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COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels,
C(2009) xxx

2009/xx/EC

Proposal for a

COMMISSION DECISION

**amending Decision 2007/589/EC as regards the inclusion of monitoring and reporting
guidelines for emissions and tonne-kilometre data from aviation activities**

{SEC(2009) xxxx}

COMMISSION DECISION

amending Decision 2007/589/EC as regards the inclusion of monitoring and reporting guidelines for emissions and tonne-kilometre data from aviation activities

(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC¹, and in particular Article 14(1) thereof,

Whereas:

- (1) Directive 2008/101/EC of the European Parliament and of the Council amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community² included aviation activities within the scheme for greenhouse gas emission allowance trading within the Community.
- (2) Pursuant to Article 14(1) of Directive 2003/87/EC the Commission should adopt guidelines for monitoring and reporting of emissions resulting from aviation activities, and for monitoring and reporting of tonne-kilometre data from aviation activities for the purpose of an application under Articles 3e or 3f of that Directive.
- (3) The administering Member State should ensure that each aircraft operator submits to the competent authority in that Member State monitoring plans setting out measures to monitor and report annual emissions as well as tonne kilometre data for the purpose of an application for an allocation of allowances that are to be allocated free of charge, and that such plans are approved by the competent authority in accordance with the guidelines adopted pursuant to Article 14(1) of that Directive.
- (4) Decision 2007/589/EC establishing guidelines on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council³ should therefore be amended accordingly.
- (5) The measures provided for in this Decision are in accordance with the opinion of the Climate Change Committee referred to in Article 23 of Directive 2003/87/EC,

¹ OJ L 275, 25.10.2003, p. 32.

² OJ L 8, 13.1.2009, p. 3.

³ OJ L 229, 31.8.2007, p. 1.

HAS ADOPTED THIS DECISION:

Article 1

Decision 2007/589/EC is amended as follows:

1. Article 1 is replaced by the following:

“Article 1

The guidelines for the monitoring and reporting of greenhouse gas emissions from the activities listed in Annex I to Directive 2003/87/EC, and of activities included pursuant to Article 24(1) of that Directive, are set out in Annexes I to XIV to this Decision. The guidelines for the monitoring and reporting of tonne-kilometre data from aviation activities for the purpose of an application under Articles 3e or 3f of Directive 2003/87/EC are set out in Annex XV.

Those guidelines are based on the principles set out in Annex IV to that Directive.”

2. In the Table of Annexes, the following entries are added:

“Annex XIV: Activity-specific guidelines for determination of emissions from aviation activities as listed in Annex I to Directive 2003/87/EC

Annex XV: Activity-specific guidelines for determination of tonne-kilometre data from aviation activities for the purpose of an application under Articles 3e or 3f of Directive 2003/87/EC”.

3. Annex I is amended as set out in Part A of the Annex to this Decision.
4. Annex XIV is added as set out in Part B of the Annex to this Decision.
5. Annex XV is added as set out in Part C of the Annex to this Decision.

Article 2

This Decision is addressed to the Member States.

Done at Brussels,

For the Commission

Member of the Commission

ANNEX

A. Annex I is amended as follows:

(1) In Section 1, the words “Annexes II to XI” are replaced by the words “Annexes II to XI and XIII-XV”:

(2) Section 2 shall be amended as follows:

(a) The introductory part is replaced by the following:

"For the purposes of this Annex and Annexes II to XV the definitions of Directive 2003/87/EC shall apply. However, for the purposes of this Annex, "operator" means operator as referred to in point (f) of Article 3 of Directive 2003/87/EC and aircraft operator as referred to in point (o) of that Article."

(b) paragraph 1 is amended as follows:

(i) point (c) is replaced by the following:

“(c) ‘emission source’ means a separately identifiable part (point or process) of an installation from which relevant greenhouse gases are emitted or, for aviation activities, an individual aircraft;”

(ii) point (e) is replaced by the following:

“(e) ‘monitoring methodology’ means the sum of approaches used by an operator or aircraft operator to determine the emissions of a given installation or aviation activity;”

(iii) in point (f), the word “installation” is replaced by the words “installation or aircraft operator”

(iv) point (g) is replaced by the following:

“(g) ‘tier’ means a specific element of a methodology for determining activity data, emission factors, annual emission, annual average hourly emission and oxidation or conversion factors, as well as for payload;”

(v) point (i) is replaced by the following:

“(i) ‘reporting period’ means one calendar year during which emissions or tonne-kilometre data have to be monitored and reported;”

(vi) in point (j), the period at the end is replaced by the following:

“; for aviation activities trading period means the period referred to in Article 3c(1) and (2) of that Directive.”

(c) in paragraph 2, point (h) is replaced by the following:

"(h) commercial standard fuel’ means the internationally standardised commercial fuels which 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 gasoline and aviation gasoline.”

(d) paragraph 4 is amended as follows:

(i) the last sentence of point (a) is replaced by the following:

"For installations or aircraft operators without this history, data from representative installations or aircraft operators carrying out the same or comparable activities are used as reference and scaled according to their capacity."

