ICAO

Doc 9501

Environmental Technical Manual

Volume IV— Procedures for demonstrating compliance with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

First Edition, 2018

Approved by and published under the authority of the Secretary General

INTERNATIONAL CIVIL AVIATION ORGANIZATION

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AMENDMENTS

Amendments are announced in the supplements to the *Products and Services Catalogue;* the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS		
No.	Date	Entered by

CORRIGENDA		
No.	Date	Entered by

FOREWORD

The *Environmental Technical Manual* (Doc 9501), Volume IV — *Procedures for demonstrating compliance with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)*, first edition, includes material which has been approved by the ICAO Committee on Aviation Environmental Protection (CAEP) at the 2017 meeting of its Steering Group (Montréal, Canada, 11-15 September 2017). This manual is to be periodically revised under the supervision of the CAEP Steering Group and is intended to make the most recent information available to administrating authorities, aeroplane operators, verification bodies and other interested parties in a timely manner, aiming at achieving the highest degree of harmonisation possible. The technical procedures and equivalent procedures described in the manual are consistent with currently accepted techniques and modern instrumentation. Subsequent revisions of this manual that may be approved by the CAEP Steering Group will be posted on the ICAO website (http://www.icao.int/) under "publications" until the latest approved revision is submitted to CAEP for formal endorsement and subsequent publication by ICAO.

Comments on this manual, particularly with respect to its application and usefulness, would be appreciated from all States. These comments will be taken into account in the preparation of subsequent editions. Comments concerning this manual should be addressed to:

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International Civil Aviation Organization
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Montréal, Quebec, Canada H3C 5H7

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ACRONYMS AND ABBREVIATIONS

Acronym or abbreviation	*Meaning*	*Unit*
ACARS	Aircraft Communications Addressing and Reporting System	
AOC	Air operator certificate	
AP	Administrative partnership	
APU	Auxiliary power unit	
ATC	Air traffic control	
BAAP	Bilateral agreement on an administrative partnership	
CERT	CO_2 Estimation and Reporting Tool	
CO_2	Carbon dioxide	tonne
CO_{2e}	Carbon dioxide equivalent	tonne
COA	Capacity obtaining authority	
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation	
CPA	Capacity providing authority	
ETM	Environmental Technical Manual	
GHG	Greenhouse gases	
IAF	International Accreditation Forum	
ICAO	International Civil Aviation Organization	
IEC	International Electrotechnical Commission	
ISO	International Organization for Standardization	
IT	Information technology	
LDCs	Least Developed Countries	
LLDCs	Landlocked Developing Countries	
MJ	Megajoule	MJ
MRV	Monitoring, Reporting and Verification	
MTOM	Maximum certificated take-off mass	kg
NAB	National accreditation body	
NM	Nautical mile	NM
OFP	Operational flight plan	
OGF	Aeroplane operator’s Growth Factor	Per cent
RTK	Revenue Tonne Kilometres	tonne*km

Acronym or abbreviation	*Meaning*	*Unit*
SGF	Sector's Growth Factor	Per cent
SIDS	Small Island Developing States	

Chapter 1

INTRODUCTION

1.1 PURPOSE

The aim of this manual is to promote uniformity of implementation of the technical procedures of Annex 16 — *Environmental Protection*, Volume IV — *Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)* by providing: (1) guidance to States, aeroplane operators, verification bodies and other interested parties regarding the intended meaning of the Standards in the current edition of the Volume; (2) guidance on specific methods that are deemed acceptable in demonstrating compliance with those Standards; and (3) equivalent procedures that may be used in lieu of the procedures specified in Annex 16, Volume IV.

1.2 DOCUMENT STRUCTURE

Chapter 1 provides general information regarding the use of this manual. Chapter 2 provides general guidelines on the interpretation of Annex 16, Volume IV. Chapter 3 presents guidelines for the monitoring, reporting and verification processes. Chapter 4 provides guidelines on the calculation of CO_2 offsetting requirements and provides several practical illustrative examples. Chapter 5 includes potential content for an administrative partnership between States. Appendix 1 provides templates of the Emissions Monitoring Plan, the Emissions Report and the CORSIA eligible fuels supplementary information to the Emissions Report.

Guidance is provided in the form of equivalent procedures and explanatory information.

1.3 EQUIVALENT PROCEDURES

An equivalent procedure is a procedure which differs from the one specified in Annex 16, Volume IV but, in the judgement of the State, yields effectively the same result. The procedures described in Annex 16, Volume IV must be used unless an equivalent procedure is approved by the State. Equivalent procedures should not be considered as limited only to those described herein, as this manual will be expanded as new equivalent procedures are developed. Also, their presentation does not infer limitation of their application or commitment by States to their further use.

The use of equivalent procedures may be requested by applicants for many reasons, including:

a) to make use of previously acquired or existing data; and

b) to minimize the costs of demonstrating compliance with the requirements of Annex 16, Volume IV.

1.4 EXPLANATORY INFORMATION

Explanatory information has the following purpose:

a) explains the intent of the Annex 16, Volume IV Standards and Recommended Practices;

b) summarizes the current policies of States regarding compliance with the Annex; and

c) provides information on critical issues concerning approval of an aeroplane operator's compliance methodology proposals.

1.5 CONVERSION OF UNITS

Conversions of some non-critical numerical values between U.S. Customary (English) and SI units are shown in the context of acceptable approximations.

1.6 REFERENCES

Unless otherwise specified, references throughout this document to "the Volume" relate to Annex 16 — *Environmental Protection* to the *Convention on International Civil Aviation*, Volume IV — *Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)*, First Edition.

References to sections of this manual are defined only by the section number to which they refer.

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Chapter 2

GENERAL GUIDELINES

Note. — The development of the Volume was based on the principles of consistency, completeness, comparability, transparency, accuracy, integrity of methodology, confidentiality and cost effectiveness.

2.1 APPLICABILITY OF MONITORING, REPORTING AND VERIFICATION OF ANNUAL CO_2 EMISSIONS FROM AN AEROPLANE OPERATOR

The applicability scope of the MRV requirements in Annex 16, Volume IV, Part II, Chapter 2, 2.1.1 is defined according to various criteria.

> *"The Standards and Recommended Practices of this Chapter shall be applicable to an aeroplane operator that produces annual CO_2 emissions greater than 10 000 tonnes from the use of an aeroplane(s) with a maximum certificated take-off mass greater than 5 700 kg conducting international flights, as defined in 1.1.2, on or after 1 January 2019, with the exception of humanitarian, medical and firefighting flights."*

There are also specific aircraft categories which do not fall within the applicability scope, and specific requirements associated with new entrants. The explanatory information below provides further guidance on these definitions and criteria.

2.1.1 International flights

For the purpose of Annex 16, Volume IV, an international flight is defined as the operation of an aircraft from take-off at an aerodrome of a State or its territories, and landing at an aerodrome of another State or its territories. Flights within a State, or between a State and one of its territories, or between the territories of a State, are considered as domestic flights and are therefore not within the scope of applicability of Annex 16, Volume IV (see Figure 2-1). Flights taking-off from or landing at an aerodrome of a State, or one of its territories, that is not an ICAO Member State are not within the applicability scope of Annex 16, Volume IV.

