)	Every 20 000 tonnes of fuel and at least six times a year
Coal, coking coal, coke, petroleum coke, peat	Every 20 000 tonnes of fuel/material and at least six times a year
Other fuels	Every 10 000 tonnes of fuel and at least four times a year
Untreated solid waste (pure fossil or mixed biomass/fossil)	Every 5 000 tonnes of waste and at least four times a year
Liquid waste, pre-treated solid waste	Every 10 000 tonnes of waste and at least four times a year
Carbonate minerals (including limestone and dolomite)	Every 50 000 tonnes of material and at least four times a year
Clays and shales	Amounts of material corresponding to 50 000 tonnes of CO <sub>2</sub> and at least four times a year
Other materials (primary, intermediate and final product)	Depending on the type of material and the variation, amounts of material corresponding to 50 000 tonnes of CO <sub>2</sub> and at least four times a year

## ANNEX VIII

**Measurement-based methodologies (Article 41)**

## 1. TIER DEFINITIONS FOR MEASUREMENT-BASED METHODOLOGIES

Measurement-based methodologies shall be approved in accordance with tiers with the following maximum permissible uncertainties for the annual average hourly emissions calculated in accordance with Equation 2 set out in section 3 of this Annex.

Table 1

**Tiers for CEMS (maximum permissible uncertainty for each tier)**

In case of CO<sub>2</sub>, the uncertainty is to be applied to the total amount of CO<sub>2</sub> measured. Where the biomass fraction is determined using a measurement based methodology, the same tier definition as for CO<sub>2</sub> shall be applied to the biomass fraction.

	Tier 1	Tier 2	Tier 3	Tier 4
CO <sub>2</sub> emission sources	± 10 %	± 7,5 %	± 5 %	± 2,5 %
N <sub>2</sub> O emission sources	± 10 %	± 7,5 %	± 5 %	N.A.
CO <sub>2</sub> transfer	± 10 %	± 7,5 %	± 5 %	± 2,5 %

## 2. MINIMUM TIER REQUIREMENTS FOR CATEGORY A INSTALLATIONS

Table 2

**Minimum tiers to be applied by category A installations for measurement-based methodologies in accordance with point (a) of Article 41(1)**

Greenhouse gas	Minimum tier level required
CO <sub>2</sub>	2
N <sub>2</sub> O	2

## 3. DETERMINATION OF GHGS USING MEASUREMENT-BASED METHODOLOGIES

Equation 1: Calculation of annual emissions in accordance with Article 43(1):

$$GHG Em_{total} [t] = \sum_{i=1}^{HoursOp} GHG conc_{hourly,i} \cdot V_{hourly,i} \cdot 10^{-6} [t/g]$$

Equation 2: Determination of average hourly emissions:

$$GHG Em_{average} [kg/h] = \frac{GHG Em_{total}}{HoursOp} \cdot 10^3 [kg/t]$$

Equation 2a: Determination of average hourly GHG concentration for the purpose of reporting in accordance with point 9(b) of Annex X, section 1:

$$GHG conc_{average} [g/Nm^3] = \frac{GHG Em_{total}}{\sum_{i=1}^{HoursOp} V_{hourly,i}} \cdot 10^6 [g/t]$$

Equation 2b: Determination of average hourly flue gas flow for the purpose of reporting in accordance with point 9(b) of Annex X, section 1:

$$Flow_{average} [Nm^3/h] = \frac{\sum_{i=1}^{HoursOp} V_{hourly,i}}{HoursOp}$$

Equation 2c: Calculation of annual emissions for the purpose of the annual emission report in accordance with point 9(b) of Annex X, section 1:

$$GHG Em_{total} [t] = GHG conc_{average} \cdot Flow_{average} \cdot HoursOp \cdot 10^{-6} [t/g]$$

The following abbreviations are used in Equations 1 to 2c:

The index *i* refers to the individual operating hour. Where an operator uses shorter reference periods in accordance with Article 44(1), that reference period shall be used instead of hours for these calculations.

$GHG Em_{total}$  = total annual GHG emissions in tonnes

$GHG conc_{hourly, i}$  = hourly concentrations of GHG emissions in g/Nm<sup>3</sup> in the flue gas flow measured during operation for hour *i*;

$V_{hourly, i}$  = flue gas volume in Nm<sup>3</sup> for hour *i* (i.e. integrated flow over the hour or shorter reference period);

$GHG Em_{average}$  = annual average hourly emissions in kg/h from the source;

$HoursOp$  = total number of hours for which the measurement-based methodology is applied, including the hours for which data has been substituted in accordance with Article 45(2) to (4);

$GHG conc_{average}$  = annual average hourly concentrations of GHG emissions in g/Nm<sup>3</sup>;

$Flow_{average}$  = annual average flue gas flow in Nm<sup>3</sup>/h.

#### 4. CALCULATION OF THE CONCENTRATION USING INDIRECT CONCENTRATION MEASUREMENT

Equation 3: Calculation of the concentration

$$GHG concentration [\%] = 100\% - \sum_i Concentration of component i [\%]$$

#### 5. SUBSTITUTION FOR MISSING CONCENTRATION DATA FOR MEASUREMENT-BASED METHODOLOGIES

Equation 4: Substitution for missing data for measurement-based methodologies

$$C_{subst}^* = \bar{C} + 2\sigma_-$$

Where:

$\bar{C}$  = the arithmetic mean of the concentration of the specific parameter over the whole reporting period or, where specific circumstances applied when data loss occurred, an appropriate period reflecting the specific circumstances;

$\sigma_c$  = the best estimate of the standard deviation of the concentration of the specific parameter over the whole reporting period or, where specific circumstances applied when data loss occurred, an appropriate period reflecting the specific circumstances.

## ANNEX IX

**Minimum data and information to be retained in accordance with Article 67(1)**

Operators and aircraft operators shall retain at least the following:

## 1. COMMON ELEMENTS FOR INSTALLATIONS AND AIRCRAFT OPERATORS

- (1) The monitoring plan approved by the competent authority;
- (2) Documents justifying the selection of the monitoring methodology and the documents justifying temporal or non-temporal changes of monitoring methodologies and, where applicable, tiers approved by the competent authority;
- (3) All relevant updates of monitoring plans notified to the competent authority in accordance with Article 15, and the competent authority's replies;
- (4) All written procedures referred to in the monitoring plan, including the sampling plan where relevant, the procedures for data flow activities and the procedures for control activities;
- (5) A list of all versions used of the monitoring plan and all related procedures;
- (6) Documentation of the responsibilities in connection to the monitoring and reporting;
- (7) The risk assessment performed by the operator or aircraft operator, where applicable;
- (8) The improvement reports in accordance with Article 69;
- (9) The verified annual emission report;
- (10) The verification report;
- (11) Any other information that is identified as required for the verification of the annual emissions report.

## 2. SPECIFIC ELEMENTS FOR STATIONARY SOURCE INSTALLATIONS:

- (1) The greenhouse gas emissions permit, and any updates thereof;
- (2) Any uncertainty assessments, where applicable;
- (3) For calculation-based methodologies applied in installations:
  - (a) the activity data used for any calculation of the emissions for each source stream, categorised according to process and fuel or material type;
  - (b) a list of all default values used as calculation factors, where applicable;
  - (c) the full set of sampling and analysis results for the determination of calculation factors;
  - (d) documentation about all ineffective procedures corrected and correction action taken in accordance with Article 64;
  - (e) any results of calibration and maintenance of measuring instruments.
- (4) For measurement-based methodologies in installations, the following additional elements:
  - (a) documentation justifying the selection of a measurement-based methodology;
  - (b) the data used for the uncertainty analysis of emissions from each emission source, categorised according to process;
  - (c) the data used for the corroborating calculations and results of the calculations;
  - (d) a detailed technical description of the continuous measurement system including the documentation of the approval from the competent authority;

- (e) raw and aggregated data from the continuous measurement system, including documentation of changes over time, the log-book on tests, down-times, calibrations, servicing and maintenance;
  - (f) documentation of any changes to the continuous measurement system;
  - (g) any results of the calibration and maintenance of measuring instruments;
  - (h) where applicable, the mass or energy balance model used for the purpose of determining surrogate data in accordance with Article 45(4) and underlying assumptions;
- (5) Where a fall-back methodology as referred to in Article 22 is applied, all data necessary for determining the emissions for the emission sources and source streams for which that methodology is applied, as well as proxy data for activity data, calculation factors and other parameters which would be reported under a tier methodology;
- (6) For primary aluminium production, the following additional elements:
- (a) documentation of results from measurement campaigns for the determination of the installation specific emission factors for CF<sub>4</sub> and C<sub>2</sub>F<sub>6</sub>;
  - (b) documentation of the results of the determination of the collection efficiency for fugitive emissions;
  - (c) all relevant data on primary aluminium production, anode effect frequency and duration or overvoltage data;
- (7) For CO<sub>2</sub> capture, transport and geological storage activities, where applicable, the following additional elements:
- (a) documentation of the amount of CO<sub>2</sub> injected into the storage complex by installations carrying out geological storage of CO<sub>2</sub>;
  - (b) representatively aggregated pressure and temperature data from a transport network;
  - (c) a copy of the storage permit, including the approved monitoring plan, pursuant to Article 9 of Directive 2009/31/EC;
  - (d) the reports submitted in accordance with Article 14 of Directive 2009/31/EC;
  - (e) reports on the results of the inspections carried out in accordance with Article 15 of Directive 2009/31/EC;
  - (f) documentation on corrective measures taken in accordance with Article 16 of Directive 2009/31/EC.

### 3. SPECIFIC ELEMENTS FOR AVIATION ACTIVITIES:

- (1) A list of aircraft owned, leased-in and leased-out, and necessary evidence for the completeness of that list; for each aircraft the date when it is added to or removed from the aircraft operator's fleet;
  - (2) A list of flights covered in each reporting period, and necessary evidence for the completeness of that list;
  - (3) Relevant data used for determining the fuel consumption and emissions;
  - (4) Data used for determining the payload and distance relevant for the years for which tonne-kilometre data are reported;
  - (5) Documentation on the methodology for data gaps where applicable, the number of flights where data gaps occurred, the data used for closing the data gaps, where they occurred, and, where the number of flights with data gaps exceeded 5 % of flights that were reported, reasons for the data gaps as well as documentation of remedial actions taken.
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## ANNEX X

**Minimum content of Annual Reports (Article 68(3))**

## 1. ANNUAL EMISSION REPORTS OF STATIONARY SOURCE INSTALLATIONS

The annual emission report of an installation shall at least contain the following information:

- (1) Data identifying the installation, as specified in Annex IV to Directive 2003/87/EC, and its unique permit number;
- (2) Name and address of the verifier of the report;
- (3) The reporting year;
- (4) Reference to and version number of the latest approved monitoring plan and the date from which it is applicable, as well as reference to and version number of any other monitoring plans relevant for the reporting year;
- (5) Relevant changes in the operations of an installation and changes as well as temporary deviations that occurred during the reporting period to the monitoring plan approved by the competent authority; including temporal or permanent changes of tiers, reasons for those changes, starting date for the changes, and starting and ending dates of temporal changes;
- (6) Information for all emissions sources and source streams consisting of at least:
  - (a) the total emissions expressed as t CO<sub>2(e)</sub>;
  - (b) where greenhouse gases other than CO<sub>2</sub> are emitted, the total emissions expressed as t;
  - (c) whether the measurement or the calculation methodology referred to in Article 21 is applied;
  - (d) the tiers applied;
  - (e) activity data:
    - (i) in the case of fuels the amount of fuel (expressed as tonnes or Nm<sup>3</sup>) and the net calorific value (GJ/t or GJ/ Nm<sup>3</sup>) reported separately;
    - (ii) for all other source streams the amount expressed as tonnes or Nm<sup>3</sup>;
  - (f) emission factors, expressed in accordance with the requirements set out in Article 36(2); biomass fraction, oxidation and conversion factors, expressed as dimensionless fractions;
  - (g) where emission factors for fuels are related to mass or volume instead of energy, values determined pursuant to Article 26(5) for the net calorific value of the respective source stream;
- (7) Where a mass balance methodology is applied, the mass flow, and carbon content for each source stream into and out of the installation; biomass fraction and net calorific value, where relevant;
- (8) Information to be reported as memo items, consisting of at least:
  - (a) amounts of biomass combusted, expressed in TJ, or employed in processes, expressed in t or Nm<sup>3</sup>;
  - (b) CO<sub>2</sub> emissions from biomass, expressed in t CO<sub>2</sub>, where measurement-based methodology is used to determine emissions;
  - (c) a proxy for the net calorific value of the biomass source streams used as fuel, where relevant;
  - (d) amounts and energy content of bioliquids and biofuels combusted, expressed in t and TJ.
  - (e) CO<sub>2</sub> or N<sub>2</sub>O transferred to an installation or received from an installation, where Article 49 or 50 is applicable, expressed in t CO<sub>2(e)</sub>;
  - (f) inherent CO<sub>2</sub> transferred to an installation or received from an installation, where Article 48 is applicable, expressed in t CO<sub>2</sub>;

- (g) where applicable, the name of the installation and its identification code as recognised in accordance with the acts adopted pursuant to Article 19(3) of Directive 2003/87/EC:
- (i) of the installation(s) to which CO<sub>2</sub> or N<sub>2</sub>O is transferred in accordance with points (e) and (f) of this point (8);
  - (ii) of the installation(s) from which CO<sub>2</sub> or N<sub>2</sub>O is received in accordance with points (e) and (f) of this point (8);
- Where that installation does not have such identification code, the name and address of the installation as well as relevant contact information of a contact person shall be provided.
- (h) transferred CO<sub>2</sub> from biomass, expressed in t CO<sub>2</sub>;
- (9) Where a measurement methodology is applied:
- (a) where CO<sub>2</sub> is measured as the annual fossil CO<sub>2</sub>-emissions and the annual CO<sub>2</sub>-emissions from biomass use;
  - (b) the hours of operation of the continuous emission measurement system (CEMS), the measured greenhouse gas concentrations and the flue gas flow expressed as an annual hourly average, and as an annual total value;
- (10) Where a methodology referred to in Article 22 is applied, all data necessary for determining the emissions for the emission sources and source streams for which that methodology is applied, as well as proxy data for activity data, calculation factors and other parameters which would be reported under a tier methodology;
- (11) Where data gaps have occurred and have been closed by surrogate data in accordance with Article 66(1):
- (a) the source stream or emission source to which each data gap applies;
  - (b) the reasons for each data gap;
  - (c) the starting and ending date and time of each data gap;
  - (d) the emissions calculated based on surrogate data;
  - (e) where the estimation method for surrogate data has not yet been included in the monitoring plan, a detailed description of the estimation method including evidence that the methodology used does not lead to an underestimation of emissions for the respective time period;
- (12) Any other changes in the installation during the reporting period with relevance for that installation's greenhouse gas emissions during the reporting year;
- (13) Where applicable, the production level of primary aluminium, the frequency and average duration of anode effects during the reporting period, or the anode effect overvoltage data during the reporting period, as well as the results of the most recent determination of the installation-specific emission factors for CF<sub>4</sub> and C<sub>2</sub>F<sub>6</sub> as outlined in Annex IV, and of the most recent determination of the collection efficiency of the ducts.

Emissions occurring from different emission sources, or source streams of the same type of a single installation belonging to the same type of activity may be reported in an aggregate manner for the type of activity.

Where tiers have been changed within a reporting period, the operator shall calculate and report emission as separate sections of the annual report for the respective parts of the reporting period.

Operators of CO<sub>2</sub> storage sites may use simplified emission reports after closure of the storage site in accordance with Article 17 of Directive 2009/31/EC containing at least the elements listed under points 1 to 5, provided the greenhouse gas emissions permit contains no emission sources.