(ii) point (c) is replaced by the following:

"(c) "de minimis source streams" means a group of minor source streams selected by the operator and jointly emitting 1 kilotonnes of fossil CO₂ or less per year, or that contribute less than 2 % (up to a total maximum contribution of 20 kilotonnes of fossil CO₂ per year) of total annual emissions of fossil CO₂ of that installation or aircraft operator before subtraction of transferred CO₂, whichever is the highest in terms of absolute emissions;"

(iii) point (e) is replaced by the following:

"(e) "minor source streams" means those source streams selected by the operator to jointly emit 5 kilotonnes of fossil CO₂ or less per year or to contribute less than 10 % (up to a total maximum contribution of 100 kilotonnes of fossil CO₂ per year), to the total annual emissions of fossil CO₂ of an installation or aircraft operator before subtraction of transferred CO₂, whichever is the highest in terms of absolute emissions."

(e) paragraph 5 is amended as follows:

(i) point (e) is replaced by the following:

"(e) "reasonable assurance" means a high but not absolute level of assurance, expressed positively in the verification opinion, whether the emissions report subject to verification is free from material misstatement and whether the installation or aircraft operator does not have material non-conformities;"

(ii) point (g) is replaced by the following:

"(g) "level of assurance" means the degree to which the verifier is confident in the verification conclusions that it has been proved whether or not the information reported in the annual emission report for an installation or aircraft operator is free from material misstatement;"

(iii) in paragraph 5, point (h) and (i) are replaced by the following:

"(h) 'Non-conformity' means any act or omission of an act by the installation or aircraft operator being under verification, either intentional or unintentional, that is contrary to the requirements in the monitoring plan approved by the competent authority under the installation's permit or under Article 3g of Directive 2003/87/EC;

(i) 'Material non-conformity' means a non-conformity to the requirements in the monitoring plan approved by the competent authority under the installation's permit or under Article 3g of Directive 2003/87/EC, that could lead to a different treatment of the installation or aircraft operator by the competent authority;"

(f) the following paragraph 6 is added:

"6. The following definitions shall apply in relation to emissions and tonne-kilometre data from aviation activities:

(a) 'aerodrome of departure' means the aerodrome at which a flight constituting an aviation activity listed in Annex I of Directive 2003/87/EC begins;

(b) 'aerodrome of arrival' means the aerodrome at which a flight constituting an aviation activity listed in Annex I of Directive 2003/87/EC ends;

(c) 'aerodrome pair' means a pair constituted by an aerodrome of departure and an aerodrome of arrival;

(d) 'mass and balance documentation' means the documentation as specified in international or national implementation of the Standards and Recommended Practices (SARPs) as laid down in Annex 6 (Operation of Aircraft) to the Chicago Convention⁴, including as specified in Council Regulation (EEC) No 3922/91 ('EU-OPS'), as amended by Commission Regulation (EC) No 859/2008 of 20 August 2008, in Annex III Subpart J, or equivalent international regulations;

(e) 'passengers' means the persons onboard the aircraft during a flight excluding its crew members;

(f) 'payload' means the total mass of freight, mail, passengers and baggage carried onboard the aircraft during a flight;

(g) 'distance' means the great circle distance between the aerodrome of departure and the aerodrome of arrival plus an additional fixed factor of 95km;

(h) 'tonne-kilometre' means a tonne of payload carried a distance of one kilometre."

(3) Section 3 is amended as follows:

(a) In the second paragraph, the word "installation" is replaced by the words, "installation and aircraft operator";

(b) the fifth paragraph is replaced by the following:

"Trueness. It shall be ensured that the emission determination is systematically neither over nor under true emissions. Sources of uncertainties shall be identified and reduced as far as practicable. Due diligence shall be exercised to ensure that the calculation and measurement of emissions exhibit highest achievable accuracy. The operator shall enable reasonable assurance of the integrity of reported emissions to be determined. Emissions shall be determined using the appropriate monitoring methodologies set out in these Guidelines. All metering or other testing equipment used to report monitoring data shall be appropriately applied, maintained and calibrated, and checked. Spreadsheets and other tools used to store and manipulate monitoring data shall be free from error. Reported emissions and related disclosures shall be free from material misstatement, 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";

(c) in the sixth paragraph, the third sentence is replaced by the following:

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

(4) Section 4.1 is amended as follows:

(a) the first paragraph is replaced by the following:

"The monitoring and reporting process for an installation or aircraft operator shall include all relevant greenhouse gas emissions from all emission sources and/or source streams belonging to activities carried out at the installation or by an aircraft operator and listed in Annex I to Directive 2003/87/EC, as well as from activities and greenhouse gases included by a Member State pursuant to Article 24 of Directive 2003/87/EC. Aircraft operators shall furthermore ensure that documented procedures

⁴ Convention on International Civil Aviation and its Annexes signed in Chicago on 7 December 1944

are in place which track any changes in the list of emission sources such as leasing or purchase of aircraft, thereby ensuring completeness of emission data and avoiding double counting.”;

(b) in the second paragraph, the second sentence is replaced by the following:

“Therefore, all emission sources and source streams from activities listed in Annex I to Directive 2003/87/EC that are to be monitored and reported shall be listed in the permit or, for aviation activities, covered by the monitoring plan.”;

(c) the third paragraph is replaced by the following:

“Emissions from mobile internal combustion engines for transportation purposes shall be excluded from the emission estimates of installations.”.

(5) The first sentence of section 4.2 is replaced by the following:

“Annex IV to Directive 2003/87/EC allows a determination of emissions of installations using either:”.