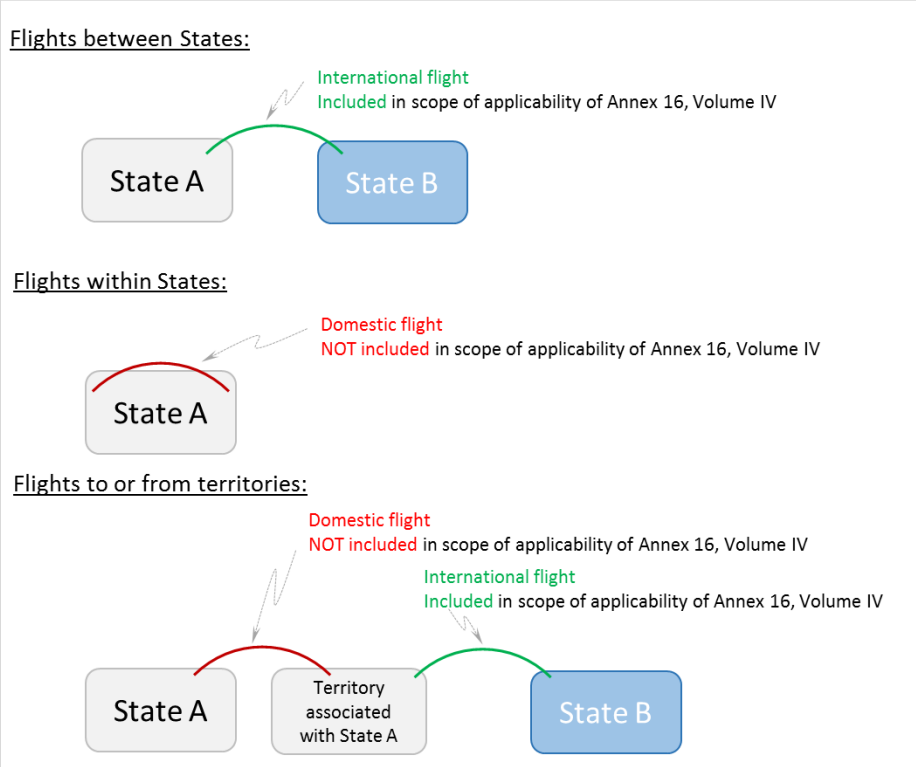

Figure 2-1. International flights as defined in Annex 16, Volume IV

Note. — International flights are defined regardless of the State of registration of the aeroplane conducting the flight, or the State to which the aeroplane operator has been attributed.

When considering whether a flight is international or domestic, an aeroplane operator and a State should use Doc 7910 — *Location Indicators,* which contains a list of aerodromes and the State or overseas territory to which they are attributed. In case an aerodrome is not listed in Doc 7910, the State in which the aerodrome is located should be determined on the basis of a similar location indicator (e.g., NZ% for New Zealand), or by identifying the overseas territory in which it is located and the State to which the overseas territory is attributed to in Doc 7910. If an aerodrome is not listed in Doc 7910, then it is recommended that the State provides this feedback to ICAO in order to support future updates.

2.1.2 Aeroplane with a maximum certificated take-off mass of greater than 5 700 kg

The *"Maximum certificated take-off mass"* is defined as *"The maximum permissible take-off mass of the aeroplane according to the certificate of airworthiness, the flight manual or other official documents".* The maximum certificated take-off mass is a limitation associated with an individual aeroplane serial number.

2.1.3 Aeroplane operator with annual CO_2 emissions greater than 10 000 tonnes

An aeroplane operator should assess whether its annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, are above the threshold of 10 000 tonnes. If above this threshold, then the aeroplane operator must engage with the State to which it has been attributed. If an aeroplane operator is close to the threshold, it should consider engaging with its State for guidance. It may also choose to engage with its State and declare that its annual CO_2 emissions are not above the threshold.

A State should carry out oversight of aeroplane operators attributed to it according to the approach in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and 1.1.3, and engage with any that it considers may be close to or above the annual CO_2 emissions threshold.

2.1.4 Aeroplane flight categories not within the applicability scope of the MRV requirements

The following aeroplane flight categories are not considered to be within the applicability scope of Annex 16, Volume IV:

Military and State aeroplane flights

The Chicago Convention relates to international civil aviation and therefore does not cover military operations. Article 3 of the Chicago Convention also states that it is not applicable to State aeroplane and provides some examples (see below), but this can also include specific flights carrying official government representatives:

> *"a) This Convention shall be applicable only to civil aircraft, and shall not be applicable to state aircraft.*
>
> *b) Aircraft used in military, customs and police services shall be deemed to be state aircraft."*

The aeroplane operator should provide evidence to the State to which it has been attributed to prove that an operation was a military or State aeroplane flight. If Item 8 (flight rules and type of flight) of the flight plan is marked "M", then it is considered to be a military flight according to Doc 4444 — *Procedures for Air Navigation Services — Air Traffic Management*. If Item 18 (other information) of the flight plan is marked "STS/STATE", then it is considered to be a flight engaged in military, customs or police services according to Doc 4444. If Item 18 (other information) of the flight plan is marked "STS/HEAD", then it is considered to be a flight with Head of State status according to Doc 4444 and as such assimilated to a State aeroplane. If a flight was operated solely for a military purpose, consistent with the State's condition(s) for demonstrating the military purpose, then the flight is considered to be a military flight.

Humanitarian, medical and firefighting flights

The aeroplane operator should provide evidence to the State to prove that a flight was a humanitarian, medical or firefighting flight. For example, if Item 18 (other information) of the flight plan should be marked:

a) “STS/HUM” then it should be considered a humanitarian flight according to Doc 4444;

b) “STS/HOSP” then it should be considered a medical flight declared by medical authorities according to Doc 4444;

c) “STS/MEDEVAC” then it should be considered a life critical medical emergency evacuation flight according to Doc 4444; or

d) “STS/FFR” then it should be considered a firefighting flight according to Doc 4444.

One or more flights preceding or following a humanitarian, medical or firefighting flight may be exempted under the above conditions as long as such preceding or following flight(s) have been operated with the same aeroplane and it can be proven that such flight(s) were part of the related humanitarian, medical or firefighting operation.

2.1.5 New entrants

Assembly Resolution A39-3 includes the definition of a "new entrant", which states that an aeroplane operator can be treated as a new entrant, if its “activity is not in whole or in part a continuation of an aviation activity previously performed by another aeroplane operator”. The following conditions should be checked to determine whether or not an activity, understood to mean the operation of one or more flights on a specific State pair as identified by the departing and arriving aerodrome pairs, of a potential new entrant aeroplane operator would be deemed the continuation of an activity previously performed by another aeroplane operator:

a) The activity has been operated by the potential new entrant in the 12 months starting from the month in which its CO_2 emissions has exceeded 10 000 tonnes, and has also been performed by one or several other aeroplane operator(s) during the same 12 months or during the 6 preceding months, irrespective of whether any such aeroplane operator was subject to CORSIA or not;

b) The activity was operated by another aeroplane operator which had a business relationship with the potential new entrant, such as being in a parent-subsidiary relationship or part of a common holding; or the activity was operated by another aeroplane operator that in such timeframe was subject of a financial operation by the potential new entrant, such as a partial or complete acquisition or merger including the case of bankruptcy of the previous aeroplane operator.

An aeroplane operator will be entitled to the provisions applicable to new entrants under CORSIA in any of the years of their applicability if, and only if, the following conditions are met in such year:

a) The aeroplane operator has not been within the scope of applicability of Annex 16, Volume IV, Part II, Chapter 2 in each year from 2019 until the year preceding the entry year; or

b) None of the activities performed by the aeroplane operator are determined to be the continuation of activities previously performed by another aeroplane operator.

2.2 APPLICABILITY OF CO_2 OFFSETTING REQUIREMENTS

As per the MRV requirements, the applicability scope of the offsetting requirements in Annex 16, Volume IV, Part II, Chapter 3, 3.1 is defined according to various criteria. It is considered to be a subset of the MRV applicability scope in Annex 16, Volume IV, Part II, Chapter 2, 2.1.

There are also specific aeroplane categories which do not fall within the applicability scope, and specific requirements associated with new entrants. The explanatory information below provides further guidance on these criteria.

2.2.1 Scope of applicability for offsetting requirements

According to Annex 16, Volume IV, Part II, Chapter 3, 3.1, offsetting requirements are applicable to the international flights in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, that have been conducted by an aeroplane operator on the following State pairs:

Between 2021 and 2026: international flights between States that decide to voluntarily participate in the scheme.

Between 2027 and 2035: international flights between States that meet the following criteria (or have decided to voluntarily participate in the scheme):

a) an individual share of international aviation activities in RTKs in year 2018 above 0.5 per cent of total RTKs; or

b) whose cumulative share in the list of States from the highest to the lowest amount of RTKs reaches 90 per cent of total RTKs.

International flights between State pairs which include Least Developed Countries (LDCs), Small Island Developing States (SIDS) and Landlocked Developing Countries (LLDCs) are not within the applicability scope of the offsetting requirements, unless the State decides to voluntarily participate.