## 2. ANNUAL EMISSION REPORTS OF AIRCRAFT OPERATORS

The emission report for an aircraft operator shall at least contain the following information:

- (1) Data identifying the aircraft operator as set out by Annex IV to Directive 2003/87/EC, and the call sign or other unique designators used for air traffic control purposes, as well as relevant contact details;
- (2) Name and address of the verifier of the report;

- (3) The reporting year;
- (4) Reference to and version number of the latest approved monitoring plan and the date from which it is applicable, reference to and version number of other monitoring plans relevant for the reporting year;
- (5) Relevant changes in the operations and deviations from the approved monitoring plan during the reporting period;
- (6) The aircraft registration numbers and types of aircraft used in the period covered by the report to perform the aviation activities covered by Annex I to Directive 2003/87/EC carried out by the aircraft operator;
- (7) The total number of flights per State pair covered by the report;
- (8) Mass of fuel (in tonnes) per fuel type per State pair;
- (9) Total CO<sub>2</sub> emissions in tonnes of CO<sub>2</sub> disaggregated by the Member State of departure and arrival;
- (10) Where emissions are calculated using an emission factor or carbon content related to mass or volume, proxy data for the net calorific value of the fuel;
- (11) Where data gaps have occurred and have been closed by surrogate data in accordance with Article 66(2):
  - (a) the number of flights expressed as percentage of annual flights (rounded to the nearest 0,1 %) for which data gaps occurred; and the circumstances and reasons for data gaps that apply;
  - (b) the estimation method for surrogate data applied;
  - (c) the emissions calculated based on surrogate data;
- (12) Memo-items:
  - (a) amount of biomass used as fuel during the reporting year (in tonnes or m<sup>3</sup>) listed per fuel type;
  - (b) the net calorific value of alternative fuels;
- (13) As an annex to the annual emission report, the operator shall include annual emissions and annual numbers of flights per aerodrome pair. Upon request of the operator the competent authority shall treat that information as confidential.

### 3. TONNE-KILOMETRE DATA REPORTS OF AIRCRAFT OPERATORS

The tonne-kilometre data report for an aircraft operator shall at least contain the following information:

- (1) Data identifying the aircraft operator as set out by Annex IV to Directive 2003/87/EC, and the call sign or other unique designator used for air traffic control purposes, as well as relevant contact details;
- (2) Name and address of the verifier of the report;
- (3) The reporting year;
- (4) Reference to and version number of the latest approved monitoring plan and the date from which it is applicable, reference to and version number of other monitoring plans relevant for the reporting year;
- (5) Relevant changes in the operations and deviations from the approved monitoring plan during the reporting period;
- (6) The aircraft registration numbers and types of aircraft used in the period covered by the report to perform the aviation activities covered by Annex I to Directive 2003/87/EC carried out by the aircraft operator;
- (7) Chosen method for calculating the mass of passengers and checked baggage, as well as freight and mail;
- (8) Total number of passenger-kilometres and tonne-kilometres for all flights performed during the year to which the report relates falling within the aviation activities listed in Annex I of Directive 2003/87/EC;

- (9) For each aerodrome pair, the: ICAO designator of the two aerodromes; distance (great circle distance + 95 km) in km; total number of flights per aerodrome pair in the reporting period; total mass of passengers and checked baggage (tonnes) during the reporting period per aerodrome pair; total number of passengers during the reporting period; total number of passenger multiplied by kilometres per aerodrome pair; total mass of freight and mail (tonnes) during the reporting period per aerodrome pair; total tonne-kilometres per aerodrome pair (t km).
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## ANNEX XI

**Correlation table**

Commission Regulation (EU) No 601/2012	This Regulation
Article 1 to 49	Article 1 to 49
—	Article 50
Article 50 to 67	Article 51 to 68
Article 68	—
Article 69 to 75	Article 69 to 75
—	Article 76
Article 76 to 77	Article 77 to 78
Annex I to X	Annex I to X
—	Annex XI

**COMMISSION IMPLEMENTING REGULATION (EU) 2018/2067****of 19 December 2018****on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council****(Text with EEA relevance)**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC <sup>(1)</sup>, and in particular the third paragraph of Article 15 and the second paragraph of Article 10a thereof,

Whereas:

- (1) This Regulation should enter into force as a matter of urgency to take account of the First Edition of the International Standards and Recommended Practices on Environmental Protection — Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) (Annex 16, Volume IV to the Chicago Convention) adopted by the ICAO Council at the tenth meeting of its 214th session on 27 June 2018, that are intended to apply from 2019.
- (2) An overall framework of rules for the accreditation of verifiers is necessary to ensure that the verification of operator's or aircraft operator's reports in the framework of the Union's greenhouse gas emission allowance trading system, to be submitted in accordance with Commission Implementing Regulation (EU) 2018/2066 <sup>(2)</sup>, is carried out by verifiers that possess the technical competence to perform the entrusted task in an independent and impartial manner and in conformity with the requirements and principles set out in this Regulation.
- (3) Experience in the application of Commission Regulation (EU) No 600/2012 <sup>(3)</sup> has shown the need to improve, clarify and simplify the accreditation and verification rules to further promote harmonisation and enhance the efficiency of the system. A number of amendments therefore need to be made to Regulation (EU) No 600/2012. In the interests of clarity, that Regulation should be replaced.
- (4) Directive 2006/123/EC of the European Parliament and of the Council <sup>(4)</sup> establishes a general framework to facilitate the free movement of services and service providers in the Union while maintaining a high quality of service. Union harmonisation of the rules for accreditation and verification relating to the Union's emissions trading system should contribute to a competitive market for verifiers while ensuring transparency and information for operators and aircraft operators.
- (5) When implementing Article 15 of Directive 2003/87/EC, it is necessary to ensure a synergy between the comprehensive framework for accreditation established by Regulation (EC) No 765/2008 of the European Parliament and of the Council <sup>(5)</sup> and related provisions of Decision No 768/2008/EC of the European Parliament and of the Council <sup>(6)</sup> on one hand, and the specific features of the Union's greenhouse gas emission trading system and requirements that are essential for the effective implementation of Directive 2003/87/EC on the other hand. Regulation (EC) No 765/2008 should continue to apply to those aspects of accreditation of verifiers which are not dealt with by this Regulation. In particular, it should be ensured that where, due to the internal practices of

<sup>(1)</sup> OJ L 275, 25.10.2003, p. 32.

<sup>(2)</sup> 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 (see page 1 of this Official Journal).

<sup>(3)</sup> Commission Regulation (EU) No 600/2012 of 21 June 2012 on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council (OJ L 181, 12.7.2012, p. 1).

<sup>(4)</sup> Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market (OJ L 376, 27.12.2006, p. 36).

<sup>(5)</sup> Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93 (OJ L 218, 13.8.2008, p. 30).

<sup>(6)</sup> Decision No 768/2008/EC of the European Parliament and of the Council of 9 July 2008 on a common framework for the marketing of products, and repealing Council Decision 93/465/EEC (OJ L 218, 13.8.2008, p. 82).

a Member State, an alternative procedure to accreditation, namely, the certification of verifiers that are natural persons, is carried out by a national authority appointed by that Member State in accordance with Regulation (EC) No 765/2008, the Member State concerned shall provide documentary evidence that such authority meets a level of credibility similar to national accreditation bodies that have successfully undergone peer evaluation organised by the body recognised under Article 14 of that Regulation.

- (6) Regulation (EC) No 1221/2009 of the European Parliament and of the Council <sup>(1)</sup> provides for an independent and neutral accreditation or licensing system for environmental verifiers. For reasons of coherence and to reduce the administrative burden imposed on the Member States and economic operators, it is appropriate to take account of synergies between that and this Regulation.
- (7) The system of verification and accreditation should avoid any unnecessary duplication of procedures and organisations established pursuant to other Union legal instruments that would result in an increased burden for Member States or economic operators. Therefore, it is appropriate to draw on best practices resulting from the application of harmonised standards adopted by the European Committee for Standardisation on the basis of a request made by the Commission in accordance with Regulation (EU) No 1025/2012 of the European Parliament and of the Council <sup>(2)</sup>, such as the harmonised standard concerning general requirements for accreditation bodies accrediting conformity assessment bodies, and the harmonised standard concerning requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition, the references of which have been published in the *Official Journal of the European Union*, as well as Document EA-6/03 and other technical documents developed by the European cooperation for accreditation or by other bodies.
- (8) When establishing harmonised rules for the verification of operator's or aircraft operator's reports and the accreditation of verifiers, it is necessary to ensure that the burden imposed on operators emitting a lower amount of carbon dioxide (CO<sub>2</sub>) per year, on aircraft operators considered small emitters within the meaning of Implementing Regulation (EU) 2018/2066, as well as on the available resources of the Member States is not disproportionate to the aims pursued.
- (9) To make best use of synergies and given the importance of verification of data used for the update of *ex ante* benchmarks and the determination of free allocation to installations, it is appropriate to include rules for verification of baseline data reports and new entrant data reports which are required by Commission Delegated Regulation .../... of 19 December 2018 determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council <sup>(3)</sup> into the harmonised rules for verification and accreditation of verifiers.
- (10) Article 27 of Directive 2003/87/EC allows Member States to exclude small installations, subject to equivalent measures, from the Union's greenhouse gas emission allowance trading system provided that the conditions contained in that Article are met. Article 27a of Directive 2003/87/EC allows Member States to exclude installation emitting less than 2 500 tonnes, from the Union's greenhouse gas emission allowance trading system provided that the conditions contained in that Article are met. This Regulation should not apply directly to those installations excluded pursuant to Article 27 or 27a of Directive 2003/87/EC unless the Member State decides that this Regulation should apply.
- (11) In accordance with the principles of Annex V to Directive 2003/87/EC, the verifier should carry out a site visit to check the boundaries of the respective installation or aircraft operator, to assess the operation of measuring devices and monitoring systems, to conduct interviews and to carry out other activities. The verifier's site visit should be waived only under specific conditions.
- (12) In accordance with the principles of Annex V to Directive 2003/87/EC, the verifier should apply a risk-based approach with the aim of reaching a verification opinion providing reasonable assurance that the total emissions or tonne-kilometres are not materially misstated and the report can be verified as satisfactory. The level of assurance should relate to the depth and detail of verification activities carried out during the verification and the

<sup>(1)</sup> Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC (OJ L 342, 22.12.2009, p. 1).

<sup>(2)</sup> Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council (OJ L 316, 14.11.2012, p. 12).

<sup>(3)</sup> Not yet published in the Official Journal.

wording of the verification opinion statement. If the findings and information obtained during the verification process so require, the verifier should be obliged to adjust one or more activities in the verification process to meet the requirements for achieving reasonable assurance.

- (13) To avoid entanglement between the role of the competent authority and the verifier, the responsibilities of a verifier when carrying out verification should be clearly defined. The verifier should take the monitoring plan approved by the competent authority as a reference point and assess whether this plan and the procedures described in this plan have been implemented correctly. Where the verifier identifies non-compliance with Implementing Regulation (EU) 2018/2066, it should be the responsibility of the verifier to report this non-compliance issue in the verification report.
- (14) Full understanding of the activities of an operator or an aircraft operator is necessary for the performance of an effective verification of an operator's or aircraft operator's report. A verifier should only perform the requested verification activities after it has ascertained following a preliminary assessment that it is competent to do so. In the pursuit of a high-quality level of verification activities, harmonised rules should be developed for a preliminary assessment to determine whether a verifier is competent, independent and impartial to carry out the requested verification activities in accordance with the rules and principles set out in this Regulation.
- (15) Provision of relevant information between the operator or the aircraft operator and the verifier is essential in all facets of the verification process, in particular in the pre-contractual phase, in the performance of a strategic analysis by the verifier and throughout the verification. It is necessary to establish a set of harmonised requirements that should govern this provision of information between the operator or aircraft operator and the verifier at all times.
- (16) All verification activities in the verification process are interconnected and should be concluded with the issuance of a verification report by the verifier containing a verification statement that is commensurate with the outcome of the verification assessment. Harmonised requirements for the verification reports and the performance of the verification activities should be established to ensure that verification reports and verification activities in the Member States meet the same standards.
- (17) Analysing the susceptibility of reported data to misstatements that could be material is an essential part of the verification process and determines how the verification activities should be carried out by the verifier. Every element in the verification process shall therefore be strongly linked to the outcome of the analysis of these risks of misstatements.
- (18) Specific provision should be made for the verification of the report of aircraft operators and that of operators of sites, which are subject to Directive 2009/31/EC of the European Parliament and of the Council <sup>(1)</sup>.
- (19) Correct and effective reporting of greenhouse gas emissions by the operator or the aircraft operator is essential for the implementation of Directive 2003/87/EC. To ensure the proper functioning of the monitoring and reporting process, continuous improvement of the operator or aircraft operator's performance should be part of the verification activities performed by the verifier.
- (20) Verification activities and the issuance of verification reports should only be carried out by verifiers and their personnel that are competent. Verifiers should establish and continuously improve internal processes that ensure that all personnel involved in the verification activities are competent to perform the tasks entrusted to them. The criteria for determining whether a verifier is competent should be the same in all Member States and should be verifiable, objective and transparent.
- (21) The national accreditation body established pursuant to Regulation (EC) No 765/2008 should be empowered to accredit and issue an authoritative statement concerning the competence of a verifier to perform the verification activities pursuant to this Regulation, adopt administrative measures and carry out the surveillance of verifiers.
- (22) Templates and specific file formats to be used by verifiers promote harmonisation between Member States and avoid differences in approaches. Verifiers should use templates or specific file formats developed by the Commission. Where a Member State has developed national templates or file format specifications, these should contain at least the same content as the templates developed by the Commission to ensure harmonised approaches.

<sup>(1)</sup> Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (OJ L 140, 5.6.2009, p. 114).

- (23) A Member State that does not consider it economically meaningful or sustainable to establish a national accreditation body or to carry out accreditation activities should have recourse to the national accreditation body of another Member State. Only national accreditation bodies that have undergone a successful peer evaluation organised by the body recognised under Article 14 of Regulation (EC) No 765/2008 should be permitted to perform the accreditation activities pursuant to this Regulation.
- (24) National accreditation bodies that demonstrate conformity with this Regulation and that have already successfully undergone peer evaluation organised by the body recognised under Article 14 of Regulation (EU) No 765/2008 should be presumed to fulfil the procedural requirements imposed on national accreditation bodies such as requirements on the structure of a national accreditation body, setting up a competence process, setting up the necessary procedures and management system and arrangements to safeguard the confidentiality of information obtained and should be exempted from undergoing a new peer evaluation following the entry into force of this Regulation. In accordance with Directive 2003/4/EC of the European Parliament and of the Council <sup>(1)</sup>, environmental information contained in verified operator's or aircraft operator's reports held by the public authorities should be made public to ensure transparency, subject to certain confidentiality requirements.
- (25) Effective cooperation between national accreditation bodies, or where applicable other national authorities, and competent authorities is essential for the proper functioning of the greenhouse gas emission allowance system and the supervision on the quality of verification. For reasons of transparency, it is necessary to ensure that the national accreditation bodies, or where applicable, other national authorities, and competent authorities establish effective means of information exchange. Information exchanges between competent authorities and between competent authorities and national accreditation bodies or other national authorities should be governed by the strictest guarantees of confidentiality and professional secrecy and be handled in accordance with applicable national and Union law.
- (26) This Regulation includes improvements to accreditation and verification that partly take into account the First Edition of the International Standards and Recommended Practices on Environmental Protection — Carbon Offsetting and Reduction Scheme for International Aviation (CORSA) (Annex 16, Volume IV to the Chicago Convention) adopted by the ICAO Council at the tenth meeting of its 214th session on 27 June 2018. The Regulation on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC is also being amended to take account of the First Edition of the International Standards and Recommended Practices, and these two instruments are being complemented by a Delegated Act pursuant to Article 28c of Directive 2003/87/EC.
- (27) The measures provided for in this Regulation are in accordance with the opinion of the Climate Change Committee,

HAS ADOPTED THIS REGULATION:

#### CHAPTER I

#### GENERAL PROVISIONS

##### *Article 1*

##### **Subject matter**

This Regulation lays down provisions for the verification of reports submitted pursuant to Directive 2003/87/EC and for the accreditation and supervision of verifiers.

This Regulation also specifies, without prejudice to Regulation (EC) No 765/2008, provisions for the mutual recognition of verifiers and peer evaluation of national accreditation bodies pursuant to Article 15 of Directive 2003/87/EC.