(6) Section 4.3 is amended as follows:

(a) in the first paragraph the following sentence is added: “Pursuant to Article 3g of that Directive, aircraft operators shall submit to the competent authority a monitoring plan setting out measures to monitor and report emissions and tonne-kilometre data.”;

(b) the third paragraph is replaced by the following:

“The competent authority shall check and approve the monitoring plan prepared by the operator before the start of the reporting period, and again after any substantial changes to the monitoring methodology are applied to an installation or by an aircraft operator. When required by an activity-specific Annex, the monitoring plan shall be submitted by a specific date using a standard template.”

(7) Section 5 is amended as follows:

(a) the third paragraph of Section 5.1 under the heading 'Combustion Emissions' is replaced by the following:

"Activity data shall be based on fuel consumption. The quantity of fuel used shall be expressed in terms of energy content as TJ, unless otherwise indicated in these guidelines. The use of a net calorific value shall be deemed not to be necessary for some specific activities if their activity-specific Annexes indicate that emission factors expressed as t CO₂ per tonne of fuel can be used with a similar level of accuracy. The emission factor shall be expressed as t CO₂/TJ, unless otherwise indicated in these guidelines. When a fuel is consumed not all of the carbon in the fuel is oxidised to CO₂. Incomplete oxidation occurs due to inefficiencies in the combustion process that leave some of the carbon unburned or partly oxidised as soot or ash. Un-oxidised or partially oxidized carbon is taken into account in the oxidation factor which shall be expressed as a fraction. The oxidation factor shall be expressed as a fraction of one. The resulting calculation formula is:”;

(b) in section 5.2, the first sentence is replaced by the following:

“The activity-specific guidelines set out in Annexes II to XI and Annexes XIV and XV contain specific methodologies for determining the following variables: activity data (consisting of the two variables fuel/material flow and net calorific value), emission factors, composition data, oxidation and conversion factors and payload.”;

- (c) The heading of section 5.3 is replaced by the following:
“5.3 Fall-Back Approaches for Stationary Installations”;
- (d) The heading of section 5.4 is replaced by the following:
“5.4 Activity data of stationary installations”;
- (e) The second paragraph of section 5.5 is replaced by the following: “In order to achieve highest transparency and widest possible consistency with national greenhouse gas inventories, the use of emission factors for a fuel expressed as t CO₂/t rather than t CO₂/TJ for combustion emissions is restricted to cases where unreasonable costs would otherwise be incurred by the operator, and to cases defined in activity-specific Annexes of these guidelines.”.
- (8) The heading of section 6 is replaced by the following: “6. Measurement Based Methodologies for stationary installations”.
- (9) Section 7.1 is amended as follows:
- (a) the second paragraph is replaced by the following:
"Under the calculation based methodology following the provisions of section 5.2, the competent authority will have approved the combination of tiers for each source stream in an installation plus approved all other details of the monitoring methodology for that installation as contained within the installation's permit or, for aviation activities, the aircraft operator's monitoring plan. In doing so, the competent authority has authorised the uncertainty directly resulting from correct application of the approved monitoring methodology, and the evidence of that approval is the content of the permit or, for aviation activities, the content of the approved monitoring plan. Stating the combination of tiers in the emissions report shall constitute reporting uncertainty for the purposes of Directive 2003/87/EC. Hence there is no further requirement to report on uncertainty if the calculation based methodology is applied.";
- (b) the first sentence of the fifth paragraph is replaced by the following:
“In all other cases, the operator shall provide written proof of the uncertainty level associated with the determination of activity data for each source stream in order to demonstrate compliance with the uncertainty thresholds defined in Annexes II to XI and Annexes XIV and XV of these Guidelines.”.
- (10) Section 8 is amended as follows:
- (a) the first paragraph is replaced by the following:
“Annex IV to Directive 2003/87/EC sets out the reporting requirements for installations and aircraft operators. The reporting format set out in Section 14 of this Annex and the information required therein shall be used as a basis for reporting of the quantitative data unless an equivalent electronic standard protocol for annual reporting has been published by the EU Commission. Where a reporting format is specified in an activity-specific Annex, this reporting format and the information required therein shall be used for reporting.”;
- (b) the eleventh paragraph is replaced by the following:
"In order to achieve consistency between data reported under Directive 2003/87/EC and data reported by Member States under the UN Framework Convention on Climate Change and other emission data reported for the European Pollutant Release

and Transfer Register (EPRTR), each activity carried out by an installation or aircraft operator shall be labelled applying the codes, if applicable, from the following two reporting schemes:".

(11) Section 9 is amended as follows:

(a) the first and second paragraphs are replaced by the following:

“An operator shall document and archive monitoring data for the installation's or aircraft operator's emissions from all emission sources and/or source streams belonging to activities listed in Annex I to Directive 2003/87/EC of greenhouse gases specified in relation to those activities.

The documented and archived monitoring data shall be sufficient to allow for the verification of the annual emissions report of an installation's or aircraft operator's emissions submitted by the operator pursuant to Article 14(3) of Directive 2003/87/EC, in accordance with the criteria set out in Annex V to that Directive.”;

(b) in the fourth paragraph, the words “an operator of an installation” are replaced by the words “an operator”;

(c) the fifth indent of the fifth paragraph is replaced by the following:

"– documentation of the process of collection of activity data for the installation or aircraft operator and its source streams,";

(d) The following paragraph is added at the end of section 9:

“The following additional information shall be retained for aviation activities:

- The list of aircraft owned and leased-in, and necessary evidence for the completeness of that list;
- The list of flights covered in each reporting period, and necessary evidence for the completeness of that list;
- Data used for determination of payload and distance relevant for the years for which tonne-kilometre data is reported;
- Documentation on the approach for data gaps if applicable, and the data used for closing the data gaps where they have occurred.”.