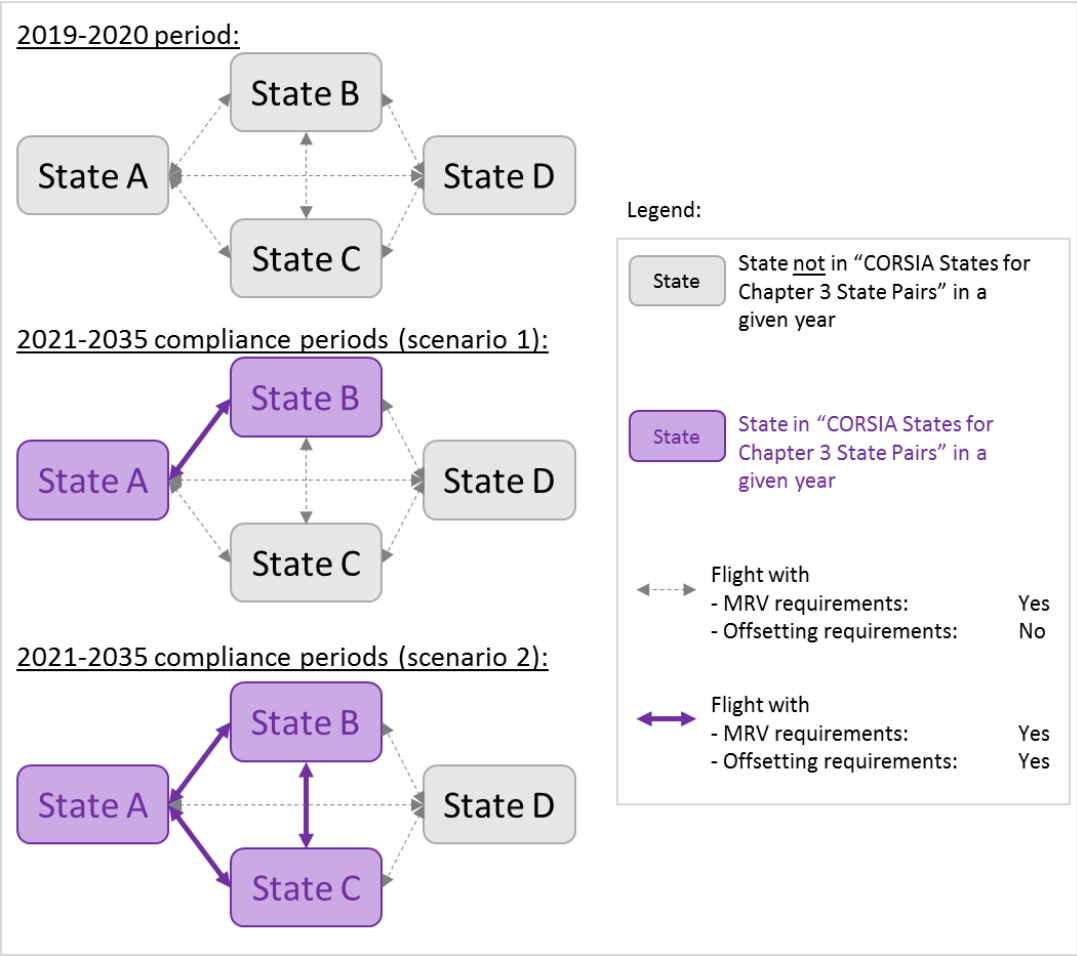

Figure 2-2. Illustration of MRV and offsetting requirements

2.2.2 New entrants

A new entrant aeroplane operator is exempted from the applicability of the offsetting requirements for three years starting in the year when it meets the requirements in Annex 16, Volume IV, Part II, Chapter 2, 2.1.1 and 2.1.3, or until its annual CO_2 emissions exceed 0.1 per cent of total CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, in 2020, whichever occurs earlier.

For illustration, the below timeline would apply to an aeroplane operator that exceeds the annual CO_2 emissions threshold of 10 000 tonnes in 2026 and is considered a new entrant in accordance with guidance as described in 2.1.5:

a) The exemption period for the new entrant begins from 1 January 2026;

b) New entrant may monitor its CO_2 emissions in 2026;

c) It will monitor, verify and report its CO_2 emissions in 2027 and 2028;

d) The first year for which the aeroplane operator is subject to offsetting requirements is 2029 (full calendar year);

e) If in 2027 the new entrant exceeds the exemption threshold of 0.1 per cent of total CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, in 2020, the first calendar year for which the aeroplane operator is subject to offsetting requirements is 2028.

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Chapter 3

GUIDELINES ON MONITORING, REPORTING AND VERIFICATION

3.1 MONITORING

3.1.1 Eligible Fuel Use Monitoring Methods

3.1.1.1 Submission of initial Emissions Monitoring Plan in 2018 for 2019-2020 period

An aeroplane operator should estimate during 2018 its annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1, in order to determine its eligibility for using Fuel Use Monitoring Methods during the 2019-2020 period, in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.1. This will form part of its initial Emissions Monitoring Plan which is to be submitted by the aeroplane operator to the State to which it has been attributed by 28 February 2019 as defined in Annex 16, Volume IV, Appendix 1. It is recognised that earlier engagement of an aeroplane operator with the State to which it has been attributed would be beneficial during 2018. A recommended timeline is provided in Table 3-1 below.

Table 3-1. Recommended timeline of 2018 activities

Timeline	*Activity*
1 January 2018 to 30 September 2018	States should provide information on the MRV compliance process to the aeroplane operator.
30 September 2018	Aeroplane operator should submit the Emissions Monitoring Plan to their State.
30 November 2018	State should approve Emissions Monitoring Plans of aeroplane operators attributed to it.
30 November 2018	States should send a list of aeroplane operators that it administers to ICAO.
31 December 2018	States should obtain and use the ICAO Document entitled “CORSIA Aeroplane Operator to State Attributions" summarising a list of aeroplane operators and the State to which they have been attributed. The document is available on the ICAO CORSIA website.

In accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.1, an aeroplane operator with estimated annual CO_2 emissions from international flights, as described in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, greater than or equal to the threshold of 500 000 tonnes in the 2019-2020 period is to use a Fuel Use Monitoring Method as described in Annex 16, Volume IV, Appendix 2. If an aeroplane operator already uses a Fuel Use Monitoring Method

as described in Annex 16, Volume IV, Appendix 2, then this could be used to calculate its annual CO_2 emissions within the scope of applicability of Annex 16, Volume IV, Part II, Chapter 2, and thus determine its eligibility for using Fuel Use Monitoring Methods.

If the aeroplane operator estimated annual CO_2 emissions from international flights, as described in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, is less than 500 000 tonnes, then it may elect to use the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) as described in Annex 16, Volume IV, Appendix 3. The aeroplane operator will demonstrate its eligibility by estimating its annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, for the year 2019, based on data from the 2017-2018 period or another suitable period.

If an aeroplane operator has monitored and reported fuel use and/or CO_2 emissions over a recent and relevant one-year period, for example 1 July 2017 to 30 June 2018, this can be used as the basis for determining eligibility. An aeroplane operator may be able to make a suitable estimate using other data sets for different time periods. If the aeroplane operator is unsure, then it should engage with the State to which it is attributed.

A full continuous 12 months of data within the 2017-2018 period can be seen as a reasonable proxy for an estimate of 2019 CO_2 emissions. However, if the aeroplane operator does not have a full year of data, or expects that its traffic and emissions will change significantly in 2019, it should take that into account.

In the absence of monitored and reported fuel use and/or CO_2 emissions between 1 July 2017 and 30 June 2018, the aeroplane operator could use the following processes to estimate its annual CO_2 emissions within the scope of applicability of Annex 16, Volume IV, Part II, Chapter 2, and thus determine its eligibility for using Fuel Use Monitoring Methods:

a) Estimate its annual CO_2 emissions by collecting and totalling fuel invoices; or

b) Use the ICAO CORSIA CERT, as described in Annex 16, Volume IV Appendix 3 to estimate its annual CO_2 emissions.

3.1.1.2 Determination of potential requirement to resubmit an Emissions Monitoring Plan (EMP) for start of the 2021-2023 period

The eligibility threshold for using the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT), as defined in Annex 16, Volume IV, Appendix 3, is different for the 2019-2020 period and subsequent compliance periods (i.e., annual emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, of 500 000 tonnes for the 2019-2020 period and annual emissions from international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 3, 3.1, of 50 000 tonnes for the subsequent periods). An aeroplane operator may need to reassess whether it is eligible to use the ICAO CORSIA CERT tool using the following processes.