##### *Article 2*

##### **Scope**

This Regulation shall apply to the verification of greenhouse gas emissions and tonne-kilometre data occurring from 1 January 2019, reported pursuant to Article 14 of Directive 2003/87/EC, and to the verification of data relevant for the update of *ex ante* benchmarks and for the determination of free allocation to installations.

<sup>(1)</sup> Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC (OJ L 41, 14.2.2003, p. 26).

*Article 3***Definitions**

For the purposes of this Regulation, in addition to the definitions laid down in Article 3 of Directive 2003/87/EC and Article 3 of Implementing Regulation (EU) 2018/2066, the following definitions shall apply:

- (1) 'detection risk' means the risk that the verifier does not detect a material misstatement;
- (2) 'accreditation' means attestation by a national accreditation body that a verifier meets the requirements set by harmonised standards, within the meaning of point 9 of Article 2 of Regulation (EC) No 765/2008, and requirements set out in this Regulation to carry out the verification of an operator's or aircraft operator's report pursuant to this Regulation;
- (3) 'verifier' means a legal person or another legal entity carrying out verification activities pursuant to this Regulation and accredited by a national accreditation body pursuant to Regulation (EC) No 765/2008 and this Regulation or a natural person otherwise authorised, without prejudice to Article 5(2) of that Regulation, at the time a verification report is issued;
- (4) 'verification' means the activities carried out by a verifier to issue a verification report pursuant to this Regulation;
- (5) 'misstatement' means an omission, misrepresentation or error in the operator's or aircraft operator's reported data, not considering the uncertainty permissible under Article 12(1)(a) of Implementing Regulation (EU) 2018/2066.
- (6) 'material misstatement' means a misstatement that, in the opinion of the verifier, individually or when aggregated with other misstatements, exceeds the materiality level or could affect the treatment of the operator's or aircraft operator's report by the competent authority;
- (7) 'operator's or aircraft operator's report' means the annual emission report to be submitted by the operator or aircraft operator pursuant to Article 14(3) of Directive 2003/87/EC, the tonne-kilometre report to be submitted by the aircraft operator for the purposes of applying for the allocation of allowances pursuant to Articles 3e and 3f of that Directive, the baseline data report submitted by the operator pursuant to Article 4(2) of Delegated Regulation (EU) .../... or the data report submitted by the operator pursuant to Article 5(2) of that Regulation;
- (8) 'scope of accreditation' means activities referred to in Annex I for which accreditation is sought or has been granted;
- (9) 'competence' means the ability to apply knowledge and skills to carry out an activity;
- (10) 'materiality level' means the quantitative threshold or cut-off point above which misstatements, individually or when aggregated with other misstatements, are considered material by the verifier;
- (11) 'control system' means the operator's or aircraft operator's risk assessment and entire set of control activities, including the continuous management thereof, that an operator or aircraft operator has established, documented, implemented and maintained pursuant to Article 59 of Implementing Regulation (EU) 2018/2066 or pursuant to Article 11 of Delegated Regulation (EU) .../..., as appropriate;
- (12) 'control activities' means any acts carried out or measures implemented by the operator or aircraft operator to mitigate inherent risks;
- (13) 'non-conformity' means one of the following:
  - (a) for the purposes of verifying an operator's emission report, any act or omission of an act by the operator that is contrary to the greenhouse gas emissions permit and the requirements in the monitoring plan approved by the competent authority;
  - (b) for the purposes of verifying an aircraft operator's emission or tonne-kilometre report, any act or omission of an act by the aircraft operator that is contrary to the requirements in the monitoring plan approved by the competent authority;
  - (c) for the purposes of verifying the baseline data report submitted by the operator pursuant to Article 4(2)(a) of Delegated Regulation (EU) .../... or the new entrant data report submitted by the operator pursuant to Article 5(2) of that Regulation any act or omission of an act by the operator that is contrary to the requirements in the monitoring methodology plan;
  - (d) for the purposes of accreditation pursuant to Chapter IV, any act or omission of an act by the verifier that is contrary to the requirements of this Regulation;

- (14) 'site' means, for the purposes of verifying the emission or tonne-kilometre report of an aircraft operator, the locations where the monitoring process is defined and managed, including the locations where relevant data and information are controlled and stored;
- (15) 'control environment' means the environment in which the internal control system functions and the overall actions of an operator's or aircraft operator's management to ensure awareness of this internal control system;
- (16) 'inherent risk' means the susceptibility of a parameter in the operator's or aircraft operator's report to misstatements that could be material, individually or when aggregated with other misstatements, before taking into consideration the effect of any related control activities;
- (17) 'control risk' means the susceptibility of a parameter in the operator's or aircraft operator's report to misstatements that could be material, individually or when aggregated with other misstatements, and that will not be prevented or detected and corrected on a timely basis by the control system;
- (18) 'verification risk' means the risk, being a function of inherent risk, control risk and detection risk, that the verifier expresses an inappropriate verification opinion when the operator's or aircraft operator's report is not free of material misstatements;
- (19) 'reasonable assurance' means a high but not absolute level of assurance, expressed positively in the verification opinion, as to whether the operator's or aircraft operator's report subject to verification is free from material misstatement;
- (20) 'analytical procedures' means the analysis of fluctuations and trends in the data including an analysis of the relationships that are inconsistent with other relevant information or that deviate from predicted amounts;
- (21) 'internal verification documentation' means all internal documentation that a verifier has compiled to record all documentary evidence and justification of activities that are carried out for the verification of an operator's or aircraft operator's report;
- (22) 'EU ETS lead auditor' means an EU ETS auditor in charge of directing and supervising the verification team, who is responsible for performing and reporting on the verification of an operator's or aircraft operator's report;
- (23) 'EU ETS auditor' means an individual member of a verification team responsible for conducting a verification of an operator's or aircraft operator's report other than the EU ETS lead auditor;
- (24) 'technical expert' means a person who provides detailed knowledge and expertise on a specific subject matter needed for the performance of verification activities for the purposes of Chapter III and for the performance of accreditation activities for the purposes of Chapter V;
- (25) 'level of assurance' means the degree of assurance the verifier provides on the verification report based on the objective of reducing the verification risk according to the circumstances of the verification engagement;
- (26) 'assessor' means a person assigned by a national accreditation body to perform individually or as part of an assessment team an assessment of a verifier pursuant to this Regulation;
- (27) 'lead assessor' means an assessor who is given the overall responsibility for assessing a verifier pursuant to this Regulation;
- (28) 'baseline data report' means a report submitted by an operator pursuant to Article 4(2) of Delegated Regulation (EU) .../...;
- (29) 'new entrant data report' means a report submitted by an operator pursuant to Article 5(2) of Delegated Regulation (EU) .../....

#### Article 4

### Presumption of conformity

Where a verifier demonstrates its conformity with the criteria laid down in the relevant harmonised standards as defined in point (9) of Article 2 of Regulation (EC) No 765/2008, or parts thereof, the references of which have been published in the *Official Journal of the European Union*, it shall be presumed to comply with the requirements set out in Chapters II and III of this Regulation in so far as the applicable harmonised standards cover those requirements.

#### Article 5

### General framework for accreditation

Where no specific provisions concerning the composition of the national accreditation bodies or the activities and requirements linked to accreditation are laid down in this Regulation, the relevant provisions of Regulation (EC) No 765/2008 shall apply.

## CHAPTER II

## VERIFICATION

## Article 6

**Reliability of verification**

A verified emissions report, baseline data report or new entrant data report shall be reliable for users. It shall represent faithfully that, which it either purports to represent or may reasonably be expected to represent.

The process of verifying operator's or aircraft operator's report shall be an effective and reliable tool in support of quality assurance and quality control procedures, providing information upon which an operator or aircraft operator can act to improve performance in monitoring and reporting emissions or data relevant for free allocation.

## Article 7

**General obligations of the verifier**

1. The verifier shall carry out the verification and the activities required by this Chapter with the aim of providing a verification report that concludes with reasonable assurance that the operator's or aircraft operator's report is free from material misstatements.
2. The verifier shall plan and perform the verification with an attitude of professional scepticism, recognising that circumstances may exist that cause the information in the operator's or aircraft operator's report to contain material misstatements.
3. The verifier must carry out verification in the public interest, and be independent of the operator or aircraft operator and the competent authorities responsible for Directive 2003/87/EC.
4. During the verification, the verifier shall assess whether:
  - (a) the operator's or aircraft operator's report is complete and meets the requirements laid down in Annex X to Implementing Regulation (EU) 2018/2066 or in Annex IV to Delegated Regulation (EU) .../..., as appropriate;
  - (b) the operator or aircraft operator has acted in compliance with the requirements of the greenhouse gas emissions permit and the monitoring plan approved by the competent authority, where the verification of an operator's emission report is concerned, and with the requirements of the monitoring plan approved by the competent authority, where the verification of an aircraft operator's emission or tonne-kilometre report is concerned;
  - (c) where the verification of an operator's baseline data report or new entrant data report is concerned, the operator has acted in conformance with the requirements of the monitoring methodology plan pursuant to Article 8 of Delegated Regulation (EU) .../... approved by the competent authority;
  - (d) the data in the operator's or aircraft operator's report are free from material misstatements;
  - (e) information can be provided in support of the operator's or aircraft operator's data flow activities, control system and associated procedures to improve the performance of their monitoring and reporting.

By way of derogation from point (c), the verifier shall assess whether the operator's monitoring methodology plan is in compliance with the requirements of Delegated Regulation (EU) .../... where the monitoring methodology plan is not subject to approval of the competent authority prior to submission of the baseline data report. If the verifier discovers that a monitoring methodology plan does not comply with Delegated Regulation (EU) .../..., the operator shall modify the monitoring methodology plan so that it complies with that Regulation.

For the purpose of point (d) of this paragraph, the verifier shall obtain clear and objective evidence from the operator or aircraft operator to support the reported aggregated emissions, tonne-kilometres or data relevant for free allocation taking into account all other information provided in the operator's or aircraft operator's report.

5. If the verifier discovers that an operator or an aircraft operator is not complying with Implementing Regulation (EU) 2018/2066 or with Delegated Regulation (EU) .../..., that irregularity shall be included in the verification report even if the monitoring plan or monitoring methodology plan concerned, as appropriate, has been approved by the competent authority.

6. If the monitoring plan has not been approved by the competent authority pursuant to Article 12 of Implementing Regulation (EU) 2018/2066, is incomplete or if significant modifications referred to in Article 15(3) or (4) of that Implementing Regulation have been made during the reporting period which have not been accordingly approved by the competent authority, the verifier shall advise the operator or aircraft operator to obtain the necessary approval from the competent authority.

If the monitoring methodology plan is subject to the approval of the competent authority prior to submission of the baseline data report pursuant to Article 8(4) of Delegated Regulation (EU) .../... and the monitoring methodology plan has not been approved or is incomplete, or where significant modifications referred to in Article 9(5) of that Regulation have been made which have not been approved by the competent authority, the verifier shall advise the operator to obtain the necessary approval from the competent authority.

Following the approval by the competent authority, the verifier shall continue, repeat or adapt the verification activities accordingly.

If the approval has not been obtained before the issue of the verification report, the verifier shall report this in the verification report.

#### Article 8

##### **Pre-contractual obligations**

1. Before accepting a verification engagement, a verifier shall obtain a proper understanding of the operator or aircraft operator and assess whether it can undertake the verification. For this purpose the verifier shall at least:
  - (a) evaluate the risks involved to undertake the verification of the operator's or aircraft operator's report in accordance with this Regulation;
  - (b) undertake a review of the information supplied by the operator or aircraft operator to determine the scope of the verification;
  - (c) assess whether the engagement falls within the scope of its accreditation;
  - (d) assess whether it has the competence, personnel and resources required to select a verification team capable of dealing with the complexity of the installation or the aircraft operator's activities and fleet as well as whether it is capable of successfully completing the verification activities within the timeframe required;
  - (e) assess whether it is capable of ensuring that the potential verification team at its disposal holds all the competence, and persons required to carry out verification activities for that specific operator or aircraft operator;
  - (f) determine, for each verification engagement requested, the time allocation needed to properly carry out the verification.
2. The operator or aircraft operator shall provide the verifier with all relevant information that enables the verifier to carry out the activities referred to in paragraph 1.

#### Article 9

##### **Time allocation**

1. When determining the time allocation for a verification engagement referred to in Article 8(1)(f), the verifier shall at least take into account:
  - (a) the complexity of the installation or the aircraft operator's activities and fleet;
  - (b) the level of information and the complexity of the monitoring plan approved by the competent authority or the monitoring methodology plan, as appropriate;
  - (c) the required materiality level;
  - (d) the complexity and completeness of the data flow activities and the control system of the operator or aircraft operator;
  - (e) the location of information and data related to greenhouse gas emissions, tonne-kilometre data or data relevant for free allocation.
2. The verifier shall ensure that the verification contract provides for the possibility for time to be charged in addition to the time agreed in the contract, where such additional time is found to be needed for the strategic analysis, risk analysis or other verification activities. The situations where the additional time may be needed shall include at least the following:
  - (a) during the verification where the data flow activities, control activities or logistics of the operator or aircraft operator seem to be more complex than initially anticipated;

- (b) where misstatements, non-conformities, insufficient data or errors in the data sets are identified by the verifier during the verification.
3. The verifier shall record the time allocated in the internal verification documentation.

#### Article 10

##### **Information from an operator or aircraft operator**

1. Before the strategic analysis and at other points of time during the verification, the operator or aircraft operator shall provide the verifier with all of the following:
- (a) the operator's greenhouse gas emissions permit, if this concerns the verification of an operator's emission report;
  - (b) the latest version of the operator's or aircraft operator's monitoring plan as well as any other relevant versions of the monitoring plan approved by the competent authority, including evidence of the approval;
  - (c) the latest version of the operator's monitoring methodology plan as well as any other relevant versions of the monitoring methodology plan, including, where applicable, evidence of the approval;
  - (d) a description of the operator's or aircraft operator's data flow activities;
  - (e) the operator's or aircraft operator's risk assessment referred to in Article 59(2)(a) of Implementing Regulation (EU) 2018/2066 or Article 11(1) of Delegated Regulation (EU) .../..., as appropriate, and an outline of the overall control system;
  - (f) where applicable, the simplified uncertainty assessment referred to in Article 7(2)(c) of Delegated Regulation (EU) .../...;
  - (g) the procedures mentioned in the monitoring plan as approved by the competent authority or the monitoring methodology plan, including procedures for data flow activities and control activities;
  - (h) the operator's or aircraft operator's annual emission, tonne-kilometre report, baseline data report or new entrant data report, as appropriate;
  - (i) the baseline data reports of previous allocation periods for earlier allocation phases and annual activity level reports of the previous years submitted to the competent authority for the purpose of Article 10a(21) of Directive 2003/87/EC, if applicable;
  - (j) where applicable, the operator's sampling plan referred to in Article 33 of Implementing Regulation (EU) 2018/2066 as approved by the competent authority;
  - (k) if the monitoring plan was modified during the reporting period, a record of all those modifications in accordance with Article 16(3) of Implementing Regulation (EU) 2018/2066;
  - (l) where applicable, the report referred to in Article 69(4) of Implementing Regulation (EU) 2018/2066;
  - (m) the verification report from the previous year or the previous baseline period, as appropriate, if the verifier did not carry out the verification for that particular operator or aircraft operator the previous year or baseline period, as appropriate;
  - (n) all relevant correspondence with the competent authority, in particular information related to the notification of modifications of the monitoring plan or monitoring methodology plan, as appropriate;
  - (o) information on databases and data sources used for monitoring and reporting purposes, including those from Eurocontrol or another relevant organisation;
  - (p) where the verification concerns the emission report of an installation carrying out the geological storage of greenhouse gases in a storage site permitted under Directive 2009/31/EC, the monitoring plan required by that Directive and the reports required by Article 14 of that Directive, covering at least the reporting period of the emissions report to be verified;
  - (q) where applicable, the approval of the competent authority for not carrying out site visits for installations pursuant to Article 31(1);
  - (r) the operator's evidence demonstrating compliance with the uncertainty thresholds for the tiers laid down in the monitoring plan;
  - (s) any other relevant information necessary for planning and carrying out the verification.
2. Before the verifier issues the verification report, the operator or aircraft operator shall provide it with the final authorised and internally validated operator's or aircraft operator's report.