(12) Section 10 is amended as follows:

(a) in the third paragraph of Section 10.3.3, the word “installation” is replaced by the words “installation or aircraft operator”;

(b) in Section 10.4.1, the third paragraph is replaced by the following:

“The operator shall submit the emissions report, a copy of its approved monitoring plan or plans, and any other relevant information to the verifier.”;

(c) in Section 10.4.2, second paragraph, point (a), the second indent is replaced by the following:

"– understand each activity undertaken by the installation or aircraft operator, the emission sources, source streams within the installation or the aircraft operator's relevant aviation activities, the metering equipment used to monitor or measure activity data, the origin and application of emission factors and oxidation/conversion factors, any other data used to calculate or measure the emissions, and the environment in which the installation or the aircraft operator operates;"

(d) in Section 10.4.2, Table 3 is replaced by the following table:

"Table 3

	Materiality Level
Category A and B Installations, or aircraft operators with annual emissions of equal to or less than 500 ktonnes CO ₂	5 %
Category C Installations, or aircraft operators with annual emissions of more than 500 ktonnes CO ₂	2 %"

(13) Section 11 is amended as follows:

(a) in table 4, after the entry for 'kerosene', the following new entries are inserted:

Fuel	Emission factor (tCO ₂ /TJ)	Net Calorific Value (TJ/Gg)
"Aviation gasoline	70.0	44.3
Jet gasoline	70.0	44.3
Jet kerosene	71.5	44.1"

(14) In section 13.5.2, the third sentence of the first paragraph is replaced by the following:

“The respective laboratories and relevant analytical procedures shall be listed in the monitoring plan.”

(15) In Section 14, first paragraph, the first sentence is replaced by the following:

“Unless otherwise provided by an activity-specific Annex, the following tables shall be used as a basis for reporting and may be adapted corresponding to the number of activities, type of installation, fuels and processes monitored.”

(16) Section 15 is amended as follows:

(a) In Section 15.1, in Table Section 1.A., the following rows are inserted before the row “4. Other sectors”:

3. Transport
a. Civil Aviation

(b) In Section 15.1, in Table Section “MEMO ITEMS”, the following row is inserted after the row “CO₂ emissions from biomass”:

International Bunkers, Aviation

B. The following Annex XIV is added:

“Annex XIV – Activity-specific guidelines for aviation activities as listed in Annex I to Directive 2003/87/EC”

1. BOUNDARIES AND COMPLETENESS

The activity-specific guidelines in this Annex shall be used to monitor and report emissions occurring from aviation activities as listed in Annex I to Directive 2003/87/EC. Annex II for the combustion of fuels is not applicable to mobile sources such as aircraft.

All flights included in Annex I to Directive 2003/87/EC and performed by an aircraft operator during the reporting period shall be included. For the purpose of identifying the unique aircraft operator as defined by Article 3(o) of Directive 2003/87/EC responsible for a flight, the call sign used for Air Traffic Control (ATC) purposes shall be used. The call sign is the ICAO designator in box 7 of the flight plan or, if not available, the registration marking of the aircraft. If the identity of the aircraft operator is not known, the owner of the aircraft shall be regarded as the aircraft operator unless it proves to the satisfaction of the competent authority who was the aircraft operator.

2. DETERMINATION OF CO₂ EMISSIONS

CO₂ emissions from aviation activities shall be calculated using the formula:

CO₂ emissions = Fuel consumption * emission factor

2.1. Choice of methodology

The aircraft operator shall define in the monitoring plan which monitoring methodology is used for each aircraft type. In case the aircraft operator intends to use leased-in or other aircraft types which are not yet included in the monitoring plan at the time of submission to the competent authority, the aircraft operator shall include in the monitoring plan a description of the procedure to be used for defining the monitoring methodology for these additional aircraft types. The aircraft operator shall ensure that the monitoring methodology, once it has been chosen, is consistently applied.

The aircraft operator shall define in the monitoring plan for each aircraft type:

- (a) which calculation formula will be used (method A or method B);
- (b) the data source which is used for determining the data on fuel uplift and fuel contained in the tank, and the methods for transmitting, storing and retrieving that data;
- (c) which method is used to determine density, where applicable. When density-temperature correlation tables are used the operator shall specify the source of this data.

For points (b) and (c), where necessary due to special circumstances such as fuel suppliers who cannot provide all the required data for a certain methodology, this list of applied methodologies may contain a list of deviations from the general methodology for specific aerodromes.

2.2. Fuel consumption

Fuel consumption is expressed as fuel consumed in mass units (tonnes) during the reporting period.

Fuel consumed shall be monitored for each flight and for each fuel and shall include fuel consumed by the auxiliary power unit as provided for by the calculation formulae below. Fuel uplift may be determined based on the measurement by the fuel supplier, as documented in the fuel delivery notes or invoices for each flight. Alternatively, fuel uplift may also be determined using aircraft onboard measurement systems. The data shall be taken from the fuel supplier, or recorded in the mass and balance documentation, in the aircraft technical log or be transmitted electronically from the aircraft to the aircraft operator. Fuel contained in the tank may be determined using 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.