Following the provision of information contained in the ICAO document entitled “CORSIA States for Chapter 3 State Pairs” that will be made available on the ICAO CORSIA website on 1 July 2020:

a) Using reported CO_2 emissions from 2019 (seen as a reasonable proxy for an estimate for 2021 data), determine the annual emissions from State pairs subject to offsetting requirements from 2021. However, if the aeroplane operator expects that its traffic and emissions will change significantly in 2021, then it should take that into account and anticipate a potential change in its eligibility to use either a Fuel Use Monitoring Method as described in Annex 16, Volume IV, Appendix 2 or the ICAO CORSIA CERT as described in Annex 16, Volume IV, Appendix 3;

b) Estimate annual CO_2 emissions by collecting and totaling fuel invoices from international flights on State pairs subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 3, 3.1, according to the first-order estimation methodology as described below; or

c) Use the ICAO CORSIA CERT, as described in Annex 16, Volume IV, Appendix 3, to estimate its annual CO_2 emissions from State pairs subject to offsetting requirements.

If the aeroplane operator used the ICAO CORSIA CERT for the 2019-2020 period, but has now determined that its emissions from international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Chapter 1, 1.1.2 and Chapter 3, 3.1, exceed 50 000 tonnes for the 2021-2023 period, then this will constitute a material change requiring the Emissions Monitoring Plan to be updated accordingly and resubmitted to the State it is attributed to for re-approval.

3.1.1.3 First-order estimation methodology for determining applicability scope of CORSIA and eligibility of use of simplified compliance procedures

Figure 3-1 presents an overview of a decision tree for an aeroplane operator to determine whether it is outside the applicability scope of CORSIA and therefore has no compliance requirements, or if not, whether they are eligible to use the ICAO CORSIA CERT.

The decision starts with gathering fuel use for all international flights of the aeroplane operator. Alternatively, an aeroplane operator can also choose to use the ICAO CORSIA CERT directly.

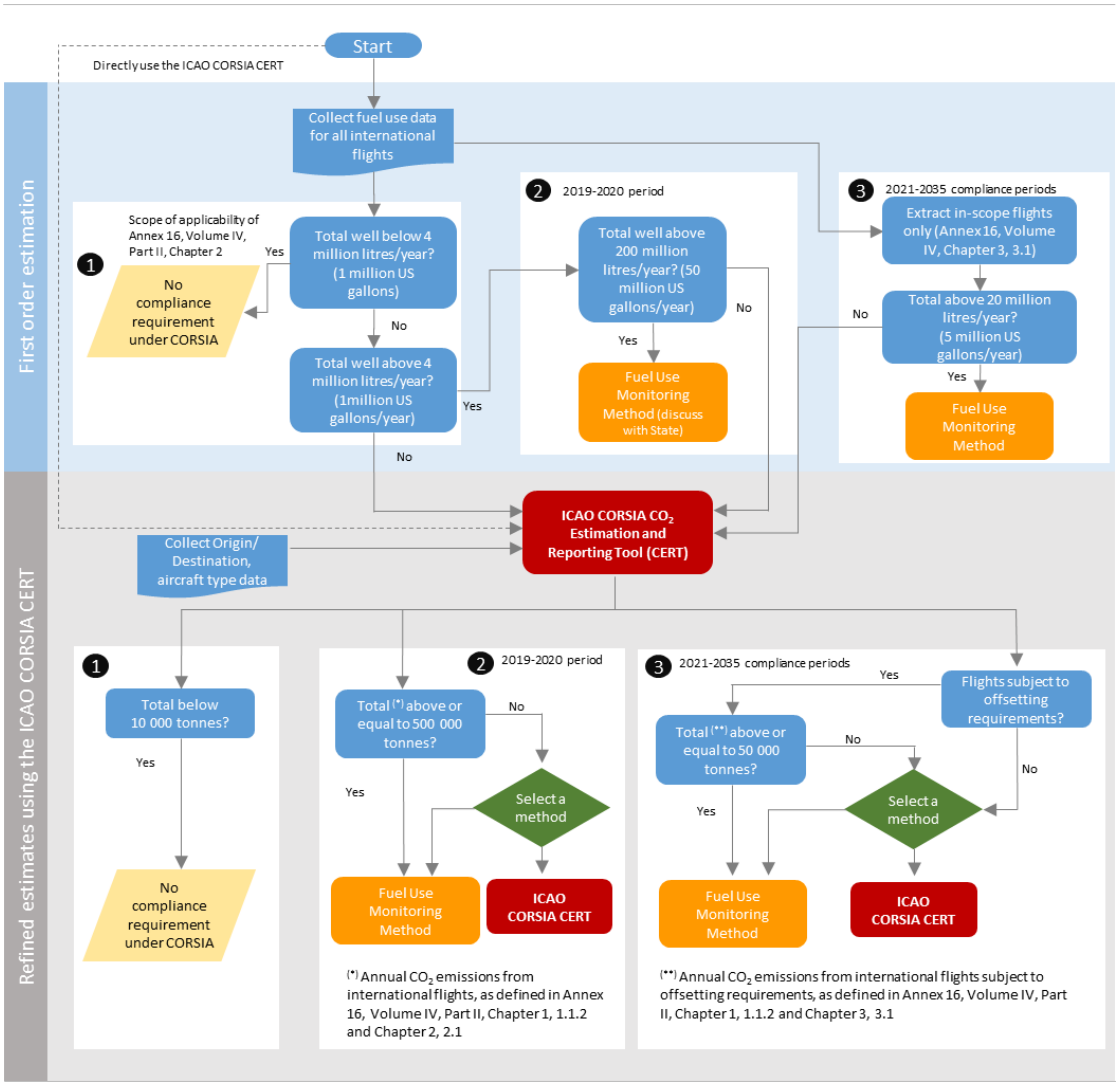


Figure 3-1. Overview of a decision tree for operators to determine whether they are outside the applicability scope of CORSIA

3.1.1.4 Threshold of annual CO_2 emissions from international flights, as described in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, of 10 000 tonnes

An aeroplane operator could use the following methods to determine whether its annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, are less than or equal to 10 000 tonnes:

a) Using fuel invoice information, assess whether the aeroplane operator has used less than 4 million litres of aviation fuel on international flights (any flight regardless of whether it is in the scope of applicability as described in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1) in the past year. If so, the aeroplane operator would probably be outside the applicability scope of CORSIA;

b) If fuel invoice information identifies that annual consumption is close to 4 million litres – either above or below – and it is not completely certain that fuel use is below this threshold, the aeroplane operator should consider using the ICAO CORSIA CERT as described in Annex 16, Volume IV, Appendix 3 (enter data on all international flights) to confirm whether or not emissions from international flights as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, are above the annual 10 000 tonne threshold;

c) A full continuous 12 months data within the 2017-2018 period can be seen as a reasonable proxy for an estimate of 2019 CO_2 emissions. However, if the aeroplane operator does not have a full year of data or expects that its traffic and emissions will change significantly it should take that into account;

d) In the absence of any fuel invoice information, an aeroplane operator may use the ICAO CORSIA CERT to determine if it is above or below the 10 000 tonne threshold of annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1.

3.1.1.5 Threshold for determining eligibility of use of the ICAO CORSIA CERT during the 2019-2020 period

The 500 000 tonne threshold is used to determine whether an aeroplane operator is eligible to use the ICAO CORSIA CERT during the 2019-2020 period. An aeroplane operator could use the following methods to determine whether its annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, fall below the threshold of 500 000 tonnes:

a) Using fuel invoice information from an appropriate one-year period to assess whether the aeroplane operator has used more than 200 million litres of fuel per year on all international flights;

b) If fuel invoice information identifies that annual consumption is within the region of 200 million litres, and the aeroplane operator is not completely certain that its emissions are under or over the threshold, the aeroplane operator should consider using the ICAO CORSIA CERT (enter data on all international flights) to confirm whether or not emissions from international flights fall above or below the emissions threshold;

c) In the absence of any fuel invoice information, an aeroplane operator may use the ICAO CORSIA CERT, to determine if its emissions are above or below the threshold.

Note. — If an aeroplane operator chooses outright to use a Fuel Use Monitoring Method, as defined in Annex 16, Volume IV, Appendix 2, for the 2019-2020 period, then there is no requirement to perform an assessment of emissions.