*Article 11***Strategic analysis**

1. At the beginning of the verification the verifier shall assess the likely nature, scale and complexity of the verification tasks by carrying out a strategic analysis of all activities relevant to the installation or the aircraft operator.
2. For the purposes of understanding the activities carried out by the installation or the aircraft operator, the verifier shall collect and review the information needed to assess that the verification team is sufficiently competent to carry out the verification, to determine that the time allocation indicated in the contract has been set correctly and to ensure that it is able to conduct the necessary risk analysis. The information shall include at least:
  - (a) the information referred to in Article 10(1);
  - (b) the required materiality level;
  - (c) the information obtained from the verification in previous years, if the verifier is carrying out the verification for the same operator or aircraft operator.
3. When reviewing the information referred to in paragraph 2, the verifier shall at least assess the following:
  - (a) for the purposes of the verification of the operator's emission report, the category of the installation referred to in Article 19 of Implementing Regulation (EU) 2018/2066 and the activities carried out at that installation;
  - (b) for the purposes of the verification of the aircraft operator's emission or tonne-kilometre report, the size and nature of the aircraft operator, the distribution of information in different locations as well as the number and type of flights;
  - (c) the monitoring plan approved by the competent authority or monitoring methodology plan, as appropriate, as well as the specifics of the monitoring methodology laid down in that monitoring plan or the monitoring methodology plan as appropriate;
  - (d) the nature, scale and complexity of emission sources and source streams as well as the equipment and processes that have resulted in emissions, tonne-kilometre data or data relevant for free allocation, including the measurement equipment described in the monitoring plan or monitoring methodology plan as appropriate, the origin and application of calculation factors and other primary data sources;
  - (e) the data flow activities, the control system and the control environment.
4. When carrying out the strategic analysis, the verifier shall check the following:
  - (a) whether the monitoring plan or monitoring methodology plan, as appropriate, presented to it is the most recent version and, where required, approved by the competent authority;
  - (b) whether there have been any modifications of the monitoring plan during the reporting period or of the monitoring methodology plan during the baseline period, as appropriate;
  - (c) where applicable, whether the modifications referred to in point (b) have been notified to the competent authority pursuant to Article 15(1) or Article 23 of Implementing Regulation (EU) 2018/2066 or approved by the competent authority in accordance with Article 15(2) of that Implementing Regulation.
  - (d) where applicable, whether the modifications referred to in point (b) have been notified to the competent authority pursuant to Article 9(3) of Delegated Regulation (EU) .../... or approved by the competent authority in accordance with Article 9(4) of that Regulation.

*Article 12***Risk analysis**

1. The verifier shall identify and analyse the following elements to design, plan and implement an effective verification:
  - (a) the inherent risks;
  - (b) the control activities;
  - (c) where control activities referred to in point (b) have been implemented, the control risks concerning the effectiveness of those control activities.
2. When identifying and analysing the elements referred to in paragraph 1, the verifier shall at least consider:
  - (a) the findings from the strategic analysis referred to in Article 11(1);
  - (b) the information referred to in Article 10(1) and Article 11(2)(c);
  - (c) the materiality level referred to in Article 11(2)(b).

3. If the verifier determines that the operator or aircraft operator has failed to identify the relevant inherent risks and control risks in its risk assessment, the verifier shall inform the operator or aircraft operator thereof.
4. Where appropriate according to the information obtained during the verification, the verifier shall revise the risk analysis and modify or repeat the verification activities to be performed.

#### Article 13

##### Verification plan

1. The verifier shall draft a verification plan commensurate with the information obtained and the risks identified during the strategic analysis and the risk analysis, and including at least:
  - (a) a verification programme describing the nature and scope of the verification activities as well as the time and manner in which these activities are to be carried out;
  - (b) a test plan setting out the scope and methods of testing the control activities as well as the procedures for control activities;
  - (c) a data sampling plan setting out the scope and methods of data sampling related to data points underlying the aggregated emissions in the operator or aircraft operator's emission report, the aggregated tonne-kilometre data in the aircraft operator's tonne-kilometre report or the aggregated data relevant for free allocation in the operator's baseline data report or new entrant data report.
2. The verifier shall set up the test plan referred to in point (b) of paragraph 1 in a manner that allows it to determine the extent to which the relevant control activities may be relied on for the purposes of assessing compliance with the requirements mentioned in Article 7(4)(b), (c), (d) or the second subparagraph of Article 7(4).

When determining the sampling size and sampling activities for testing the control activities, the verifier shall consider the following elements:

- (a) the inherent risks;
  - (b) the control environment;
  - (c) the relevant control activities;
  - (d) the requirement to deliver a verification opinion with reasonable assurance.
3. When determining the sampling size and sampling activities for sampling the data referred to in point (c) of paragraph 1, the verifier shall consider the following elements:
    - (a) the inherent risks and control risks;
    - (b) the results of the analytical procedures;
    - (c) the requirement to deliver a verification opinion with reasonable assurance;
    - (d) the materiality level;
    - (e) the materiality of the contribution of an individual data element for the overall data set.
  4. The verifier shall set up and implement the verification plan such that the verification risk is reduced to an acceptable level to obtain reasonable assurance that the operator's or aircraft operator's report is free from material misstatements.
  5. The verifier shall update the risk analysis and the verification plan, and adapt the verification activities during the verification when it finds additional risks that need to be reduced or when there is less actual risk than initially expected.

#### Article 14

##### Verification activities

The verifier shall implement the verification plan and, based on the risk analysis, the verifier shall check the implementation of the monitoring plan as approved by the competent authority or monitoring methodology plan, as appropriate.

To that end, the verifier shall at least carry out substantive testing consisting of analytical procedures, data verification and checking the monitoring methodology and check the following:

- (a) the data flow activities and the systems used in the data flow, including information technology systems;
- (b) whether the control activities of the operator or aircraft operator are appropriately documented, implemented, maintained and effective to mitigate the inherent risks;

- (c) whether the procedures listed in the monitoring plan or monitoring methodology plan, as appropriate, are effective to mitigate the inherent risks and control risks and whether the procedures are implemented, sufficiently documented and properly maintained.

For the purposes of point (a) of the second paragraph, the verifier shall track the data flow following the sequence and interaction of the data flow activities from primary source data to the compilation of the operator's or aircraft operator's report.

#### Article 15

##### **Analytical procedures**

1. The verifier shall use analytical procedures to assess the plausibility and completeness of data where the inherent risk, the control risk and the aptness of the operator's or aircraft operator's control activities show the need for such analytical procedures.
2. In carrying out the analytical procedures referred to in paragraph 1, the verifier shall assess reported data to identify potential risk areas and to subsequently validate and tailor the planned verification activities. The verifier shall at least:
  - (a) assess the plausibility of fluctuations and trends over time or between comparable items;
  - (b) identify immediate outliers, unexpected data and data gaps.
3. In applying the analytical procedures referred to in paragraph 1, the verifier shall perform the following procedures:
  - (a) preliminary analytical procedures on aggregated data before carrying out the activities referred to in Article 14 in order to understand the nature, complexity and relevance of the reported data;
  - (b) substantive analytical procedures on the aggregated data and the data points underlying these data for the purposes of identifying potential structural errors and immediate outliers;
  - (c) final analytical procedures on the aggregated data to ensure that all errors identified during the verification process have been resolved correctly.
4. Where the verifier identifies outliers, fluctuations, trends, data gaps or data that are inconsistent with other relevant information or that differ significantly from expected amounts or ratios, the verifier shall obtain explanations from the operator or aircraft operator supported by additional relevant evidence.

Based on the explanations and additional evidence provided, the verifier shall assess the impact on the verification plan and the verification activities to be performed.

#### Article 16

##### **Data verification**

1. The verifier shall verify the data in the operator's or aircraft operator's report by applying detailed testing of the data, including by tracing the data back to the primary data source, cross-checking data with external data sources, performing reconciliations, checking thresholds regarding appropriate data and carrying out recalculations.
2. As part of the data verification referred to in paragraph 1 and taking into account the approved monitoring plan or monitoring methodology plan, as appropriate, including the procedures described in that plan, the verifier shall check:
  - (a) for the purposes of verifying an operator's emission report, the boundaries of an installation;
  - (b) for the purposes of verifying an operator's baseline data report or new entrant data report, the boundaries of an installation and its sub-installations;
  - (c) for the purposes of verifying an operator's emission report, baseline data report or new entrant data report, the completeness of source streams and emission sources as described in the monitoring plan approved by the competent authority or monitoring methodology plan, as appropriate;
  - (d) for the purposes of verifying an aircraft operator's emission report and tonne-kilometre report, the completeness of flights covered by an aviation activity listed in Annex I to Directive 2003/87/EC for which the aircraft operator is responsible as well as the completeness of emission data and tonne-kilometre data respectively;
  - (e) for the purposes of verifying an aircraft operator's emission report and tonne-kilometre report, the consistency between reported data and mass and balance documentation;

- (f) for the purposes of verifying an aircraft operator's emission report, the consistency between aggregated fuel consumption and data on fuel purchased or otherwise supplied to the aircraft performing the aviation activity;
  - (g) the consistency of the aggregated reported data in an operator's or aircraft operator's report with primary source data;
  - (h) where an operator applies a measurement-based methodology referred to in Article 21(1) of Implementing Regulation (EU) 2018/2066, the measured values using the results of the calculations performed by the operator in accordance with Article 46 of that Implementing Regulation;
  - (i) the reliability and accuracy of the data.
3. For the purposes of checking the completeness of flights referred to in point (d) of paragraph 2, the verifier shall use an aircraft operator's air traffic data, including data collected from Eurocontrol or other relevant organisations which can process air traffic information such as that available to Eurocontrol.

#### Article 17

### Verification of the correct application of the monitoring methodology

1. The verifier shall check the correct application and implementation of the monitoring methodology as approved by the competent authority in the monitoring plan including specific details of that monitoring methodology.
2. For the purposes of verifying the operator's emission report, the verifier shall check the correct application and implementation of the sampling plan referred to in Article 33 of Implementing Regulation (EU) 2018/2066, as approved by the competent authority.
3. For the purposes of verifying the operator's baseline data report or new entrant data report, the verifier shall check whether the methodology for collecting and monitoring data defined in the monitoring methodology plan is applied in the correct way, including:
  - (a) whether all data on emissions, inputs, outputs and energy flows are attributed correctly to the sub-installations in line with the system boundaries as referred to in Annex I to Delegated Regulation (EU) .../...;
  - (b) whether data are complete and whether data gaps or double counting have occurred;
  - (c) whether activity levels for product benchmarks are based on a correct application of the product definitions listed in Annex I to Delegated Regulation (EU) .../...;
  - (d) whether activity levels for the heat benchmark sub-installations, the district heating sub-installation, the fuel benchmark sub-installations and the process emissions sub-installations have been correctly attributed according to the products produced and pursuant to delegated acts adopted pursuant to Article 10b(5) of Directive 2003/87/EC.
4. Where transferred CO<sub>2</sub> is subtracted in accordance with Article 49 of Implementing Regulation (EU) 2018/2066 or transferred N<sub>2</sub>O is not counted in accordance with Article 50 of that Regulation and the CO<sub>2</sub> or N<sub>2</sub>O transferred is measured by both the transferring and receiving installation, the verifier shall check whether differences between the measured values at both installations can be explained by the uncertainty of the measurement systems and whether the correct arithmetic average of the measured values has been used in the emission reports of both installations.

Where the differences between the measured values at both installations cannot be explained by the uncertainty of the measurement systems, the verifier shall check whether adjustments were made to align the differences between the measured values, whether those adjustments were conservative and whether the competent authority has granted approval for those adjustments.

5. Where operators are required, pursuant to Article 12(3) of Commission Regulation (EU) No 601/2012, to include further elements in the monitoring plan that are relevant for meeting the requirements of Article 24(1) of Commission Decision 2011/278/EU <sup>(1)</sup>, the verifier shall check the correct application and implementation of the procedures referred to in Article 12(3) of Commission Regulation (EU) No 601/2012. In doing so, the verifier shall also check whether information on any planned or actual changes to the capacity, activity level and operation of an installation have been submitted by the operator to the competent authority by 31 December of the reporting period.

<sup>(1)</sup> Commission Decision 2011/278/EU of 27 April 2011 determining transitional Union-wide rules for harmonised free allocation of emission allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council (OJ L 130, 17.5.2011, p. 1).

*Article 18***Verification of methods applied for missing data**

1. Where methods laid down in the monitoring plan as approved by the competent authority have been used to complete missing data pursuant to Article 66 of Implementing Regulation (EU) 2018/2066, the verifier shall check whether the methods used were appropriate for the specific situation and whether they have been applied correctly.

If the operator or aircraft operator has obtained an approval by the competent authority to use other methods than those referred to in the first subparagraph in accordance with Article 66 of Implementing Regulation (EU) 2018/2066, the verifier shall check whether the approved approach has been applied correctly and appropriately documented.

Where an operator or an aircraft operator is not able to obtain such approval in time, the verifier shall check whether the approach used by the operator or aircraft operator to complete the missing data ensures that the emissions are not underestimated and that this approach does not lead to material misstatements.

2. The verifier shall check the effectiveness of the control activities implemented by the operator or aircraft operator to prevent missing data referred to in Article 66 of Implementing Regulation (EU) 2018/2066 from occurring.

3. Where data gaps in baseline data reports or new entrant data reports have occurred, the verifier shall check whether methods are laid down in the monitoring methodology plan to deal with data gaps pursuant to Article 12 Delegated Regulation (EU) .../..., whether those methods were appropriate for the specific situation and whether they have been applied correctly.

Where no applicable data gap method is laid down in the monitoring methodology plan, the verifier shall check whether the approach used by the operator to compensate for the missing data is based on reasonable evidence and ensures that the data required by Delegated Regulation (EU) .../... are not underestimated or overestimated.

*Article 19***Uncertainty assessment**

1. Where Implementing Regulation (EU) 2018/2066 requires the operator to demonstrate compliance with the uncertainty thresholds for activity data and calculation factors, the verifier shall confirm the validity of the information used to calculate the uncertainty levels as set out in the approved monitoring plan.

2. Where an operator applies a monitoring methodology not based on tiers, as referred to in Article 22 of Implementing Regulation (EU) 2018/2066, the verifier shall check the following:

- (a) whether an assessment and quantification of the uncertainty has been carried out by the operator demonstrating that the required overall uncertainty threshold for the annual level of greenhouse gas emissions pursuant to point (c) of Article 22 of Implementing Regulation (EU) 2018/2066 has been met;
- (b) the validity of the information used for the assessment and quantification of the uncertainty;
- (c) whether the overall approach used for the assessment and the quantification of the uncertainty is in accordance with point (b) of Article 22 of Implementing Regulation (EU) 2018/2066;
- (d) whether evidence is provided that the conditions for the monitoring methodology referred to in point (a) of Article 22 of Implementing Regulation (EU) 2018/2066 have been met.

3. Where Delegated Regulation (EU) .../... requires the operator to carry out a simplified uncertainty assessment, the verifier shall confirm the validity of the information used for that assessment.

*Article 20***Sampling**

1. When checking the conformance of control activities and procedures referred to in points (b) and (c) of Article 14 or when performing the checks referred to in Articles 15 and 16, the verifier may use sampling methods specific to an installation or aircraft operator provided that, based on the risk analysis, sampling is justified.

2. Where the verifier identifies a non-conformity or a misstatement in the course of sampling, it shall request the operator or aircraft operator to explain the main causes of the non-conformity or the misstatement in order to assess the impact of the non-conformity or misstatement on the reported data. Based on the outcome of that assessment, the verifier shall determine whether additional verification activities are needed, whether the sampling size needs to be increased, and which part of the data population has to be corrected by the operator or aircraft operator.
3. The verifier shall document the outcome of the checks referred to in Articles 14 to 17, including the details of additional samples, in the internal verification documentation.