The operator shall choose the method which provides for the most complete and timely data combined with the lowest uncertainty without incurring unreasonable costs.

2.2.1. Calculation formulae

Actual fuel consumed shall be calculated using one of the following two methods:

METHOD A:

The following formula is used:

Actual fuel consumption for each flight (tonnes) = Amount of fuel contained in aircraft tanks once fuel uplift for the flight is complete (tonnes) – Amount of fuel contained in aircraft tanks once fuel uplift for subsequent flight is complete (tonnes) + Fuel uplift for that subsequent flight (tonnes)

In case 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, such as undergoing major maintenance involving the emptying of the tanks, after the flight whose fuel consumption is being monitored, an aircraft operator may substitute the figures “Amount of fuel contained in aircraft tanks once fuel uplift for subsequent flight is complete + fuel uplift for that subsequent flight” by 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 following formula is used:

Actual fuel consumption for each flight (tonnes) = Amount of fuel remaining in aircraft tanks at block-on at the end of the previous flight (tonnes) + Fuel uplift for the flight (tonnes) – Amount of fuel contained in tanks at block-on at the end of the flight (tonnes)

The moment of block-on may be considered equivalent to the moment of engine shut down. When an aircraft did not perform a flight previous to the flight whose fuel consumption is being measured, aircraft operators may provide the amount of fuel remaining in aircraft tanks at the end of the previous activity of the aircraft, as

recorded by technical logs, instead of the “Amount of fuel remaining in aircraft tanks at block-on at the end of the previous flight”.

2.2.2. *Quantification requirements*

Tier 1:

Fuel consumption over the reporting period is determined with a maximum uncertainty of less than $\pm 5.0\%$.

Tier 2:

Fuel consumption over the reporting period is determined with a maximum uncertainty of less than $\pm 2.5\%$.

Aircraft operators with average reported annual emissions over the previous trading period (or a conservative estimate or projection if reported emissions are not available or no longer applicable) equal to or less than 50 kilotonnes of fossil CO₂ shall apply as a minimum tier 1 for major source streams. All other aircraft operators shall apply tier 2 for major source streams.

2.2.3. *Fuel Density*

If the amount of fuel uplift or the amount of fuel remaining in the tanks is determined in units of volume (litres or m³), the aircraft operator shall convert this amount from volume to mass by using actual density values. Actual density means density expressed as kg/litre and determined for the applicable temperature for a specific measurement. Unless on-board measurement systems can be used, the actual density shall be the one measured by the fuel supplier at fuel uplift and recorded on the fuel invoice or delivery note. If such information is not available, the actual density shall be determined from the temperature of the fuel during the uplift provided by the fuel supplier or specified for the aerodrome where the fuel uplift takes place, using standard density-temperature correlation tables. Only in cases for which it is shown to the satisfaction of the competent authority that actual values are not available, a standard density factor of 0.8 kg/litre shall be applied.

2.3. **Emission factor**

The following reference factors, expressed as t CO₂/t fuel, based on the reference net calorific values and emission factors specified in Section 11 of Annex I, shall be used for each aviation fuel:

Table 1: Emission factors for aviation fuels

Fuel	Emission factor (tCO ₂ /tfuel)
Aviation gasoline	3.10
Jet gasoline	3.10
Jet kerosene	3.15

For reporting purposes, this approach is considered as tier 1.

For alternative fuels for which no reference values have been defined, activity specific emission factors shall be determined as specified in Section 5.5 and 13 of Annex I. In such cases the net calorific value shall be determined and reported as a memo-item. If the alternative fuel contains biomass, the requirements for monitoring and reporting of biomass content as set out in Annex I shall apply.

For commercially traded fuels the emission factor or the carbon content, on which it is based, the biomass content and net calorific value may be derived from the purchasing records for the respective fuel provided by the fuel supplier, provided it has been derived based on accepted international standards.

3. UNCERTAINTY ASSESSMENT

The aircraft operator shall have an understanding of the main sources of uncertainty when calculating emissions. Aircraft operators shall not be required to carry out a detailed uncertainty assessment as set out in Section 7.1 of Annex I, provided the aircraft operator identifies sources of uncertainties and their associated levels of uncertainty. This information shall be used when selecting the monitoring methodology under section 2.2.

Where fuel uplifts are determined solely on the invoiced quantity of fuel or other appropriate information provided by the fuel supplier such as delivery notes for fuel uplift per flight, no further proof of the associated uncertainty level is required.

Where on-board systems are used for measuring fuel uplift, the level of uncertainty associated with fuel measurements shall be supported by calibration certificates. If such certificates are not available, aircraft operators shall

- provide the aircraft manufacturer’s specifications determining uncertainty levels of on-board fuel measurement systems, and
- provide evidence of carrying out routine checks of the satisfactory operation of the fuel measurement systems.

Uncertainties for all other components of the monitoring methodology may be based on conservative expert judgement taking into account the estimated number of flights within the reporting period. There is no requirement to take into account the cumulative effect of all components of the measurement system on the uncertainty of the annual activity data.

The aircraft operator shall regularly carry out cross-checks between uplift quantity as provided by invoices and uplift quantity indicated by on-board measurement, and take corrective action in accordance with section 10.3.5 if deviations are observed.

4. SIMPLIFIED PROCEDURES FOR SMALL EMITTERS

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 10 000 tonnes CO₂ per year shall be considered small emitters.