3.1.1.6 Threshold for determining eligibility of use of the ICAO CORSIA CERT during the 2021-2035 period

The 50 000 tonne threshold is used to determine whether an aeroplane operator is eligible to use the ICAO CORSIA CERT during the 2021-2035 period. An aeroplane operator should use the following methods to determine whether its annual CO_2 emissions from international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 3, 3.1, fall below the threshold of 50 000 tonnes:

a) An aeroplane operator should identify international flights, as described in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, based on State of origin and destination;

b) Using fuel invoice information from an appropriate one-year period to assess whether the aeroplane operator has used more than 20 million litres of aviation fuel per year on international flights subject to offsetting requirements, as described in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 3,

3.1. If so, the aeroplane operator should use a Fuel Use Monitoring Method in Annex 16, Volume IV, Appendix 2;

c) If fuel invoice information identifies that annual consumption is within the region of the 20 million litres, and the aeroplane operator is not completely certain that emissions fall above or below the threshold, the aeroplane operator should consider using the ICAO CORSIA CERT by entering information on international flights subject to offsetting requirements, as described in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 3, 3.1, to confirm whether or not emissions fall above or below this threshold;

d) In the absence of any fuel invoice information, an aeroplane operator may use the ICAO CORSIA CERT to determine if its emissions are below the emissions threshold.

Where an aeroplane operator has an approved Emissions Monitoring Plan, the Fuel Use Monitoring Method stated in the Emissions Monitoring Plan should be used to determine whether flight emissions fall below this threshold. This will generally be determined from their on-going monitoring and reporting requirements.

3.1.2 Fuel density

Measurement of fuel density is a well-established and important procedure within the fuel delivery and quality assurance process. It is systematically measured and recorded throughout the value chain - from supplier, to tank farm operator, to fuelling agent and finally to aeroplane operator. However, the level of data on fuel density at an aeroplane operator level will vary depending on their own requirements and procedures. This section provides information on these key stages of the fuel delivery chain and how data on fuel density is measured and 'transferred' from one stakeholder to another.

3.1.2.1 Process of monitoring and collecting fuel density

Figure 3-2. Process of monitoring and collecting fuel density

Tank farm operator

a) The tank farm operator is responsible for maintaining the fuel storage system and dispatch of fuel for the aerodrome;

b) Fuel density is physically measured by the tank farm operator as part of fuel dispatch quality assurance checks. This is done for every fuel batch and likely to be at least once a day. The tank farm operator follows guidance from the Joint Inspection Group[1] using international standardised methods to measure density;

1 Reference: Joint Inspection Group, additional information available at http://www.jigonline.com/.

c) The density information is then recorded and passed to fuelling agent/other stakeholders, as part of the fuel dispatch certification.

Fuelling agent

a) The fuelling agent is responsible for uplifting/delivering fuel to the aeroplane;

b) Fuelling agents require fuel density information as part of fuelling activity/conversion calculations and is provided to aeroplane operator for their records;

c) Density information is provided to fuelling agent directly from tank farm operator.

Aeroplane operator

a) At the aeroplane operator level, fuel density data is captured through existing flight on-board systems to aeroplane operator post flight systems supported by various flight paperwork on a flight by flight level;

b) The level at which aeroplane operator records fuel density information varies in terms of their individual process and procedures.

3.1.3 Emissions Monitoring Plans (EMP)

The section provides additional guidance on the initial submission, amendments and approval of aeroplane operators' Emissions Monitoring Plans.

3.1.3.1 Emissions Monitoring Plans: checklist for State review and guidance on material changes

Table 3-2. Emissions Monitoring Plan checklist

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
I. Aeroplane operator identification		
Identification of aeroplane operator with legal responsibility.	Subject to review and approval by the State; reviewer to review and confirm document(s).	Can be material – If legal entity or means to identify legal entity changes; resubmit and subject to re-approval.
Name and address.	Subject to review and approval by the State; reviewer to review and confirm document(s).	Can be material – If changes to name and/or address are due to a change in the legal entity or means for the State to identify legal entity changes; resubmit and subject to re-approval.
Identifying information for attributing the aeroplane operator to a State: either unique ICAO Designator (or Designators) used in the call sign for air traffic control	Subject to review and approval by the State; reviewer to review and confirm document(s)	A change in the identifying information would be material; resubmit and subject to re-approval.

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
purposes; copy of the air operator certificate; or place of juridical registration.		
Details of ownership structure relative to any other aeroplane operators with international flights, including identification of whether the aeroplane operator is a parent company, a subsidiary and/or has a parent and/or subsidiaries.	Information provided? Check “Yes” or “No”.	Not material unless a change in corporate structure changed which entity is the aeroplane operator subject to requirements from Annex 16, Volume IV – Changes that do not affect which entity is the aeroplane operator would be handled as simple notice to the authority in the annual Emissions Report.
If the aeroplane operator in a parent-subsidiary relationship seeks to be considered a single aeroplane operator for purposes of the CORSIA, confirm that those parent and/or subsidiaries are subject to CORSIA requirements by the same State and that the subsidiary(ies) are wholly-owned by the parent.	Subject to review and approval by the State; reviewer to confirm eligibility of aeroplane operator in parent-subsidiary relationship to be considered a single aeroplane operator.	Would be material if the corporate structure changed in a way that the entity no longer was eligible to be considered a single aeroplane operator under CORSIA.
Contact information for person within the aeroplane operator’s company who is responsible for the Emissions Monitoring Plan.	Information provided? Check “Yes” or “No.”	Not material – Changes in this would be handled as simple notice to the authority in the annual Emissions Report.
Brief description of aeroplane operator’s activities (e.g., scheduled/non-scheduled, passenger/cargo/executive, and geographic scope of operations).	Information provided? Check “Yes” or “No.”	Not material
II. Fleet and operations data		
List of the aeroplane types with maximum certificated take-off mass (MTOM) greater than 5 700 kg and types of aviation fuel (e.g., Jet-A, Jet-A1, Jet-B, Aviation Gasoline) used in aeroplane operated in international flight at the time of submission of the Emissions Monitoring Plan, recognizing that there may be changes over time.	Information provided? Check “Yes” or “No.”	Not material – changes in this could be handled as simple notice to the authority in the annual Emissions Report.
Identify the aeroplane operator’s means for having its international flights attributed to it: ICAO Designator; or registration marks.	Subject to review and approval by the State; reviewer to review and confirm means for attribution of flights and documentation.	A change in the means for having international flights attributed; resubmit the Emissions Monitoring Plan and subject to re-approval.

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
Information on procedures for how changes in aeroplane fleet and fuel used will be tracked and integrated in emissions monitoring.	Subject to review and approval by the State; reviewer to review and confirm that sufficient procedures are in place.	Can be material – if the aeroplane operator changes the procedures, that would be subject to re-review and re-approval by the State.
Information on the means the aeroplane operator will use to track/document each aeroplane operated and the specific flights of the aeroplane to ensure completeness of monitoring.	Subject to review and approval by the State; reviewer to review and confirm that sufficient means are in place.	Can be material – If the aeroplane operator changes the means for tracking/documenting, that would be subject to re-review and re-approval by the State; reviewer to review and confirm that sufficient means are in place.
Information on procedures for determining which aeroplane flights meet the definition of international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, and therefore are subject to the emissions monitoring requirements.	Subject to review and approval by the State; reviewer to review and confirm that sufficient procedures are in place.	Can be material – If the aeroplane operator changes procedures, that would be subject to re-review and re-approval by the State.
List all of States at the time of initial Emissions Monitoring Plan submission where the aeroplane operator operates international flights, listed as State pairs (e.g., State A to State B; State C to State D).	Information provided? Check “Yes” or “No”.	Not material – Changes in this would be handled as simple notice to the State in the aeroplane operator’s annual Emissions Report.
Information on procedures for identifying international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 3, 3.1.	Subject to review and approval by the State; reviewer to review and confirm that sufficient procedures are in place	Can be material – If the aeroplane operator changes procedures, that would be subject to re-review and re-approval by the State.
If the aeroplane operator conducts any domestic flights and/or humanitarian, medical or firefighting international flights that would not be subject to the emissions monitoring requirements, information on the procedures for how those flights will be separated from those subject to the emissions monitoring requirements.	Subject to review and approval by the State; reviewer to review and confirm that sufficient procedures are in place.	Can be material – If the aeroplane operator changes procedures, that would be subject to re-review and re-approval by the State.
III. Methods/Means of calculating emissions from international flights		
A. Methods/Means for establishing the 2019-2020 period		
Does the aeroplane operator seek to use the ICAO CORSIA CERT (for which the threshold is less than 500 000 tonnes of CO_2 from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1,	Subject to review by the State; reviewer to review and confirm that the estimation method was reasonable and to consider with respect to any claim by the	This is a one-time demonstration for purposes of the 2019-2020 period only, so a change during the monitoring period would not result in a requirement to resubmit the plan on these grounds