#### Article 21

##### Site visits

1. At one or more appropriate times during the verification process, the verifier shall conduct a site visit in order to assess the operation of measuring devices and monitoring systems, to conduct interviews, to carry out the activities required by this Chapter as well as to gather sufficient information and evidence enabling it to conclude whether the operator's or aircraft operator's report is free from material misstatements.
2. The operator or aircraft operator shall provide the verifier access to its sites.
3. For the purposes of verifying the operator's emission report, the verifier shall also use a site visit to assess the boundaries of the installation as well as the completeness of source streams and emission sources.
4. For the purposes of verifying the operator's baseline data report or new entrant data report, the verifier shall also use a site visit to assess the boundaries of the installation and its sub-installations as well as the completeness of source streams, emission sources and technical connections.
5. For the purposes of verifying the operator's emission report, baseline data report or new entrant data report, the verifier shall decide, based on the risk analysis, whether visits to additional locations are needed, including where relevant parts of data flow activities and control activities are carried out in other locations such as company headquarters and other off-site offices.

#### Article 22

##### Addressing misstatements, non-conformities and non-compliance

1. If the verifier identifies misstatements, non-conformities or non-compliance with Implementing Regulation (EU) 2018/2066 or Delegated Regulation (EU) .../..., as appropriate, during the verification, it shall inform the operator or aircraft operator thereof on a timely basis and request relevant corrections.

The operator or aircraft operator shall correct any communicated misstatements or non-conformities.

Where a non-compliance with Implementing Regulation (EU) 2018/2066 or Delegated Regulation (EU) .../... has been identified, the operator or aircraft operator shall notify the competent authority and correct the non-compliance as appropriate without undue delay.

2. The verifier shall document and mark as resolved in the internal verification documentation all misstatements, non-conformities or non-compliance with Implementing Regulation (EU) 2018/2066 or Delegated Regulation (EU) .../... that have been corrected by the operator or aircraft operator during the verification.
3. If the operator or aircraft operator does not correct the misstatements or non-conformities communicated to them by the verifier in accordance with paragraph 1 before the verifier issues the verification report, the verifier shall request the operator or aircraft operator to explain the main causes of the non-conformity or misstatement in order to assess the impact of the non-conformities or misstatements on the reported data.

The verifier shall determine whether the uncorrected misstatements, individually or when aggregated with other misstatements, have a material effect on the total reported emissions, tonne-kilometre data or data relevant for free allocation. In assessing the materiality of misstatements the verifier shall consider the size and nature of the misstatement as well as the particular circumstances of their occurrence.

The verifier shall assess whether the uncorrected non-conformity, individually or when combined with other non-conformities, has an impact on the reported data and whether this leads to material misstatement.

If the operator or aircraft operator does not correct the non-compliance with Implementing Regulation (EU) 2018/2066 or Delegated Regulation (EU) .../... in accordance with paragraph 1 before the verifier issues the verification report, the verifier shall assess whether the uncorrected non-compliance has an impact on the reported data and whether this leads to material misstatement.

The verifier may consider misstatements as material even if those misstatements, individually or when aggregated with other misstatements, are below the materiality level set out in Article 23, where such consideration is justified by the size and nature of the misstatements and the particular circumstances of their occurrence.

#### Article 23

##### Materiality level

1. For the purposes of verifying emission reports, the materiality level shall be 5 % of the total reported emissions in the reporting period which is subject to verification, for any of the following:
  - (a) category A installations referred to in Article 19(2)(a) of Implementing Regulation (EU) 2018/2066 and category B installations referred to in Article 19(2)(b) of that Implementing Regulation;
  - (b) aircraft operators with annual emissions equal to or less than 500 kilotonnes of fossil CO<sub>2</sub>.
2. For the purposes of verifying emissions reports the materiality level shall be 2 % of the total reported emissions in the reporting period which is subject to verification, for any of the following:
  - (a) category C installations referred to in Article 19(2)(c) of Implementing Regulation (EU) 2018/2066;
  - (b) aircraft operators with annual emissions of more than 500 kilotonnes of fossil CO<sub>2</sub>.
3. For the purposes of verifying tonne-kilometre reports of aircraft operators, the materiality level shall be 5 % of the total reported tonne-kilometre data in the reporting period which is subject to verification.
4. For the purposes of verifying baseline data report or new entrant data reports, the materiality level shall be 5 % of the total reported value of the following:
  - (a) the installation's total emissions, where the data relate to emissions;
  - (b) the sum of imports and production of net measurable heat, if relevant, where the data relate to measurable heat data;
  - (c) the sum of the amounts of waste gases imported and produced within the installation, if relevant;
  - (d) the activity level of each relevant product benchmark sub-installation individually.

#### Article 24

##### Concluding on the findings of verification

When completing the verification and considering the information obtained during the verification, the verifier shall:

- (a) check the final data from the operator or aircraft operator, including data that have been adjusted based upon information obtained during the verification;
- (b) review the operator's or aircraft operator's reasons for any differences between the final data and data previously provided;
- (c) review the outcome of the assessment to determine whether the monitoring plan approved by the competent authority or monitoring methodology plan, as appropriate, including the procedures described in that plan, has been implemented correctly;
- (d) assess whether the verification risk is at an acceptably low level to obtain reasonable assurance;
- (e) ensure that sufficient evidence has been gathered to be able to give a verification opinion with reasonable assurance that the report is free from material misstatements;
- (f) ensure that the verification process is fully documented in the internal verification documentation and that a final judgment in the verification report can be given.

#### Article 25

##### Independent review

1. The verifier shall submit the internal verification documentation and the verification report to an independent reviewer prior to the issuance of the verification report.

2. The independent reviewer shall not have carried out any verification activities that are subject to their review.
3. The scope of the independent review shall encompass the complete verification process described in this Chapter and recorded in the internal verification documentation.

The independent reviewer shall perform the review so as to ensure that the verification process is conducted in accordance with this Regulation, that the procedures for verification activities referred to in Article 41 have been correctly carried out, and that due professional care and judgment has been applied.

The independent reviewer shall also assess whether the evidence gathered is sufficient to enable the verifier to issue a verification report with reasonable assurance.

4. Where circumstances occur which may cause changes in the verification report after the review, the independent reviewer shall also review those changes and the evidence thereof.
5. The verifier shall properly authorise a person to authenticate the verification report based upon the conclusions of the independent reviewer and the evidence in the internal verification documentation.

#### Article 26

##### Internal verification documentation

1. The verifier shall prepare and compile internal verification documentation containing at least:
  - (a) the results of the verification activities performed;
  - (b) the strategic analysis, risk analysis and verification plan;
  - (c) sufficient information to support the verification opinion, including justifications for judgments made on whether or not the misstatements identified have material effect on the reported emissions, tonne-kilometre data or data relevant for free allocation.
2. The internal verification documentation referred to in paragraph 1 shall be drafted in such a manner that the independent reviewer referred to in Article 25 and the national accreditation body can assess whether the verification has been performed in accordance with this Regulation.

After authentication of the verification report pursuant to Article 25(5), the verifier shall include results of the independent review in the internal verification documentation.

3. The verifier shall, upon request, provide the competent authority access to the internal verification documentation to facilitate an evaluation of the verification by the competent authority.

#### Article 27

##### Verification report

1. Based on the information collected during the verification, the verifier shall issue a verification report to the operator or aircraft operator on each emission report, tonne-kilometre report, baseline data report or new entrant data report that was subject to verification. The verification report shall include at least one of the following findings:
  - (a) the report is verified as satisfactory;
  - (b) the operator's or aircraft operator's report contains material misstatements that were not corrected before issuing the verification report;
  - (c) the scope of verification is too limited pursuant to Article 28 and the verifier could not obtain sufficient evidence to issue a verification opinion with reasonable assurance that the report is free from material misstatements;
  - (d) non-conformities, individually or combined with other non-conformities, provide insufficient clarity and prevent the verifier from stating with reasonable assurance that the operator's or aircraft operator's report is free from material misstatements;
  - (e) where the monitoring methodology plan is not subject to the approval of the competent authority, non-compliance with Delegated Regulation (EU) .../... provide insufficient clarity and prevent the verifier from stating with reasonable assurance that the baseline data report or new entrant data report is free from material misstatements.

For the purposes of point (a) of the first subparagraph, the operator's or aircraft operator's report may be verified as satisfactory only where the operator's or aircraft operator's report is free from material misstatements.

2. The operator or aircraft operator shall submit the verification report to the competent authority together with the operator's or aircraft operator's report concerned.
3. The verification report shall at least contain the following elements:
  - (a) the name of the operator or aircraft operator that was subject to verification;
  - (b) the objectives of the verification;
  - (c) the scope of the verification;
  - (d) a reference to the operator's or aircraft operator's report that has been verified;
  - (e) the criteria used to verify the operator's or aircraft operator's report, including the permit, where applicable, and versions of the monitoring plan approved by the competent authority or monitoring methodology plan, as appropriate, as well as the period of validity for each plan;
  - (f) in the case of verification of the baseline report required for allocation for the period 2021-2025, and the competent authority has not required the monitoring methodology plan to be approved, confirmation that the verifier has checked the monitoring methodology plan and that this plan is compliant with Delegated Regulation (EU) .../...;
  - (g) where it concerns the verification of the operator's or aircraft operator's emission report, aggregated emissions or tonne-kilometres per activity referred to in Annex I to Directive 2003/87/EC and per installation or aircraft operator;
  - (h) where it concerns the verification of the baseline data report or new entrant data report, aggregated annual verified data for each year in the baseline period for each sub-installation for the annual activity level and the emissions attributed to the sub-installation;
  - (i) the reporting period or baseline period subject to verification;
  - (j) the responsibilities of the operator or aircraft operator, the competent authority and the verifier;
  - (k) the verification opinion statement;
  - (l) a description of any identified misstatements and non-conformities that were not corrected before the issuance of the verification report;
  - (m) the dates on which site visits were carried out and by whom;
  - (n) information on whether any site visits were waived as well as the reasons for waiving these site visits;
  - (o) any issues of non-compliance with Implementing Regulation (EU) 2018/2066 or Delegated Regulation (EU) .../..., which have become apparent during the verification;
  - (p) if approval by the competent authority cannot be obtained in time for the method used to complete the data gap pursuant to the last subparagraph of Article 18(1), a confirmation whether the method used is conservative and whether it does or does not lead to material misstatements;
  - (q) a statement if the method used to complete any data gap pursuant to Article 12 of Delegated Regulation (EU) .../... leads to material misstatements;
  - (r) where the verifier has observed changes to the capacity, activity level and operation of the installation, which might have an impact on the installation's allocation of emission allowances and which have not been reported to the competent authority by 31 December of the reporting period in accordance with Article 24(1) of Commission Decision 2011/278/EU, a description of those changes and related remarks;
  - (s) recommendations for improvements, where applicable;
  - (t) the names of the EU ETS lead auditor, the independent reviewer and, where applicable, the EU ETS auditor and the technical expert that were involved in the verification of the operator's or aircraft operator's report;
  - (u) the date and signature by an authorised person on behalf of the verifier, including his name.
4. The verifier shall describe the misstatements, non-conformities and non-compliance with Implementing Regulation (EU) 2018/2066 or Delegated Regulation (EU) .../..., in sufficient detail in the verification report to allow the operator or aircraft operator as well as the competent authority to understand the following:
  - (a) the size and nature of the misstatement, non-conformity or non-compliance with Implementing Regulation (EU) 2018/2066 or Delegated Regulation (EU) .../...;
  - (b) why the misstatement has material effect, or not;

- (c) to which element of the operator's or aircraft operator's report the misstatement refers, or to what element of the monitoring plan or the monitoring methodology plan the non-conformity refers;
  - (d) to which Article in Implementing Regulation (EU) 2018/2066 or Delegated Regulation (EU) .../... the non-compliance relates.
5. For the purposes of verifying emission reports or tonne-kilometre reports, if a Member State requires the verifier to submit information on the verification process in addition to the elements described in paragraph 3 and that information is not necessary to understand the verification opinion, the operator or aircraft operator may, for efficiency reasons, submit that additional information to the competent authority separately from the verification report at an alternative date, but no later than 15 May of the same year.

#### Article 28

##### **Limitation of scope**

The verifier may conclude that the scope of the verification referred to in Article 27(1)(c) is too limited in any of the following situations:

- (a) data are missing that prevent a verifier from obtaining the evidence required to reduce the verification risk to the level needed to obtain reasonable level of assurance;
- (b) the monitoring plan is not approved by the competent authority;
- (c) the monitoring plan or monitoring methodology plan, as appropriate, does not provide sufficient scope or clarity to conclude on the verification;
- (d) the operator or aircraft operator has failed to make sufficient information available to enable the verifier to carry out the verification;
- (e) where Delegated Regulation (EU) .../... or the Member State required approval of the monitoring methodology plan by the competent authority prior to submission of the baseline data report and that plan has not been approved by the competent authority before the start of verification.

#### Article 29

##### **Addressing outstanding non-material non-conformities**

1. The verifier shall assess whether the operator or aircraft operator has corrected the non-conformities indicated in the verification report related to the previous monitoring period according to the requirements on the operator referred to in Article 69(4) of Implementing Regulation (EU) 2018/2066, where relevant.

If the operator or aircraft operator has not corrected those non-conformities pursuant to Article 69(4) of Implementing Regulation (EU) 2018/2066, the verifier shall consider whether the omission increases or may increase the risk of misstatements.

The verifier shall report in the verification report whether those non-conformities have been resolved by the operator or aircraft operator.

2. The verifier shall record in the internal verification documentation details of when and how identified non-conformities are resolved by the operator or aircraft operator during the verification.

#### Article 30

##### **Improvement of the monitoring and reporting process**

1. Where the verifier has identified areas for improvement in the operator's or aircraft operator's performance related to points (a) to (e) of this paragraph, it shall include in the verification report recommendations for improvement related to the operator's or aircraft operator's performance on those points:

- (a) the operator's or aircraft operator's risk assessment;
- (b) the development, documentation, implementation and maintenance of data flow activities and control activities as well as the evaluation of the control system;

- (c) the development, documentation, implementation and maintenance of procedures for data flow activities and control activities as well as other procedures that an operator or aircraft operator has to establish pursuant to Implementing Regulation (EU) 2018/2066 or Article 11(2) of Delegated Regulation (EU) .../...;
- (d) the monitoring and reporting of emissions or tonne kilometres, including in relation to achieving higher tiers, reducing risks and enhancing efficiency in the monitoring and reporting;
- (e) the monitoring and reporting of data for baseline data reports and new entrant reports.

2. During verification following a year in which recommendations for improvement were made in a verification report, the verifier shall check whether the operator or aircraft operator has implemented those recommendations for improvement and the manner in which this has been done.

Where the operator or aircraft operator has not implemented those recommendations or has not implemented them correctly, the verifier shall assess the impact this has on the risk of misstatements and non-conformities.

### Article 31

#### **Simplified verification for installations**

1. By way of derogation from Article 21(1), the verifier may decide, subject to the approval by a competent authority in accordance with the second subparagraph of this Article, not to carry out site visits to installations. This decision shall be based on the outcome of the risk analysis and after determining that all relevant data can be remotely accessed by the verifier and that the conditions for not carrying out site visits are met. The verifier shall inform the operator thereof without undue delay.

The operator shall submit an application to the competent authority requesting the competent authority to approve the verifier's decision not to carry out the site visit.

On an application submitted by the operator concerned, the competent authority shall decide whether to approve the verifier's decision not to carry out the site visit, taking into consideration all of the following elements:

- (a) the information provided by the verifier on the outcome of the risk analysis;
- (b) information that the relevant data can be remotely accessed;
- (c) evidence that the requirements laid down in paragraph 3 are not applicable to the installation;
- (d) evidence that the conditions for not carrying out the site visits are met.

2. The approval of the competent authority referred to in paragraph 1 of this Article is not required for not carrying out site visits of installations with low emissions referred to in Article 47(2) of Implementing Regulation (EU) 2018/2066.