Aircraft operators that are small emitters may estimate the fuel consumption using tools implemented by Eurocontrol or another relevant organisation, which can process all relevant air traffic information such as that available to Eurocontrol. The applicable tools shall be used only if they are approved by the Commission including the application of correction factors to compensate for any inaccuracies in the modelling methods.

An aircraft operator making use of the simplified procedure and exceeding the threshold for small emitters during a reporting year shall notify this fact to the competent authority. Unless the aircraft operator demonstrates to the satisfaction of the competent authority, that the threshold will not be exceeded again from the following reporting period onwards, the aircraft operator shall update the monitoring

plan to meet the monitoring requirements laid down in sections 2 and 3. The revised monitoring plan shall be submitted without undue delay to the competent authority for approval.

5. APPROACHES FOR DATA GAPS

The aircraft operator shall take all necessary action to prevent missing data from occurring by implementing suitable control activities as referred to in section 10.2 to 10.3 of Annex I of these guidelines.

If a competent authority, an aircraft operator or the verifier detects that for a flight covered by Annex I to Directive 2003/87/EC part of the data necessary for determining the emissions are missing as a result of circumstances beyond the control of the aircraft operator and cannot be determined by an alternative method defined in the monitoring plan, the emissions for that flight may be estimated by the operator using the tools mentioned in section 4 above. The quantity of emissions for which such approach is used shall be specified in the annual emission report.

6. MONITORING PLAN

Aircraft operators shall submit their monitoring plan to the competent authority for approval at least four months prior to the start of the first reporting period.

The competent authority shall ensure that the aircraft operator reviews the monitoring plan before the start of each trading period and submits a revised monitoring plan as appropriate. Subsequent to the submission of a monitoring plan for the reporting of emissions from 1 January 2010, a review of the monitoring plan shall take place before the start of the trading period commencing in 2013.

In performing such review, the aircraft operator shall assess to the satisfaction of the competent authority if the monitoring methodology can be changed in order to improve the quality of the reported data without leading to unreasonably high costs. Proposed changes to the monitoring methodology, if any, shall be notified to the competent authority. Substantial changes to the monitoring methodology which require an update of the monitoring plan shall be subject to the approval of the competent authority. Substantial changes include:

- a change of the average reported annual emissions which require the aircraft operator to apply a different tier as laid down in section 2.2.2;
- a change in the number of flights or in the total annual emissions which cause the aircraft operator to exceed the threshold for small emitters as laid down in section 4;
- substantial changes to the type of fuels used.

By way of derogation from Section 4.3 of Annex I, the monitoring plan shall contain the following information:

For all aircraft operators:

- (1) 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;
- (2) identification of the version of the Monitoring Plan;

- (3) an initial list of aircraft types in its fleet operated at the time of 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 fuel streams (fuel types) associated with each aircraft type;
- (4) a description of procedures, systems and responsibilities used to track the completeness of the list of emission sources over the monitoring year, i.e. for ensuring the completeness of monitoring and reporting of the emissions of owned aircraft as well as leased-in aircraft;
- (5) 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 of Directive 2003/87/EC, ensuring completeness and avoiding double-counting;
- (6) a description of data acquisition and handling activities and control activities, the quality control and assurance activities, including maintenance and calibration of measurement equipment (see section 10.3 of Annex I);
- (7) where applicable, information on relevant links with activities undertaken under the Community eco-management and audit scheme (EMAS) and other environmental management systems (e.g. ISO14001:2004), in particular on procedures and controls with relevance to greenhouse gas emissions monitoring and reporting.

In addition to points 1 to 7, for all aircraft operators, except small emitters who want to make use of the simplified procedure defined in section 4 above, the monitoring plan shall contain:

- (8) a description of the methods for monitoring fuel consumption in both owned and leased-in aircraft, including:
 - (a) the chosen methodology (method A or method B) for calculation of fuel consumption; if the same method is not applied for all aircraft types, a justification for this approach is to be provided, as well as a list specifying which method is used under which conditions;
 - (b) procedures for measurement of fuel uplifts and fuel in tanks, including the selected tiers, a description of the measurement instruments involved and the procedures for recording, retrieving, transmitting and storing information regarding measurements, as applicable;
 - (c) a procedure to ensure that the total uncertainty of fuel measurements will comply with the requirements of the selected tier, referring to calibration certificates of measurement systems, national laws, clauses in customer contracts or fuel suppliers accuracy standards.
- (9) the procedures for measurement of the density used for fuel uplifts and fuel in tanks, including a description of the measurement instruments involved, or if measurement is not feasible, the standard value used and a justification for this approach;
- (10) emission factors used for each fuel type, or in case of alternative fuels, the methodologies for determining the emission factors, including the approach for sampling, methods of analysis, a description of the laboratories used and of their accreditation and/or of their quality assurance procedures.

In addition to points 1 to 7, for small emitters who want to make use of the simplified procedure defined in section 4 above, the monitoring plan shall contain:

- (11) Evidence that the thresholds defined for small emitters in section 4 are met;
- (12) A confirmation of which tool as described in section 4 will be used, including a description of the tool.

The competent authority may require the aircraft operator to use an electronic template for submission of the monitoring plan. The Commission may publish a standardised electronic template or file format specification. In this case the competent authority shall accept the use by the aircraft operator of this template or specification, unless the competent authority's template requires at least the same data input..