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
1.1.2 and Chapter 2, 2.1)? If so, provide an estimate of CO_2 emissions for all international flights (other than humanitarian, medical or firefighting flights) in 2018. Provide supporting information on how the estimation of emissions was reached, including on how fuel consumption was estimated.	aeroplane operator that it will qualify to use the ICAO CORSIA CERT.	for purposes of the 2019-2020 period.
If the aeroplane operator will be using the ICAO CORSIA CERT, identify the input method into the ICAO CORSIA CERT (i.e., Great Circle Distance input method or Block Time input method).	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has properly identified an applicable input method into the ICAO CORSIA CERT.	Can be material – If the aeroplane operator changes methods that would be subject to review and approval by the State; reviewer to review and confirm.
For aeroplane operators using a Fuel Use Monitoring Method, provide information on the specific Fuel Use Monitoring Method as described in Annex 16, Volume IV, Appendix 2, whether the aeroplane operator plans to use different methods for different aeroplane fleet types.	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has properly identified an applicable method or methods.	Can be material – If the aeroplane operator changes methods that would be subject to review and approval by the State; reviewer to review and confirm.
For aeroplane operators using a Fuel Use Monitoring Method, provide information on the procedures for determining and recording fuel density values (standard or actual) as used for operational and safety reasons and provide a reference to the relevant aeroplane operator documentation.	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has identified means for determining and recording fuel density and provided a reference to the relevant documentation.	Can be material – if the operator changes its procedures for determining and/or recording fuel density values that would be subject to re-review and reapproval by the State.
For aeroplane operators using a Fuel Use Monitoring Method, identify information about the systems and procedures to monitor fuel consumption in both owned and leased-in aeroplane. If the aeroplane operator has chosen the Fuel Allocation with Block Hour method, information about the systems and procedures to establish the block hour information to be used.	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has systems and procedures in place to implement.	Can be material – if the aeroplane operator changes systems for differentiating fuel use to owned or leased aeroplane, that would be subject to re-review and re-approval by the State.
If the aeroplane operator is in a parent-subsidiary relationship and seeks to be considered a single aeroplane operator for purposes of complying with Annex 16, Volume IV, identify the procedures that will be used for maintaining separate 2019-2020 fuel and emissions monitoring of the various corporate entities for the purpose of	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has systems and procedures in place for maintaining separate 2019-2020 fuel and emissions monitoring of the various	Can be material – if the aeroplane operator changes systems and procedures for segregating the information.

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
establishing individual 2019-2020 CO_2 emissions for the parent and subsidiary (or subsidiaries).	corporate entities.	
B. Methods/Means for emissions monitoring and compliance after 2020		
If the aeroplane operator has international flights, but does not have any international flights subject to the offsetting requirements, does the aeroplane operator plan to use the ICAO CORSIA CERT?	Subject to review by the State; reviewer to review and confirm that the aeroplane operator has international flights, but does not have any international flights subject to the offsetting requirements.	Can be material – if the aeroplane operator begins to operate flights subject to the offsetting requirements.
If the aeroplane operator has international flights, including international flights subject to the offsetting requirements, are the aeroplane operator's emissions from international flights subject to offsetting requirements less than 50 000 tonnes and does the aeroplane operator plan to use the ICAO CORSIA CERT? If so, provide an estimate of CO_2 emissions for all international flights that would be subject to the offsetting requirement for the year before the emissions monitoring is to occur (for example, for monitoring in 2021, provide an estimate of such emissions for 2020). Provide supporting information on how the estimation of emissions was reached, including on how fuel consumption was estimated.	Subject to review by the State; reviewer to review and confirm that the estimation method was reasonable and to consider with respect to any claim by the aeroplane operator that it will qualify to use the ICAO CORSIA CERT.	If the aeroplane operator's CO_2 emissions for international flights exceed the threshold, such that the aeroplane operator is no longer eligible to use the ICAO CORSIA CERT, this would be material.
If the aeroplane operator will be using the ICAO CORSIA CERT, identify which input method into the CERT will be used (i.e., Great Circle Distance input method or Block Time input method).	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has properly identified an applicable input method into the ICAO CORSIA CERT.	Can be material – If the aeroplane operator changes methods that would be subject to review and approval by the State; reviewer to review and confirm.
If the aeroplane operator will be using a Fuel Use Monitoring Method for flights subject to the emissions monitoring requirements and the offsetting requirements under Annex 16, Volume IV, provide information on the specific Fuel Use Monitoring Method, whether the aeroplane operator plans to use different methods for different aeroplane types.	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has properly identified an applicable Fuel Use Monitoring Method(s) as described in Annex 16, Volume IV, Appendix 2.	Can be material – If the aeroplane operator changes methods or seeks to revise its approach to fuel density, that would be subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has noted proper and sufficient fuel use methodology.
Provide information on the procedures for	Subject to review and approval	Can be material – if the aeroplane

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
determining and recording fuel density values (standard or actual) as used for operational and safety reasons and provide a reference to the relevant aeroplane operator documentation.	by the State; reviewer to review and confirm that aeroplane operator has identified means for determining and recording fuel density and provided a reference to the relevant documentation.	operator changes its procedures for determining and/or recording fuel density values that would be subject to re-review and reapproval by the State.
If the aeroplane operator is applying Fuel Use Monitoring Methods as described in Annex 16, Volume IV, Appendix 2 for flights subject to both emissions monitoring and offsetting requirements, does the aeroplane operator plan to use the ICAO CORSIA CERT for international flights that are only subject to emissions monitoring but not subject to the offsetting requirement? If so, which input method into the ICAO CORSIA CERT (i.e., Great Circle Distance input method or Block Time input method)?	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has noted proper and sufficient simplified fuel use methodology.	Can be material – If the aeroplane operator's choice of options under the simplified fuel use methodology changes, that would be subject to review and approval by the State; reviewer to review and confirm that the aeroplane operator has noted proper and sufficient simplified fuel use methodology.
Information about the systems and procedures to monitor fuel consumption in both owned and leased aeroplane.	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has systems and procedures in place to implement.	Can be material – if the aeroplane operator changes systems for differentiating fuel use to owned or leased aeroplane, that would be subject to re-review and re-approval by the State.
IV. Data management, data flow and control		
How data management will be done by the aeroplane operator and by who.	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has a data management plan in place to track and report required information.	Can be material – If the aeroplane operator changes the underlying approach to data management, that would be subject to re-review and re-approval by the State.
Handling data gaps and erroneous data values: if data is missing/incorrect such that the aeroplane operator cannot determine emissions for a flight in accordance with the specified procedures, what secondary data reference sources would be used as an alternative? In cases where a secondary data reference source is not available, what method would be used to fill data gaps?	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has noted methodology for handling data gaps and erroneous data values.	Can be material – If the aeroplane operator changes the means for handling data gaps significant risks, that would be subject to re-review and re-approval by the State.
Documentation and record keeping plan.	Information provided? Check "Yes" or "No."	Not material.
Brief assessment of the risks associated	Subject to review and approval	Can be material – If the aeroplane

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
with the data management processes and means for addressing significant risks.	by the State; reviewer to review and confirm that aeroplane operator has noted methodology for addressing.	operator changes the means for addressing significant risks, that would be subject to re-review and re-approval by the State.
Procedures for making revisions to the Emissions Monitoring Plan and resubmitting relevant portions to the State when there are material changes to the Emissions Monitoring Plan and for providing notice in the Emissions Report of non-material changes that require notice to the State.	Information provided? Check “Yes” or “No.”	Not material.
Attach a data flow diagram summarizing the systems are used to record and store data associated with the monitoring and reporting of CO_2 emissions.	Information provided? Check “Yes” or “No.”	Not material.

3.1.3.2 Approval of the Emissions Monitoring Plan

Following submission of the Emissions Monitoring Plan by the aeroplane operator, the State to which it has been attributed will approve it, or return the Emissions Monitoring Plan for additional questions and clarifications before final approval.