3. The verifier shall always carry out site visits in the following situations:

- (a) when an operator's emission report is verified for the first time by the verifier;
- (b) if a verifier has not carried out a site visit in two reporting periods immediately preceding the current reporting period;
- (c) if, during the reporting period, there have been significant modifications of the monitoring plan including those referred to in Article 15(3) of Implementing Regulation (EU) 2018/2066;
- (d) if an operator's baseline data report or new entrant data report is verified.

4. Point c of paragraph 3 is not applicable where, during the reporting period, there have been only modifications of the default value for a calculation factor as referred to in Article 15(3)(h) of Implementing Regulation (EU) 2018/2066.

## Article 32

**Conditions for not carrying out site visits**

The conditions for not carrying out site visits referred to in Article 31(1) are any of the following:

- (1) the verification concerns a category A installation referred to in Article 19(2)(a) of Implementing Regulation (EU) 2018/2066 or a category B installation referred to in Article 19(2)(b) of that Implementing Regulation whereby:
  - (a) the installation has only one source stream as referred to in Article 19(3)(c) of Implementing Regulation (EU) 2018/2066 which is natural gas, or one or more *de minimis* source streams which aggregated do not exceed the threshold for *de minimis* source streams laid down in Article 19 of Implementing Regulation (EU) 2018/2066;
  - (b) the natural gas is monitored through fiscal metering which is subject to an appropriate legal regime for the control of fiscal meters and meets the required uncertainty levels related to the applicable tier;
  - (c) only default values for the calculation factors of natural gas are applied;
- (2) the verification concerns a category A installation referred to in Article 19(2)(a) of Implementing Regulation (EU) 2018/2066 or a category B installation referred to in Article 19(2)(b) of that Implementing Regulation whereby:
  - (a) the installation has only one source stream which is a fuel without process emissions, and that fuel is either a solid fuel directly combusted in the installation without intermediate storage, or a liquid or gaseous fuel for which there may be intermediate storage;
  - (b) the activity data related to the source stream is monitored by using one of the following methods:
    - (i) fiscal metering method which is subject to an appropriate legal regime for the control of fiscal meters and meets the required uncertainty levels related to the applicable tier;
    - (ii) method based solely on invoice data taking into account stock changes if relevant;
  - (c) only default values for calculation factors are applied;
  - (d) the competent authority has allowed the installation to use a simplified monitoring plan in accordance with Article 13 of Implementing Regulation (EU) 2018/2066;
- (3) the verification concerns an installation with low emissions as referred to in Article 47(2) of Implementing Regulation (EU) 2018/2066 and paragraphs (a) to (c) of point 2 are applicable.
- (4) the verification concerns an installation located on an unmanned site whereby:
  - (a) telemetered data from the unmanned site is sent directly to another location where all data is processed, managed and stored;
  - (b) the same person is responsible for all data management and recording for the site;
  - (c) the meters have already been inspected on site by the operator or a laboratory in accordance with Article 60 of Implementing Regulation (EU) 2018/2066 and a signed document or date-stamped photographic evidence provided by the operator demonstrates that no metering or operational changes have occurred at the installation since that inspection;
- (5) the verification concerns an installation located on a remote or inaccessible site, in particular an off-shore installation, whereby:
  - (a) there is a high level of centralisation of data collected from that site and transmitted directly to another location where all the data is processed, managed and stored with good quality assurance;
  - (b) the meters have already been inspected on site by the operator or a laboratory in accordance with Article 60 of Implementing Regulation (EU) 2018/2066 and a signed document or date-stamped photographic evidence provided by the operator demonstrates that no metering or operational changes have occurred at the installation since that inspection.

Point (2) may also be applied if, in addition to the source stream as referred to in point (a) of that point, the installation uses one or more *de minimis* source streams which aggregated do not exceed the threshold for *de minimis* source streams laid down in Article 19 of Implementing Regulation (EU) 2018/2066.

*Article 33***Simplified verification for aircraft operators**

1. By way of derogation from Article 21(1) of this Regulation, a verifier may decide not to carry out a site visit of a small emitter referred to in Article 55(1) of Implementing Regulation (EU) 2018/2066 if the verifier has concluded, based on its risk analysis, that all relevant data can be remotely accessed by the verifier.
2. Where an aircraft operator uses the simplified tools referred to in Article 55(2) of Implementing Regulation (EU) 2018/2066 to determine the fuel consumption and the reported data has been generated using those tools independently from any input from the aircraft operator, the verifier may, based on its risk analysis, decide not to carry out the checks referred to in Articles 14 and 16, Article 17(1) and (2) and Article 18 of this Regulation.

*Article 34***Simplified verification plans**

Where a verifier uses a simplified verification plan, the verifier shall keep a record of justifications for using such plans in the internal verification documentation, including evidence that the conditions for using simplified verification plans have been met.

## CHAPTER III

**REQUIREMENTS FOR VERIFIERS***Article 35***Sectoral scopes of accreditation**

The verifier shall only issue a verification report to an operator or aircraft operator that performs an activity that is covered by the scope of the activity referred to in Annex I for which the verifier has been granted accreditation according to the provisions of Regulation (EC) No 765/2008 and this Regulation.

*Article 36***Continued competence process**

1. The verifier shall establish, document, implement and maintain a competence process to ensure that all personnel entrusted with verification activities are competent for the tasks that are allocated to them.
2. As part of the competence process referred to in paragraph 1, the verifier shall at least determine, document, implement and maintain the following:
  - (a) general competence criteria for all personnel undertaking verification activities;
  - (b) specific competence criteria for each function within the verifier undertaking verification activities, in particular for the EU ETS auditor, EU ETS lead auditor, independent reviewer and technical expert;
  - (c) a method to ensure the continued competence and regular evaluation of the performance of all personnel that undertake verification activities;
  - (d) a process for ensuring ongoing training of the personnel undertaking verification activities;
  - (e) a process for assessing whether the verification engagement falls within the scope of the verifier's accreditation, and whether the verifier has the competence, personnel and resources required to select the verification team and successfully complete the verification activities within the timeframe required.

The competence criteria referred to in point (b) of the first subparagraph shall be specific for each scope of accreditation in which these persons are carrying out verification activities.

In evaluating the competence of the personnel pursuant to point (c) of the first subparagraph, the verifier shall assess that competence against the competence criteria referred to in points (a) and (b).

The process referred to in point (e) of the first subparagraph shall also include a process for assessing whether the verification team holds all the competence and persons required to carry out verification activities for a specific operator or aircraft operator.

The verifier shall develop general and specific competence criteria which are in conformity with the criteria laid down in Article 37(4) and Articles 38, 39 and 40.

3. The verifier shall regularly monitor the performance of all personnel that undertake verification activities to confirm the continued competence of that personnel.

4. The verifier shall regularly review the competence process referred to in paragraph 1 to ensure that:
  - (a) the competence criteria referred to in points (a) and (b) of the first subparagraph of paragraph 2 are developed in accordance with the competence requirements under this Regulation;
  - (b) all issues that may be identified related to the setting of the general and specific competence criteria pursuant to points (a) and (b) of the first subparagraph of paragraph 2 are addressed;
  - (c) all the requirements in the competence process are updated and maintained as appropriate.
5. The verifier shall have a system for recording the results of the activities carried out in the competence process referred to in paragraph 1.
6. A sufficiently competent evaluator shall assess the competence and performance of an EU ETS auditor and EU ETS lead auditor.

The competent evaluator shall monitor those auditors during the verification of the operator's or aircraft operator's report on the site of the installation or aircraft operator as appropriate, to determine whether they meet the competence criteria.

7. If a member of personnel fails to demonstrate that the competence criteria for a specific task allocated to that member have been fully met, the verifier shall identify and organise additional training or supervised work experience. The verifier shall monitor that member until the member demonstrates to the verifier that the member meets the competence criteria.

#### Article 37

##### Verification teams

1. For each particular verification engagement, the verifier shall assemble a verification team capable of performing the verification activities referred to in Chapter II.
2. The verification team shall at least consist of an EU ETS lead auditor, and, where the verifier's conclusions during the assessment referred to in Article 8(1)(e) and the strategic analysis so require, a suitable number of EU ETS auditors and technical experts.
3. For the independent review of the verification activities related to a particular verification engagement, the verifier shall appoint an independent reviewer who shall not be part of the verification team.
4. Each team member shall:
  - (a) have a clear understanding of their individual role in the verification process;
  - (b) be able to communicate effectively in the language necessary to perform their specific tasks.
5. The verification team shall include at least one person with the technical competence and understanding required to assess the specific technical monitoring and reporting aspects related to the activities referred to in Annex I that are carried out by the installation or aircraft operator. The verification team shall also include one person who is able to communicate in the language required for the verification of an operator's or aircraft operator's report in the Member State where the verifier is carrying out that verification.

Where the verifier is carrying out verification of baseline data reports and new entrant data reports the verification team shall include in addition at least one person with the technical competence and understanding required to assess the specific technical aspects regarding the collection, monitoring and reporting of data relevant for free allocation.

6. Where the verification team consists of one person, this person shall meet all the competence requirements for the EU ETS auditor and EU ETS lead auditor and meet the requirements laid down in paragraphs 4 and 5.

#### Article 38

##### Competence requirements for EU ETS auditors and EU ETS lead auditors

1. An EU ETS auditor shall have the competence to perform the verification. To this end, the EU ETS auditor shall have at least:
  - (a) knowledge of Directive 2003/87/EC, Implementing Regulation (EU) 2018/2066, Regulation (EU) .../... in the case of verification of the baseline data report or new entrant data report, this Regulation, relevant standards, and other relevant legislation, applicable guidelines, as well as relevant guidelines and legislation issued by the Member State in which the verifier is carrying out a verification;

- (b) knowledge and experience of data and information auditing, including:
    - (i) data and information auditing methodologies, including the application of the materiality level and assessing the materiality of misstatements;
    - (ii) analysing inherent risks and control risks;
    - (iii) sampling techniques in relation to data sampling and checking the control activities;
    - (iv) assessing data and information systems, IT systems, data flow activities, control activities, control systems and procedures for control activities.
  - (c) the ability to perform the activities related to the verification of an operator's or aircraft operator's report as required by Chapter II;
  - (d) knowledge of and experience in the sector specific technical monitoring and reporting aspects that are relevant for the scope of activities referred to in Annex I in which the EU ETS auditor is carrying out verification.
2. An EU ETS lead auditor shall meet the competence requirements for an EU ETS auditor and shall have demonstrated competence to lead a verification team and to be responsible for carrying out the verification activities in accordance with this Regulation.

#### *Article 39*

### **Competence requirements for independent reviewers**

1. The independent reviewer shall have the appropriate authority to review the draft verification report and internal verification documentation pursuant to Article 25.
2. The independent reviewer shall meet the competence requirements of an EU ETS lead auditor referred to in Article 38(2).
3. The independent reviewer shall have the necessary competence to analyse the information provided to confirm the completeness and integrity of the information, to challenge missing or contradictory information as well as to check data trails for the purposes of assessing whether the internal verification documentation is complete and provides sufficient information to support the draft verification report.

#### *Article 40*

### **Use of technical experts**

1. When carrying out verification activities, a verifier may use technical experts to provide detailed knowledge and expertise on a specific subject matter needed to support the EU ETS auditor and EU ETS lead auditor in carrying out their verification activities.
2. Where the independent reviewer does not have the competence to assess a particular issue in the review process, the verifier shall request the support of a technical expert.
3. The technical expert shall have the competence and expertise required to support the EU ETS auditor and EU ETS lead auditor, or the independent reviewer, where necessary, effectively on the subject matter for which their knowledge and expertise is requested. In addition, the technical expert shall have a sufficient understanding of the issues described in points (a), (b) and (c) of Article 38(1).
4. The technical expert shall undertake specified tasks under the direction and full responsibility of the EU ETS lead auditor of the verification team in which the technical expert is operating or the independent reviewer.

#### *Article 41*

### **Procedures for verification activities**

1. A verifier shall establish, document, implement and maintain one or more procedures for verification activities as described in Chapter II, and the procedures and processes required by Annex II. When establishing and implementing these procedures and processes the verifier shall carry out the activities in accordance with the harmonised standard referred to in Annex II.
2. A verifier shall design, document, implement and maintain a quality management system to ensure consistent development, implementation, improvement and review of the procedures and processes referred to in paragraph 1 in accordance with the harmonised standard referred to in Annex II.

*Article 42***Records and communication**

1. A verifier shall keep records, including records on the competence and impartiality of personnel, to demonstrate compliance with this Regulation.
2. A verifier shall on a regular basis make information available to the operator or aircraft operator and other relevant parties in accordance with the harmonised standard referred to in Annex II.
3. A verifier shall safeguard the confidentiality of information obtained during the verification in accordance with the harmonised standard referred to in Annex II.

*Article 43***Impartiality and independence**

1. A verifier shall be independent from an operator or aircraft operator and impartial in carrying out its verification activities.

To ensure independence and impartiality, the verifier and any part of the same legal entity shall not be an operator or aircraft operator, the owner of an operator or aircraft operator or owned by them, nor shall the verifier have relations with the operator or aircraft operator that could affect its independence and impartiality. The verifier shall also be independent from bodies that trade emission allowances under the greenhouse gas emission allowances trading system established pursuant to Article 19 of Directive 2003/87/EC.

2. A verifier shall be organised in a manner that safeguards its objectivity, independence and impartiality. For the purposes of this Regulation, the relevant requirements laid down in the harmonised standard referred to in Annex II shall apply.
3. A verifier shall not carry out verification activities for an operator or aircraft operator that poses an unacceptable risk to its impartiality or that creates a conflict of interest for it. The verifier shall not use personnel or contracted persons in the verification of an operator's or aircraft operator's report that involves an actual or potential conflict of interest. The verifier shall also ensure that the activities of personnel or organisations do not affect the confidentiality, objectivity, independence and impartiality of the verification.

An unacceptable risk to impartiality or a conflict of interest referred to in the first sentence of the first subparagraph shall be considered to have arisen in particular in either of the following cases:

- (a) where a verifier or any part of the same legal entity provides consulting services to develop part of the monitoring and reporting process that is described in the monitoring plan approved by the competent authority or in the monitoring methodology plan, as applicable, including the development of the monitoring methodology, the drafting of the operator's or aircraft operator's report and the drafting of the monitoring plan or monitoring methodology plan;
  - (b) where a verifier or any part of the same legal entity provides technical assistance to develop or maintain the system implemented to monitor and report emissions, tonne-kilometre data or data relevant for free allocation.
4. A conflict of interest for a verifier in the relations between it and an operator or an aircraft operator shall be considered to have arisen in particular in either of the following cases:
    - (a) where the relationship between the verifier and the operator or aircraft operator is based on common ownership, common governance, common management or personnel, shared resources, common finances and common contracts or marketing;
    - (b) where the operator or aircraft operator has received consulting services referred to in point (a) of paragraph 3 or technical assistance referred to in point (b) of that paragraph from a consultancy body, technical assistance body or another organisation having relations with the verifier and threatening the impartiality of the verifier.

For the purposes of point (b) of the first subparagraph, the verifier's impartiality shall be considered compromised where the relations between the verifier and the consultancy body, technical assistance body or the other organisation is based on common ownership, common governance, common management or personnel, shared resources, common finances, common contracts or marketing and common payment of sales commission or other inducement for the referral of new clients.

5. A verifier shall not outsource the independent review or the issuance of the verification report. For the purposes of this Regulation, when outsourcing other verification activities, the verifier shall meet the relevant requirements laid down in the harmonised standard referred to in Annex II.

However, contracting individuals to carry out verification activities shall not constitute outsourcing for the purposes of the first subparagraph if the verifier, when contracting those persons, meets the relevant requirements in the harmonised standard referred to in Annex II.

6. A verifier shall establish, document, implement and maintain a process to ensure continuous impartiality and independence of the verifier, parts of the same legal entity as the verifier, other organisations referred to in paragraph 4, and of all personnel and contracted persons involved in the verification. That process shall include a mechanism to safeguard the impartiality and independence of the verifier and shall meet the relevant requirements laid down in the harmonised standard referred to in Annex II.

7. If the EU ETS lead auditor undertakes six annual verifications for a given aircraft operator, then the EU ETS lead auditor shall take a three consecutive year break from providing verification services to that same aircraft operator. The six years maximum period includes any greenhouse gas verifications performed for the aircraft operator starting after the entry into force of this regulation.