7. REPORTING FORMAT

Aircraft operators shall use the format set out in section 8 below for reporting their annual emissions. The competent authority may require the aircraft operator to use an electronic template for submission of the annual emission report. The Commission may publish a standardised electronic template or file format specification. In this case the competent authority shall accept the use by the aircraft operator of this template or specification, unless the competent authority's template requires at least the same data input.

Emissions shall be reported as rounded tonnes of CO₂. Emission factors shall be rounded to include only significant digits both for emission calculations and reporting purposes. Fuel consumption per flight shall be used with all significant digits for calculation.

8. CONTENT OF THE ANNUAL EMISSION REPORT

Each aircraft operator shall include the following information in its annual emission report:

- (1) data identifying the aircraft operator as set out by Annex IV of 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 relevant approved monitoring plan;
- (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 of Directive 2003/87/EC carried out by the aircraft operator;
- (7) the total number of flights covered by the report;
- (8) the data according to Table 2 below;
- (9) Memo-Items: amount of biomass used as fuel during the reporting year (in tonnes or m³) listed per fuel type.

Table 2: Reporting format for annual emissions from aviation activities

Parameter	Units	Source Stream			TOTAL
		Fuel type 1	Fuel type 2	Fuel type n	
Name of fuel					
Emission sources using each type of source stream (Generic aircraft types):					
Total fuel consumption	t				
Net Calorific Value of the Fuel ⁵	TJ/t				
Emission Factor of this fuel	t CO ₂ /t or t CO ₂ /TJ				
Total aggregated CO ₂ emissions from all eligible flights using this fuel	t CO ₂				
of which departure MS is the same as arrival MS (domestic flights)	t CO ₂				
of which all other flights (international flights both intra and extra EU)	t CO ₂				
Aggregated CO₂ emissions from all flights of which departure Member State is the same as arrival Member State (domestic flights):					
Member State 1	t CO ₂				
Member State 2	t CO ₂				
Member State n	t CO ₂				
Aggregated CO₂ emissions from all flights departing from each Member State to another Member State or a third country⁶:					
Member State 1	t CO ₂				
Member State 2	t CO ₂				
Member State n	t CO ₂				
Aggregated CO₂ emissions from all flights arriving at each Member State from a third country⁶:					
Member State 1	t CO ₂				
Member State 2	t CO ₂				
Member State n	t CO ₂				

Each aircraft operator shall include the following information as an annex to its annual emission report:

⁵ Not applicable to those commercial standard fuels listed in Table 1 of this Annex used for aviation activities.

⁶ Aggregated emissions per third country reported on a country by country basis.

- Annual emissions and annual numbers of flights per aerodrome pair.

The operator may request that this annex is treated as confidential information.

9. VERIFICATION

In addition to the verification requirements set out in Section 10.4 of Annex I, the following shall be taken into account by the verifier:

- completeness of flight and emissions data compared to air traffic data such as collected by Eurocontrol;
- consistency between reported data and mass and balance documentation;
- consistency between aggregated fuel consumption data and data on fuel purchased or otherwise supplied to the aircraft performing the aviation activity.

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C. The following Annex XV is added:

“Annex XV – Activity specific guidelines for determination of tonne-kilometre data from aviation activities for the purpose of an application under Articles 3e or 3f of Directive 2003/87/EC”

1. INTRODUCTION

This Annex contains the general guidelines for the monitoring, reporting and verification of tonne-kilometre data for the aviation activities listed in Annex I to Directive 2003/87/EC.

Annex I shall apply to the monitoring, reporting and verification of tonne-kilometre data as appropriate. For this purpose, the references to emissions shall be interpreted as references to tonne-kilometre data. Sections 4.1, 4.2, 5.1, 5.3 to 5.7, 6 to 7 and 11 to 16 of Annex I are not applicable to tonne-kilometre data.

2. BOUNDARIES AND COMPLETENESS

The activity-specific guidelines of this Annex shall be used to monitor and report tonne-kilometre data from aviation activities as included in Annex I to Directive 2003/87/EC. All flights covered by Annex I of that Directive performed by an aircraft operator during the reporting period shall be included.

For the purpose of identifying the unique aircraft operator as defined by Article 3(o) of Directive 2003/87/EC responsible for a flight, the call sign used for Air Traffic Control (ATC) purposes shall be used. The call sign is the ICAO designator in box 7 of the flight plan or, if not available, the registration marking of the aircraft. If the identity of the aircraft operator is not known, the owner of the aircraft shall be regarded as the aircraft operator unless it proves which other person was the aircraft operator.

3. THE MONITORING PLAN

Pursuant to Article 3g of Directive 2003/87/EC aircraft operators shall submit a monitoring plan setting out measures to monitor and report tonne-kilometre data.

Aircraft operators shall submit their monitoring plan to the competent authority at least four months prior to the start of the first reporting period for approval.

The aircraft operator shall define in the monitoring plan which monitoring methodology is used for each aircraft type. In case the aircraft operator intends to use leased-in or other aircraft types which are not yet included in the monitoring plan at the time of submission to the competent authority, the aircraft operator shall include in the monitoring plan a description of the procedure to be used for defining the monitoring methodology for these additional aircraft types. The aircraft operator shall ensure that the monitoring methodology, once it has been chosen, is consistently applied.