Prior to the 2019-2020 period, the State should aim to approve the aeroplane operator’s Emissions Monitoring Plan and associated Fuel Use Monitoring Method according to the eligibility criteria in Annex 16, Volume IV, Part II, Chapter 2, 2.2 while taking into account the following:

a) Aeroplane operators with annual emissions from international flights, as described in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, of less than 500 000 tonnes may use the ICAO CORSIA CERT;

b) If an aeroplane operator can reasonably be expected to have the capability to implement a Fuel Use Monitoring Method as described in Annex 16, Volume IV, Appendix 2, and is expected to have annual CO_2 emissions greater than 500 000 tonnes during the first compliance period, the State should not approve the aeroplane operator to use the ICAO CORSIA CERT;

c) If an aeroplane operator has annual CO_2 emissions greater than or equal to 500 000 tonnes, but is expected to have annual CO_2 emissions lower than 500 000 tonnes during the first compliance period, the State may choose to approve its use of the ICAO CORSIA CERT.

3.1.4 Fuel Use Monitoring Methods

As described in Annex 16, Volume IV, Appendix 2, an aeroplane operator can choose from five different methods for fuel use monitoring. The methods are equal, there is no hierarchy for the selecting a method. The following methods are applicable:

a) Method A;

b) Method B;

c) Block-off / Block-on;

d) Fuel Uplift; or

e) Fuel Allocation with Block Hour.

The chosen method is to be defined in the Emissions Monitoring Plan and approved by the State prior to the monitoring period. The chosen monitoring method will be applied for the whole compliance period. Any changes to the Fuel Use Monitoring Method require a resubmission to and re-approval by the State for the next compliance period.

3.1.4.1 Guidance on the implementation of Method A

Method A requires data from the flight under consideration (N) as well as data from the subsequent flight (N+1).

Data from flight under consideration (flight N):

Amount of fuel contained in aeroplane tanks once fuel uplifts for the flight are complete. The amount of fuel will be expressed as mass (in tonnes).

Data from subsequent flight (N+1):

Amount of fuel contained in aeroplane tanks once fuel uplifts for the subsequent flight are complete. The amount of fuel will be expressed as mass (in tonnes).

Sum of fuel uplifts for the subsequent flight measured in volume and multiplied with a density value (in tonnes).

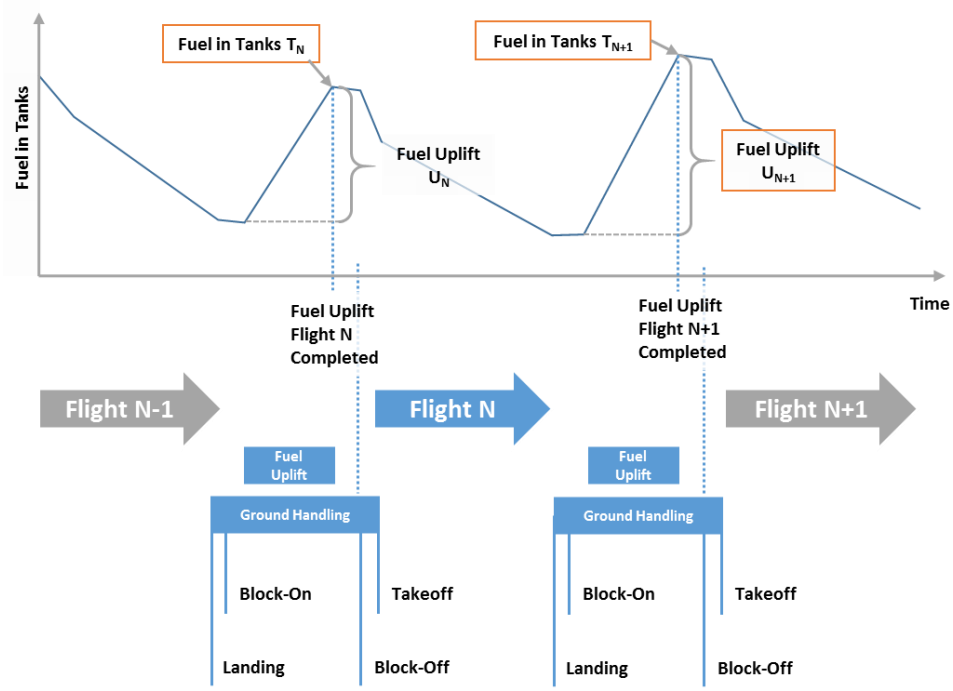


Figure 3-3. Fuel Use Monitoring Method A

Calculation of fuel use (F_N):

The aeroplane operator will use the following formula to compute fuel use according to Method A:

$$F_N = T_N - T_{N+1} + U_{N+1}$$

Illustration of calculation:

The following table shows an illustration of calculations of fuel use based on Method A.

Table 3-3. Illustration of calculations of fuel use based on Method A

Flight details		*Fuel in Tanks and Uplift (in tonnes)*				*Fuel use*
Consecutive number	*Date of flight*	*Uplift quantity*	*Fuel in tanks before uplift*	*Fuel in tanks after uplift*	*Block-off fuel*	*Method A*
N		U_N		T_N		$F_N=T_N-T_{N+1}+U_{N+1}$
1	28-Jan-16	89.3	5.3	94.6	94.5	87.6
2	29-Jan-16	43.3	7.0	50.3	50.3	44.5
3	29-Jan-16	26.9	5.8	32.7	32.7	23.1
4	30-Jan-16	-	9.6	9.6	9.5	6.1
5	30-Jan-16	71.7	3.4	75.1	75.0	70.6
…	31-Jan-16	-	4.5	4.5	4.5	-

Note. — The time of measurement of fuel in tanks is essential for the correct application of Method A. The value "fuel in tanks after uplift" is a rather unusual data point in aeroplane operations which should not be mistaken with the far more common "block-off fuel".

Exemption:

If no fuel uplift takes place for the flight under consideration, the amount of fuel contained in aeroplane tanks will be determined at block-off for the flight. The rule will be applied in the same way in cases where no fuel uplift takes place for the subsequent flight. This is shown for flight number 4 in the illustration of calculation table above (i.e., T_N taken as 9.5 tonnes block-off fuel for the flight under consideration, assuming 0.1 tonne APU fuel burn between block-on and block-off).

3.1.4.2 Guidance on the implementation of Method B

Method B requires data from the flight under consideration (N) as well as data from the prior flight (N-1).

Data from flight prior to the flight under consideration (flight N-1):

Amount of fuel remaining in aeroplane tanks at time of block-on of the flight prior to the flight under consideration. The amount of fuel will be expressed as mass (in tonnes).

Data from flight under consideration (flight N):

Amount of fuel remaining in aeroplane tanks at time of block-on of the flight under consideration. The amount of fuel will be expressed as mass (in tonnes).

Sum of fuel uplifts for the flight measured in volume and multiplied with a density value (in tonnes).

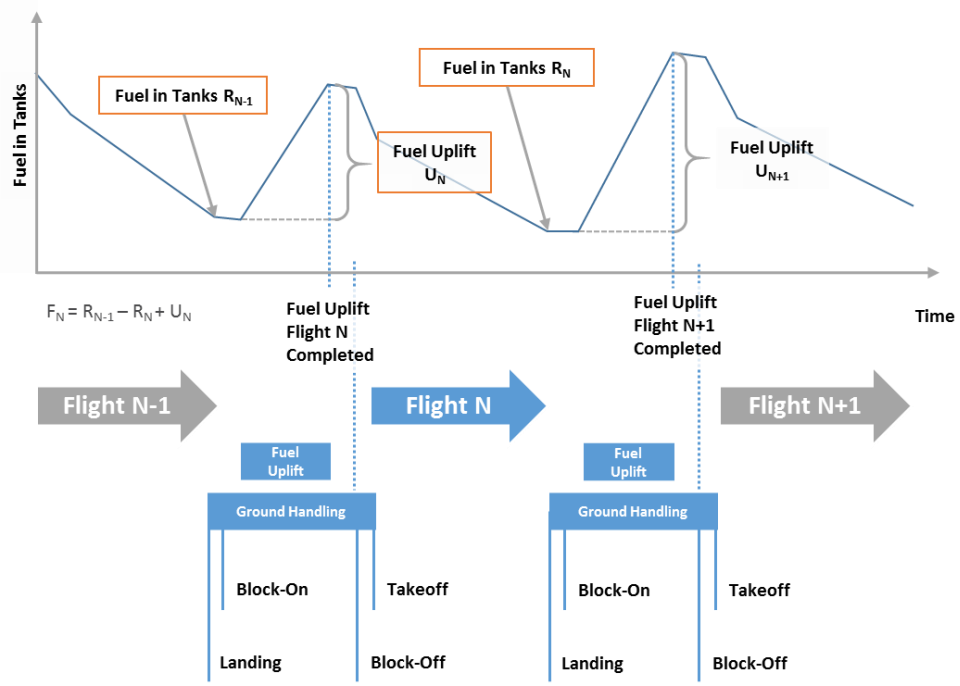


Figure 3-4. Fuel Use Monitoring Method B

Calculation of fuel use (F_N):

The aeroplane operator will use the following formula to compute fuel use according to Method B:

$$F_N = R_{N-1} - R_N + U_N$$

Illustrative calculation:

The following table shows an illustration of calculations for Method B.