#### CHAPTER IV

### ACCREDITATION

#### Article 44

#### Accreditation

A verifier issuing a verification report to an operator or an aircraft operator shall be accredited for the scope of activities referred to in Annex I for which the verifier is carrying out the verification of an operator's or aircraft operator's report.

For the purpose of verifying baseline data reports or new entrant data reports, a verifier issuing a verification report to an operator shall in addition be accredited for activity group No 98 referred to in Annex I.

#### Article 45

#### Objectives of accreditation

During the accreditation process and the monitoring of accredited verifiers, each national accreditation body shall assess whether the verifier and its personnel undertaking verification activities:

- (a) have the competence to carry out the verification of operator's or aircraft operator's reports in accordance with this Regulation;
- (b) are performing the verification of operator's or aircraft operator's reports in accordance with this Regulation;
- (c) meet the requirements referred to in Chapter III.

#### Article 46

#### Request for accreditation

1. Any legal person or other legal entity may request accreditation pursuant to Article 5(1) of Regulation (EC) No 765/2008 and the provisions of this Chapter.

The request shall contain the information required on the basis of the harmonised standard referred to in Annex III.

2. In addition to the information referred to in paragraph 1 of this Article, an applicant shall also, prior to the commencement of the assessment pursuant to Article 45, make available to the national accreditation body the following:

- (a) all information requested by the national accreditation body;
- (b) procedures and information concerning processes referred to in Article 41(1) and the information on the quality management system referred to in Article 41(2);
- (c) the competence criteria referred to in Article 36(2)(a) and (b), the results of the competence process referred to in Article 36 as well as other relevant documentation on the competence of all personnel involved in verification activities;
- (d) information on the process for ensuring continuous impartiality and independence referred to in Article 43(6), including relevant records on the impartiality and independence of the applicant and its personnel;
- (e) information on the technical experts and key personnel involved in the verification of operator's or aircraft operator's reports;
- (f) the system and process for ensuring appropriate internal verification documentation;
- (g) other relevant records referred to in Article 42(1).

*Article 47***Preparation for assessment**

1. When preparing the assessment referred to in Article 45, each national accreditation body shall take into account the complexity of the scope for which the applicant requests accreditation as well as the complexity of the quality management system referred to in Article 41(2), the procedures and information on processes referred to in Article 41(1) and the geographical areas in which the applicant is carrying out or planning to carry out verification.
2. For the purposes of this Regulation, the national accreditation body shall meet the minimum requirements set out in the harmonised standard referred to in Annex III.

*Article 48***Assessment**

1. The assessment team referred to in Article 58 shall carry out at least the following activities for the purposes of making the assessment referred to in Article 45:
  - (a) a review of all relevant documents and records referred to in Article 46;
  - (b) a visit of the premises of the applicant to review a representative sample of the internal verification documentation and to assess the implementation of the applicant's quality management system and the procedures or processes referred to in Article 41;
  - (c) witnessing of a representative part of the requested scope for accreditation and the performance and competence of a representative number of the applicant's staff involved in the verification of the operator's or aircraft operator's report to ensure that the staff are operating in accordance with this Regulation.

In carrying out those activities, the assessment team shall meet the requirements set out in the harmonised standard referred to in Annex III.

2. The assessment team shall report the findings and non-conformities to the applicant in accordance with the requirements set out in the harmonised standard referred to in Annex III and shall request the applicant to respond to the reported findings and non-conformities in accordance with those provisions.
3. An applicant shall take corrective action to address any non-conformities reported pursuant to paragraph 2 and indicate in applicant's response to the reported findings and non-conformities of the assessment team what actions are taken or are planned to be taken within a time set by the national accreditation body to resolve any identified non-conformities.
4. The national accreditation body shall review the responses of the applicant to the findings and non-conformities submitted pursuant to paragraph 3.

Where the national accreditation body finds the response of the applicant to be insufficient or ineffective, it shall request further information or action from the applicant. The national accreditation body may also request evidence of the effective implementation of actions taken or carry out a follow-up assessment to assess the effective implementation of the corrective actions.

*Article 49***Decision on accreditation and accreditation certificate**

1. The national accreditation body shall take into account the requirements laid down in the harmonised standard referred to in Annex III when preparing and taking the decision on whether to grant, extend or renew the accreditation of an applicant.
2. Where the national accreditation body has decided to grant, extend or renew the accreditation of an applicant, it shall issue an accreditation certificate to that effect.

The accreditation certificate shall at least contain the information required on the basis of the harmonised standard referred to in Annex III.

The accreditation certificate shall be valid for a period not exceeding five years after the date on which the national accreditation body has issued that certificate.

*Article 50***Surveillance**

1. The national accreditation body shall carry out an annual surveillance of each verifier to which it has issued an accreditation certificate.

The surveillance shall at least comprise the following:

- (a) a visit to the premises of the verifier with a view to carrying out the activities referred to Article 48(1)(b);
  - (b) witnessing the performance and competence of a representative number of the verifier's staff in accordance with Article 48(1)(c).
2. The national accreditation body shall carry out the first surveillance of a verifier in accordance with paragraph 1 no later than 12 months after the date on which the accreditation certificate has been issued to that verifier.
  3. The national accreditation body shall prepare its plan for the surveillance of each verifier in a manner that allows for representative samples of the scope of accreditation to be assessed, in accordance with the requirements laid down in the harmonised standard referred to in Annex III.
  4. Based on the results of the surveillance referred to in paragraph 1, the national accreditation body shall decide whether to confirm the continuation of accreditation.
  5. Where a verifier carries out a verification in another Member State, the national accreditation body that has accredited the verifier may request the national accreditation body of the Member State where the verification is performed to carry out surveillance activities on its behalf and under its responsibility.

#### *Article 51*

##### **Reassessment**

1. Before the expiry of the accreditation certificate, the national accreditation body shall carry out a reassessment of the verifier to which the national accreditation body has issued an accreditation certificate to determine whether the validity of that accreditation certificate may be extended.
2. The national accreditation body shall prepare its plan for the reassessment of each verifier in a manner that allows representative samples of the scope of accreditation to be assessed. In planning and carrying out the reassessment, the national accreditation body shall meet the requirements laid down in the harmonised standard referred to in Annex III.

#### *Article 52*

##### **Extraordinary assessment**

1. The national accreditation body may conduct an extraordinary assessment of the verifier at any time to ensure that the verifier meets the requirements of this Regulation.
2. For the purposes of enabling the national accreditation body to assess the need for an extraordinary assessment, the verifier shall inform the national accreditation body forthwith of any significant changes relevant to its accreditation concerning any aspect of its status or operation. Significant changes shall include those changes mentioned in the harmonised standard referred to in Annex III.

#### *Article 53*

##### **Extension of scope**

The national accreditation body shall, in response to an application by a verifier for an extension of the scope of a granted accreditation, undertake the necessary activities to determine whether the verifier meets the requirements of Article 45 for the requested extension of the scope of its accreditation.

#### *Article 54*

##### **Administrative measures**

1. The national accreditation body may suspend, withdraw or reduce an accreditation of a verifier if the verifier does not meet the requirements of this Regulation.

The national accreditation body shall suspend, withdraw or reduce an accreditation of a verifier if the verifier so requests.

The national accreditation body shall establish, document, implement and maintain a procedure for the suspension of the accreditation, the withdrawal of the accreditation and the reduction of the scope of accreditation.

2. The national accreditation body shall suspend an accreditation, or restrict the scope of an accreditation in any of the following cases:
  - (a) the verifier has committed a serious breach of the requirements of this Regulation;
  - (b) the verifier has persistently and repeatedly failed to meet the requirements of this Regulation;
  - (c) the verifier has breached other specific terms and conditions of the national accreditation body.

3. The national accreditation body shall withdraw the accreditation in the following cases:
  - (a) the verifier has failed to remedy the grounds for a decision to suspend the accreditation certificate;
  - (b) a member of the top management of the verifier or a verifier's staff involved in verification activities under this Regulation has been found guilty of fraud;
  - (c) the verifier has intentionally provided false information or concealed information.
4. The decision of a national accreditation body to suspend, withdraw or reduce the scope of the accreditation in accordance with paragraphs 2 and 3 shall be subject to appeal.

Member States shall establish procedures for the resolution of those appeals.

5. The decision of a national accreditation body to suspend, withdraw or reduce the scope of the accreditation shall take effect upon its notification to the verifier.

The national accreditation body shall terminate the suspension of an accreditation certificate where it has received satisfactory information and is confident that the verifier meets the requirements of this Regulation.

#### CHAPTER V

#### REQUIREMENTS CONCERNING ACCREDITATION BODIES FOR THE ACCREDITATION OF ETS VERIFIERS

##### *Article 55*

##### **National accreditation body**

1. The tasks related to accreditation pursuant to this Regulation shall be carried out by the national accreditation bodies appointed pursuant to Article 4(1) of Regulation (EC) No 765/2008.
2. Where a Member State decides to allow the certification of verifiers that are natural persons, under this Regulation the tasks related to the certification of those verifiers shall be entrusted to a national authority other than the national accreditation body appointed pursuant to Article 4(1) of Regulation (EC) No 765/2008.
3. Where a Member State decides to use the option laid down in paragraph 2, it shall ensure that the national authority concerned meets the requirements of this Regulation, including those laid down in Article 71 of this Regulation, and provide the required documentary evidence in accordance with Article 5(2) of Regulation (EC) No 765/2008.
4. A national accreditation body shall be a member of the body recognised under Article 14 of that Regulation (EC) No 765/2008.
5. A national accreditation body shall be entrusted with the operation of accreditation as a public authority activity and be granted formal recognition by the Member State, if accreditation is not operated directly by public authorities.
6. For the purposes of this Regulation, the national accreditation body shall carry out its functions in accordance with the requirements set out in the harmonised standard referred to in Annex III.

##### *Article 56*

##### **Cross-border accreditation**

Where a Member State considers that it is economically not meaningful or sustainable to appoint a national accreditation body or to provide accreditation services within the meaning of Article 15 of Directive 2003/87/EC, that Member State shall have recourse to a national accreditation body of another Member State.

The Member State concerned shall inform the Commission and the other Member States.

##### *Article 57*

##### **Independence and impartiality**

1. The national accreditation body shall be organised in a manner that guarantees its full independence from verifiers it assesses and its impartiality in carrying out its accreditation activities.
2. For that purpose, the national accreditation body shall not offer or provide any activities or services provided by a verifier, nor shall it provide consultancy services, own shares in or otherwise have a financial or managerial interest in a verifier.
3. Without prejudice to Article 55(2), the structure, responsibilities and tasks of the national accreditation body shall be clearly distinguished from those of the competent authority and those of other national authorities.

4. The national accreditation body shall take all final decisions pertaining to the accreditation of verifiers.

However, the national accreditation body may sub-contract certain activities, subject to the requirements set out in the harmonised standard referred to in Annex III.

#### Article 58

##### Assessment team

1. The national accreditation body shall appoint an assessment team for each particular assessment.
2. An assessment team shall consist of a lead assessor and, where necessary, a suitable number of assessors or technical experts for a specific scope of accreditation.

The assessment team shall include at least one person with the knowledge of the monitoring and reporting of greenhouse gas emissions pursuant to Implementing Regulation (EU) 2018/2066 that are relevant for the scope of accreditation and the competence and understanding required to assess the verification activities within the installation or aircraft operator for that scope, and at least one person with the knowledge of relevant national legislation and guidance.

Where the national accreditation body assesses the verifier's competence and performance for scope no 98 referred to in Annex I of this Regulation, the assessment team shall include in addition at least one person with the knowledge of collecting, monitoring and reporting data relevant for free allocation pursuant to Delegated Regulation (EU) .../... as well as the competence and understanding required to assess the verification activities for that scope.

#### Article 59

##### Competence requirements for assessors

1. An assessor shall have the competence to carry out the activities required under Chapter IV when assessing the verifier. To that end, the assessor shall:
  - (a) meet the requirements laid down in the harmonised standard pursuant to Regulation (EC) No 765/2008 referred to in Annex III;
  - (b) have knowledge of Directive 2003/87/EC, Implementing Regulation (EU) 2018/2066, Delegated Regulation (EU) .../... where the assessors assesses the verifier's competence and performance for scope no 98 referred to in Annex I of this Regulation, this Regulation, relevant standards and other relevant legislation as well as applicable guidelines;
  - (c) have knowledge of data and information auditing referred to in Article 38(1)(b) of this Regulation obtained through training or access to a person that has knowledge and experience of such data and information.
2. A lead assessor shall meet the competence requirements referred to in paragraph 1, have demonstrated competence to lead an assessment team and be responsible for carrying out an assessment in accordance with this Regulation.
3. Internal reviewers and persons taking the decisions on the granting, extending or renewing of an accreditation shall, in addition to the competence requirements referred to in paragraph 1, have sufficient knowledge and experience to evaluate the accreditation.

#### Article 60

##### Technical experts

1. The national accreditation body may include technical experts in the assessment team to provide detailed knowledge and expertise on a specific subject matter needed to support the lead assessor or assessor in carrying out assessment activities.
2. A technical expert shall have the competence required to support the lead assessor and assessor effectively on the subject matter for which knowledge and expertise of such expert is requested. In addition, the technical expert shall:
  - (a) have knowledge of Directive 2003/87/EC, Implementing Regulation (EU) 2018/2066, Delegated Regulation (EU) .../... where the technical expert assesses the verifier's competence and performance for scope no 98 referred to in Annex I of this Regulation, this Regulation, relevant standards, and other relevant legislation as well as applicable guidelines;
  - (b) have a sufficient understanding of verification activities.
3. A technical expert shall undertake specified tasks under the direction and full responsibility of the lead assessor of the assessment team concerned.

*Article 61***Procedures**

The national accreditation body shall comply with the requirements established pursuant to Article 8 of Regulation (EC) No 765/2008.

*Article 62***Complaints**

Where the national accreditation body has received a complaint concerning the verifier from the competent authority, the operator or aircraft operator, or other interested parties, the national accreditation body shall, within a reasonable time but no later than three months from the date of its receipt:

- (a) decide on the validity of the complaint;
- (b) ensure that the verifier concerned is given the opportunity to submit its observations;
- (c) take appropriate actions to address the complaint;
- (d) record the complaint and action taken; and
- (e) respond to the complainant.

*Article 63***Records and documentation**

1. The national accreditation body shall keep records on each person involved in the accreditation process. Those records shall include records related to relevant qualifications, training, experience, impartiality and competence necessary to demonstrate compliance with this Regulation.
2. The national accreditation body shall keep records of the verifier in line with the harmonised standard pursuant to Regulation (EC) No 765/2008 referred to in Annex III.

*Article 64***Access to information and confidentiality**

1. The national accreditation body shall, on a regular basis, make publicly available and update information about the national accreditation body and its accreditation activities.
2. The national accreditation body shall make, in accordance with point 4 of Article 8 of Regulation (EC) No 765/2008, adequate arrangements to safeguard, as appropriate, the confidentiality of information obtained.

*Article 65***Peer evaluation**

1. National accreditation bodies shall subject themselves to a regular peer evaluation.

The peer evaluation shall be organised by the body recognised under Article 14 of Regulation (EC) No 765/2008.

2. The body recognised under Article 14 of Regulation (EC) No 765/2008 shall implement appropriate peer evaluation criteria and an effective and independent peer evaluation process in order to assess whether:
  - (a) the national accreditation body that is subject to the peer evaluation has carried out the accreditation activities in accordance with Chapter IV;
  - (b) the national accreditation body that is subject to the peer evaluation has met the requirements laid down in this Chapter.

The criteria shall include competence requirements for peer evaluators and peer evaluation teams that are specific to the system for greenhouse gas emission allowances trading established by Directive 2003/87/EC.

3. The body recognised under Article 14 of Regulation (EC) No 765/2008 shall publish and communicate the outcome of the peer evaluation of a national accreditation body to the Commission, the national authorities responsible for the national accreditation bodies in the Member States, and the competent authority of Member States or the focal point referred to in Article 70(2).