By way of derogation from Section 4.3 of Annex I, the monitoring plan shall contain the following information:

- (1) identification of the aircraft operator, call sign or other unique designators used for air traffic control purposes, contact details of the aircraft operator and of a responsible person at the aircraft operator, contact address;

- (2) identification of the version of the monitoring plan;
- (3) an initial list of aircraft types in its fleet operated at the time of 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;
- (4) a description of procedures, systems and responsibilities used to track the completeness of the list of aircraft employed over the monitoring year, i.e. ensuring the completeness of monitoring and reporting of the tonne-kilometre data of owned aircraft as well as leased-in aircraft;
- (5) 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 of Directive 2003/87/EC, ensuring completeness and avoiding double-counting;
- (6) a description of data acquisition and handling activities and control activities in accordance with section 10.3 of Annex I;
- (7) information on relevant links with activities undertaken under a quality management system, in particular on procedures and controls with relevance to tonne-kilometre data monitoring and reporting, if applicable;
- (8) a description of the methods for determining tonne-kilometre data per flight, including
 - (a) the procedures, responsibilities, data sources and calculation formulae for determination and recording of the distance per aerodrome pair;
 - (b) whether a standard mass of 100 kg per passenger (tier 1) is used or the passenger mass from the mass and balance documentation (tier 2). In the case of tier 2, a description of the procedure for obtaining passenger mass is to be provided;
 - (c) a description of the procedures used to determine the mass of freight and mail;
 - (d) a description of the measurement devices used for measuring mass of passengers, freight and mail as applicable.

The competent authority may require the aircraft operator to use an electronic template for submission of the monitoring plan. The Commission may publish a standardised electronic template or file format specification. In this case the competent authority shall accept the use by the aircraft operator of this template or specification, unless the competent authority's template requires at least the same data input.

4. METHODOLOGIES FOR CALCULATING TONNE-KILOMETRE DATA

4.1. Calculation formula

Aircraft operators shall monitor and report tonne-kilometre data using a calculation-based methodology. Calculation of tonne-kilometre data shall be based on the following formula:

tonne kilometres (t km) = distance (km) * payload (t)

4.2. Distance

Distance shall be calculated using the formula:

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

The Great Circle Distance is defined as 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 (hereinafter "AIP") in compliance to Annex 15 of the Chicago Convention or from a source using such AIP data.

Distances calculated by software or by a third party may also be used, provided that the calculation methodology is based on the above formula and AIP data.

4.3. Payload

Payload shall be calculated using the following formula:

Payload (t) = mass of freight and mail (t) + mass of passengers and checked baggage (t)

4.3.1. *Mass of freight and mail*

Actual or standard mass contained in the mass and balance documentation for the relevant flights shall be used for calculating payload. Aircraft operators which are not required to have a mass and balance documentation shall propose a suitable methodology for determining mass of freight and mail in the monitoring plan for approval by the competent authority.

The actual freight and mail mass shall exclude the tare weight of all pallets and containers that are not payload, and the service weight.

4.3.2. *Mass of passengers and checked baggage*

Aircraft operators may apply one of two different tiers to determine the mass of passengers. The aircraft operator may select as a minimum the Tier 1 level to determine the mass of passengers and checked baggage. Within the same trading period the chosen tier shall be applied to all flights.

Tier 1:

A default value of 100 kg for each passenger and their checked baggage is used.

Tier 2:

The mass for passengers and checked baggage contained in the mass and balance documentation for each flight is used.

5. UNCERTAINTY ASSESSMENT

The aircraft operator shall have an understanding of the main sources of uncertainty when calculating tonne-kilometre data. A detailed uncertainty analysis as set out in Section 7 of Annex I is not required for the methodology of tonne-kilometre data determination.

The aircraft operator shall carry out regularly suitable control activities as set out by section 10.2 and 10.3 of Annex I, and take immediately corrective action in accordance with section 10.3.5 if irregularities are observed.

6. REPORTING

Reporting of tonne-kilometre data is required for the purpose of applications pursuant to Articles 3e and 3f of Directive 2003/87/EC in respect of the monitoring years specified therein only.

Aircraft operators shall use the format set out in section 7 below for reporting their tonne-kilometre data. The competent authority may require the aircraft operator to use an electronic template for submission of the tonne-kilometre data report. The Commission may publish a standardised electronic template or file format specification. In this case the competent authority shall accept the use by the aircraft operator of this template or specification, unless the competent authority's template requires at least the same data input.

Tonne-kilometres shall be reported as rounded values of [t km]. All data per flight shall be used with all significant digits for calculation.

7. CONTENT OF THE REPORT ON TONNE-KILOMETRE DATA

Each aircraft operator shall include the following information in its report on tonne-kilometre data:

- (1) data identifying the aircraft operator as set out by Annex IV of 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 relevant approved monitoring plan;
- (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 of Directive 2003/87/EC carried out by the aircraft operator;
- (7) chosen method for calculation of mass for passengers and checked baggage, as well as for 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;

- (9) for each aerodrome pair: ICAO designator of the two aerodromes, distance (= great circle distance + 95km) 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 * 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).

8. VERIFICATION

In addition to the verification requirements set out in Section 10.4 of Annex I, the following shall be taken into account by the verifier:

- completeness of flight and tonne-kilometre data compared to air traffic data such as collected by Eurocontrol to ascertain that only eligible flights have been taken into account in the operators report;
- consistency between reported data and mass and balance documentation.

For tonne-kilometre data, the materiality level shall be 5%.

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