4. Without prejudice to paragraph 1, where a national accreditation body has successfully undergone a peer evaluation organised by the body recognised under Article 14 of Regulation (EC) No 765/2008 prior to the entry into force of this Regulation, the national accreditation body shall be exempted from undergoing a new peer evaluation following the entry into force of this Regulation if it can demonstrate conformity with this Regulation.

To that end, the national accreditation body concerned shall submit a request and the necessary documentation to the body recognised under Article 14 of Regulation (EC) No 765/2008.

The body recognised under Article 14 of Regulation (EC) No 765/2008 shall decide whether the conditions for granting an exemption have been met.

The exemption shall apply for a period not exceeding three years from the date of notification of the decision to the national accreditation body.

5. The national authority entrusted, pursuant to Article 55(2), with the tasks related to the certification of verifiers that are natural persons, pursuant to this Regulation shall meet a level of credibility equivalent to national accreditation bodies that have successfully undergone peer evaluation.

To that end, the Member State concerned shall, immediately following its decisions authorising the national authority to perform certification, provide the Commission and the other Member States with all relevant documentary evidence. No national authority shall certify verifiers for the purposes of this Regulation before the Member State concerned provides that documentary evidence.

The Member State concerned shall periodically review the functioning of the national authority to ensure that it continues to meet the aforementioned level of credibility and shall inform the Commission thereof.

#### *Article 66*

##### **Corrective action**

1. Member States shall monitor their national accreditation bodies at regular intervals in order to ensure that they fulfil the requirements of this Regulation on a continuing basis, taking into account the results of the peer evaluation carried out in accordance with Article 65.

2. Where a national accreditation body does not meet the requirements or fails to fulfil its obligations as laid down in this Regulation, the Member State concerned shall take appropriate corrective action or ensure that such corrective action is taken, and shall inform the Commission thereof.

#### *Article 67*

##### **Mutual recognition of verifiers**

1. Member States shall recognise the equivalence of the services delivered by those national accreditation bodies that have successfully undergone a peer evaluation. Member States shall accept the accreditation certificates of verifiers accredited by those national accreditation bodies and respect the right of the verifiers to carry out verification for their scope of accreditation.

2. Where a national accreditation body has not undergone the complete peer evaluation process, Member States shall accept the accreditation certificates of verifiers accredited by that national accreditation body provided the body recognised under Article 14 of Regulation (EC) No 765/2008 has started a peer evaluation for that national accreditation body and it has not identified any non-compliance of the national accreditation body with this Regulation.

3. Where the certification of verifiers is carried out by a national authority referred to in Article 55(2), Member States shall accept the certificate issued by such authority and respect the right of certified verifiers to carry out verification for their scope of certification.

#### *Article 68*

##### **Monitoring of services delivered**

Where a Member State has established, in the course of an inspection carried out in accordance with Article 31(4) of Directive 2006/123/EC, that a verifier is not complying with this Regulation, the competent authority or national accreditation body of that Member State shall inform the national accreditation body that has accredited the verifier.

The national accreditation body that has accredited the verifier shall consider the communication of that information as a complaint within the meaning of Article 62 and shall take appropriate action and respond to the competent authority or the national accreditation body in accordance with the second subparagraph of Article 73(2).

#### *Article 69*

##### **Electronic data exchange and use of automated systems**

1. Member States may require verifiers to use electronic templates or specific file formats for verification reports in accordance with Article 74(1) of Implementing Regulation (EU) 2018/2066 or in accordance with Article 13 of Delegated Regulation (EU) .../....

2. Standardised electronic templates or file format specifications may be made available for further types of communication between the operator, aircraft operator, verifier, competent authority and national accreditation body in accordance with Article 74(2) of Implementing Regulation (EU) 2018/2066.

## CHAPTER VI

### INFORMATION EXCHANGE

#### Article 70

#### Information exchange and focal points

1. The Member State shall establish an effective exchange of appropriate information and effective cooperation between their national accreditation body, or where applicable, the national authority entrusted with the certification of verifiers, and the competent authority.

2. Where more than one competent authority is designated pursuant to Article 18 of Directive 2003/87/EC in a Member State, the Member State shall authorise one of those competent authorities to be the focal point for the exchange of information, for coordinating the cooperation referred to in paragraph 1, and for the activities referred to in this Chapter.

#### Article 71

#### Accreditation work programme and management report

1. By 31 December of each year, the national accreditation body shall make available an accreditation work programme to the competent authority of each Member State containing the list of verifiers accredited by that national accreditation body and which have notified it pursuant to Article 77 that they intend to carry out verifications in those Member States. The accreditation work programme shall at least contain the following information in relation to each verifier:

- (a) the anticipated time and place of the verification;
- (b) information on activities that the national accreditation body has planned for that verifier, in particular surveillance and reassessment activities;
- (c) dates of anticipated witnessing audits to be performed by the national accreditation body to assess the verifier, including the address and contact details of operators or aircraft operators that will be visited during the witness audit;
- (d) information on whether the national accreditation body has requested the national accreditation body from the Member State in which the verifier is performing the verification to carry out surveillance activities.

Where changes occur in the information referred to in the first subparagraph, the national accreditation body shall submit to the competent authority an updated work programme by 31 January of each year.

2. Following the submission of the accreditation work programme in accordance with paragraph 1, the competent authority shall provide the national accreditation body with any relevant information, including any relevant national legislation or guidelines.

3. By 1 June of each year, the national accreditation body shall make available a management report to the competent authority. The management report shall at least contain the following information in relation to each verifier that has been accredited by that national accreditation body:

- (a) accreditation details of verifiers that were newly accredited by that national accreditation body, including the scope of accreditation for these verifiers
- (b) any changes to the scope of accreditation for these verifiers;
- (c) summarised results of surveillance and reassessment activities carried out by the national accreditation body;
- (d) summarised results of extraordinary assessments that have taken place, including reasons for initiating such extraordinary assessments;
- (e) any complaints filed against the verifier since the last management report and the actions taken by the national accreditation body;
- (f) details of action taken by the national accreditation body in response to the information that is shared by the competent authority, unless the national accreditation body has considered the information as a complaint within the meaning of Article 62.

*Article 72***Information exchange on administrative measures**

If the national accreditation body has imposed administrative measures on the verifier pursuant to Article 54 or if a suspension of the accreditation has been terminated or a decision on appeal has reversed the decision of a national accreditation body to impose administrative measures referred to in Article 54, the national accreditation body shall inform the following parties:

- (a) the competent authority of the Member State where the verifier is accredited;
- (b) the competent authority and the national accreditation body of each Member State where the verifier is carrying out verifications.

*Article 73***Information exchange by the competent authority**

1. The competent authority of the Member State where the verifier is carrying out the verification shall annually communicate to the national accreditation body which has accredited that verifier at least the following:

- (a) relevant results from checking the operator's and aircraft operator's report and the verification reports, in particular of any identified non-compliance of that verifier with this Regulation;
- (b) results from the inspection of the operator or aircraft operator where those results are relevant for the national accreditation body concerning the verifier's accreditation and surveillance or where those results include any identified non-compliance of that verifier with this Regulation;
- (c) results from the evaluation of the internal verification documentation of that verifier where the competent authority has evaluated the internal verification documentation pursuant to Article 26(3);
- (d) complaints received by the competent authority concerning that verifier.

2. Where the information referred to in paragraph 1 provides evidence that the competent authority has identified non-compliance of the verifier with this Regulation, the national accreditation body shall consider the communication of that information as a complaint by the competent authority concerning that verifier within the meaning of Article 62.

The national accreditation body shall take appropriate action to address such information and respond to the competent authority within a reasonable time, but no later than three months from the date of its receipt. The national accreditation body shall inform the competent authority in its response of the action taken by it and, where relevant, the administrative measures imposed on the verifier.

*Article 74***Information exchange on surveillance**

1. Where the national accreditation body of the Member State in which a verifier is performing a verification has been requested, pursuant to Article 50(5), to carry out surveillance activities, that national accreditation body shall report its findings to the national accreditation body that has accredited the verifier, unless otherwise agreed between both national accreditation bodies.

2. The national accreditation body that has accredited the verifier shall take the findings referred to in paragraph 1 into account when assessing whether the verifier meets the requirements of this Regulation.

3. Where the findings referred to in paragraph 1 show evidence that the verifier is not complying with this Regulation, the national accreditation body that has accredited the verifier shall take appropriate action pursuant to this Regulation and shall inform the national accreditation body that has carried out surveillance activities on:

- (a) what action has been taken by the national accreditation body that has accredited the verifier;
- (b) where appropriate, how the findings were resolved by the verifier;
- (c) where relevant, what administrative measures have been imposed on the verifier.

*Article 75***Information exchange with a Member State where the verifier is established**

Where a verifier has been granted accreditation by a national accreditation body in a Member State other than the Member State in which the verifier is established, the accreditation work programme and the management report referred to in Article 71, as well as the information referred to in Article 72, shall also be provided to the competent authority of the Member State in which the verifier is established.

*Article 76***Databases of accredited verifiers**

1. National accreditation bodies, or where applicable national authorities referred to in Article 55(2), shall set up and manage a database and allow access to that database to other national accreditation bodies, national authorities, verifiers, operators, aircraft operators and competent authorities.

The body recognised under Article 14 of Regulation (EC) No 765/2008 shall facilitate and harmonise access to the databases to enable efficient and cost-effective communication between national accreditation bodies, national authorities, verifiers, operators, aircraft operators and competent authorities, and may reconcile those databases into a single and centralised database.

2. The database referred to in paragraph 1 shall contain at least the following information:

- (a) the name and address of each verifier accredited by that national accreditation body;
- (b) the Member States in which the verifier is carrying out verification;
- (c) each verifier's scope of accreditation;
- (d) the date on which the accreditation was granted and the expiry date of the accreditation;
- (e) any information on administrative measures that have been imposed on the verifier.

The information shall be publicly available.

*Article 77***Notification by verifiers**

1. For the purposes of enabling the national accreditation body to draft the accreditation work programme and the management report referred to in Article 71, a verifier shall by 15 November of each year send the following information to the national accreditation body that has accredited that verifier:

- (a) the planned time and place of the verifications that the verifier is scheduled to perform;
- (b) the address and contact details of the operators or aircraft operators whose emissions, tonne-kilometre reports, baseline data reports or new entrant data reports are subject to its verification;
- (c) the names of the members of the verification team and the scope of the accreditation under which the operator's or aircraft operator's activity falls.

2. Where changes occur in the information referred to in paragraph 1, the verifier shall notify those changes to the accreditation body within a timeframe agreed with that national accreditation body.

## CHAPTER VII

**FINAL PROVISIONS***Article 78***Repeal of Regulation (EU) No 600/2012 and transitional provisions**

1. Regulation (EU) No 600/2012 is repealed with effect from 1 January 2019 or the date of entry into force of this Regulation, whichever is the later.

References to the repealed Regulation shall be construed as references to this Regulation and read in accordance with the correlation table in Annex IV.

2. The provisions of Regulation (EU) No 600/2012 shall continue to apply to verification of emissions and, where applicable, activity data occurring prior to 1 January 2019.

*Article 79***Entry into force**

This Regulation shall enter into force on the day following that of its publication in the *Official Journal of the European Union*.

It shall apply from 1 January 2019 or the date of entry into force of this Regulation, whichever is the later.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 19 December 2018.

*For the Commission*  
*The President*  
Jean-Claude JUNCKER

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## ANNEX I

**Scope of accreditation for verifiers**

The scope of accreditation of verifiers shall be indicated in the accreditation certificate using the following groups of activities pursuant to Annex I to Directive 2003/87/EC and other activities pursuant to Articles 10a and 24 of Directive 2003/87/EC. Those provisions shall equally apply to verifiers certified by a national authority in accordance with Article 55(2) of this Regulation.

Activity Group No.	Scopes of Accreditation
1a	Combustion of fuels in installations, where only commercial standard fuels as defined in Commission Implementing Regulation (EU) 2018/2066 are used, or where natural gas is used in category A or B installations.
1b	Combustion of fuels in installations, without restrictions
2	Refining of mineral oil
3	<ul style="list-style-type: none"> <li>— Production of coke</li> <li>— Metal ore (including sulphide ore) roasting or sintering, including pelletisation</li> <li>— Production of pig iron or steel (primary or secondary fusion) including continuous casting</li> </ul>
4	<ul style="list-style-type: none"> <li>— Production or processing of ferrous metals (including ferro-alloys)</li> <li>— Production of secondary aluminium</li> <li>— Production or processing of non-ferrous metals, including production of alloys</li> </ul>
5	Production of primary aluminium (CO <sub>2</sub> and PFC emissions)
6	<ul style="list-style-type: none"> <li>— Production of cement clinker</li> <li>— Production of lime or calcination of dolomite or magnesite</li> <li>— Manufacture of glass including glass fibre</li> <li>— Manufacture of ceramic products by firing</li> <li>— Manufacture of mineral wool insulation material</li> <li>— Drying or calcination of gypsum or production of plaster boards and other gypsum products</li> </ul>
7	<ul style="list-style-type: none"> <li>— Production of pulp from timber or other fibrous materials</li> <li>— Production of paper or cardboard</li> </ul>
8	<ul style="list-style-type: none"> <li>— Production of carbon black</li> <li>— Production of ammonia</li> <li>— Production of bulk organic chemicals by cracking, reforming, partial or full oxidation or by similar processes</li> <li>— Production of hydrogen (H<sub>2</sub>) and synthesis gas by reforming or partial oxidation</li> <li>— Production of soda ash (Na<sub>2</sub>CO<sub>3</sub>) and sodium bicarbonate (NaHCO<sub>3</sub>)</li> </ul>
9	<ul style="list-style-type: none"> <li>— Production of nitric acid (CO<sub>2</sub> and N<sub>2</sub>O emissions)</li> <li>— Production of adipic acid (CO<sub>2</sub> and N<sub>2</sub>O emissions)</li> <li>— Production of glyoxal and glyoxylic acid (CO<sub>2</sub> and N<sub>2</sub>O emissions)</li> </ul>
10	<ul style="list-style-type: none"> <li>— Capture of greenhouse gases from installations covered by Directive 2003/87/EC for the purpose of transport and geological storage in a storage site permitted under Directive 2009/31/EC</li> <li>— Transport of greenhouse gases by pipelines for geological storage in a storage site permitted under Directive 2009/31/EC</li> </ul>

Activity Group No.	Scopes of Accreditation
11	Geological storage of greenhouse gases in a storage site permitted under Directive 2009/31/EC
12	Aviation activities (emissions and tonne-kilometre data)
98	Other activities pursuant to Article 10a of Directive 2003/87/EC
99	Other activities, included by a Member State pursuant to Article 24 of Directive 2003/87/EC, to be specified in detail in the accreditation certificate

## ANNEX II

**Requirements on verifiers**

With respect to the requirements on verifiers, the harmonised standard pursuant to Regulation (EC) No 765/2008 concerning requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition, shall apply. In addition, the following procedures, processes and arrangements referred to in Article 41(1), shall apply:

- (a) a process and policy for communication with the operator or aircraft operator and other relevant parties;
  - (b) adequate arrangements to safeguard the confidentiality of information obtained;
  - (c) a process for dealing with appeals;
  - (d) a process for dealing with complaints (including indicative timescale);
  - (e) a process for issuing a revised verification report where an error in the verification report or operator's or aircraft operator's report has been identified after the verifier has submitted the verification report to the operator or aircraft operator for onwards submission to the competent authority;
  - (f) a procedure or process for outsourcing verification activities to other organisations.
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*ANNEX III***Minimum requirements of the accreditation process and requirements on accreditation bodies**

With respect to the minimum requirements for accreditation, and the requirements for accreditation bodies, the harmonised standard pursuant to Regulation (EC) No 765/2008 concerning general requirements for accreditation bodies accrediting conformity assessment bodies shall apply.

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## ANNEX IV

**Correlation table**

Commission Regulation (EU) No 600/2012	This Regulation
Article 1 to 31	Article 1 to 31
—	Article 32
Article 32 to 78	Article 33 to 79
Annex I to III	Annex I to III
—	Annex IV







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