Table 3-4. Illustration of calculations of fuel use based on Method B

Flight details		*Fuel in Tanks and Uplift (in tonnes)*			*Fuel use*
Consecutive number	*Date of flight*	*On-block previous flight*	*On-block current flight*	*Uplift quantity*	*Method B*
N		R_{N-1}	R_N	U_N	$F_N = R_{N-1} - R_N + U_N$
1	28-Jan-16	5.5	8.5	89.3	86.3
2	29-Jan-16	8.5	5.8	43.3	46.0
3	29-Jan-16	5.8	9.7	26.9	23.0
4	30-Jan-16	9.7	4.0	-	5.7
5	30-Jan-16	4.0	4.5	71.7	71.2
…	31-Jan-16	4.5	-	-	-

3.1.4.3 Guidance on the implementation of Block-off/Block-on

This method requires data only from the flight under consideration. The data points (block-off, block-on) are commonly used in aeroplane operations.

Data from flight under consideration (flight N):

Amount of fuel in aeroplane tanks at time of block-off of the flight under consideration.

Amount of fuel remaining in aeroplane tanks at time of block-on of the flight under consideration.

The amount of fuel will be expressed as mass (in tonnes) in both cases.

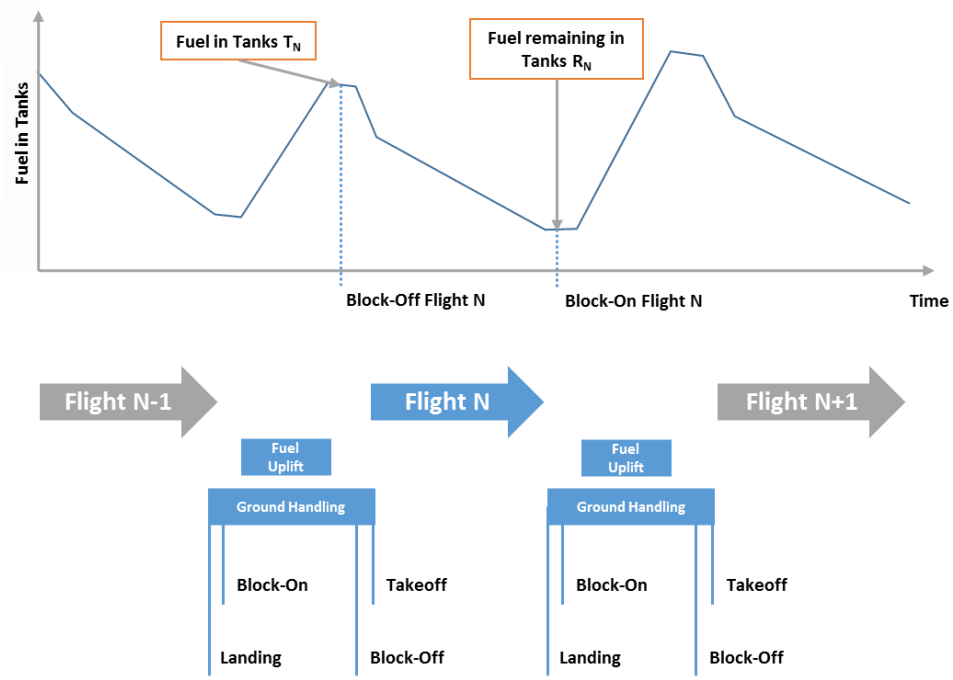


Figure 3-5. Fuel Use Monitoring Block-off/Block-on

Calculation of fuel use (F_N):

The aeroplane operator will use the following formula to compute fuel use according to Block-off/Block-on Method:

$$F_N = T_N - R_N$$

Illustration of calculation:

The following table shows an illustration of calculation for the Block-off / Block-on Method.

Table 3-5. Illustration of calculations of fuel use based on Block-off/Block-on Method

Flight details		*Fuel in Tanks (in tonnes)*		*Fuel use*
Consecutive number	*Date of flight*	*Off-block current flight*	*On-block current flight*	*Block-off/block-on*
N		T_N	R_N	$F_N = T_N - R_N$
1	28-Jan-16	94.5	8.5	86.0
2	29-Jan-16	51.8	5.8	46.0
3	29-Jan-16	32.7	9.7	23.0
4	30-Jan-16	9.5	4.0	5.5
5	30-Jan-16	75.0	4.5	70.5
…	31-Jan-16	-	-	-

3.1.4.4 Guidance on implementation of Fuel Uplift

This method requires data only from the flight under consideration. The only data point is the amount of fuel uplift per flight.

Case: Fuel uplift data available for flight under consideration (flight N):

Amount of fuel uplift as measured by the supplier of the flight.

The amount of fuel will be expressed as mass (in tonnes) in both cases.

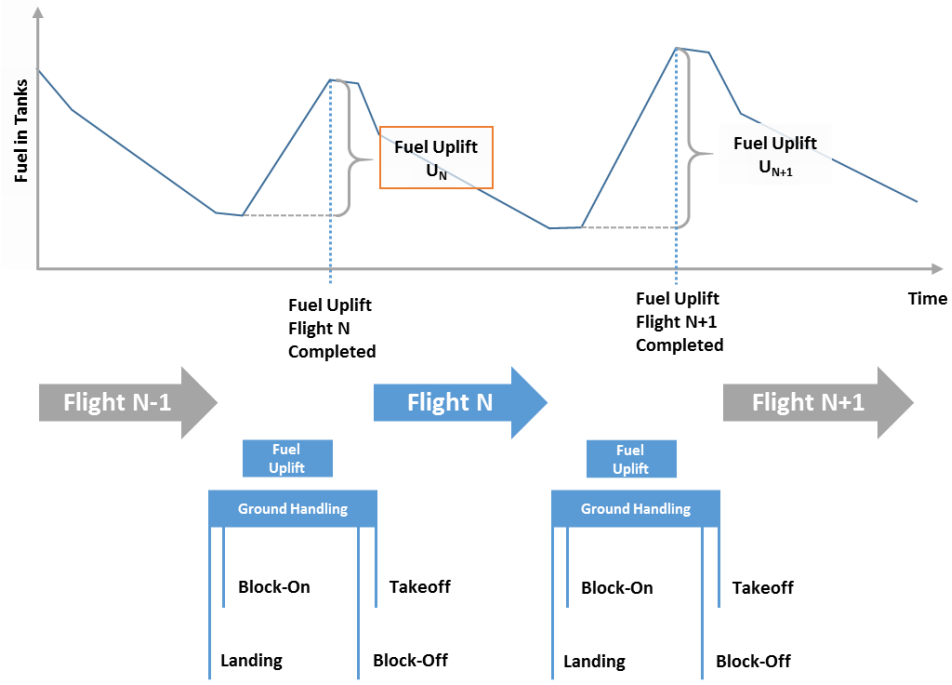


Figure 3-6. Fuel use monitoring based on Fuel Uplift

Calculation of fuel use (F_N):

The aeroplane operator will use the following formula to compute fuel use:

$$F_N = U_N$$

Case: Allocation of fuel use in the case of flight under consideration (flight N) has no fuel uplift:

If no fuel uplift takes place for the flight subsequent to the flight under consideration, the amount of fuel uplifted for the flight under consideration will be determined by distributing the fuel to both flights in proportion of the block-time of both flights, as shown in the chart below. For flight(s) without a fuel uplift (i.e., flight N+1, …, flight N+n,), an aeroplane operator will use the following formula to allocate fuel use from the prior fuel uplift (i.e., from flight N) proportionally to block hour. This distribution will be done also if one of the flights is a domestic flight.

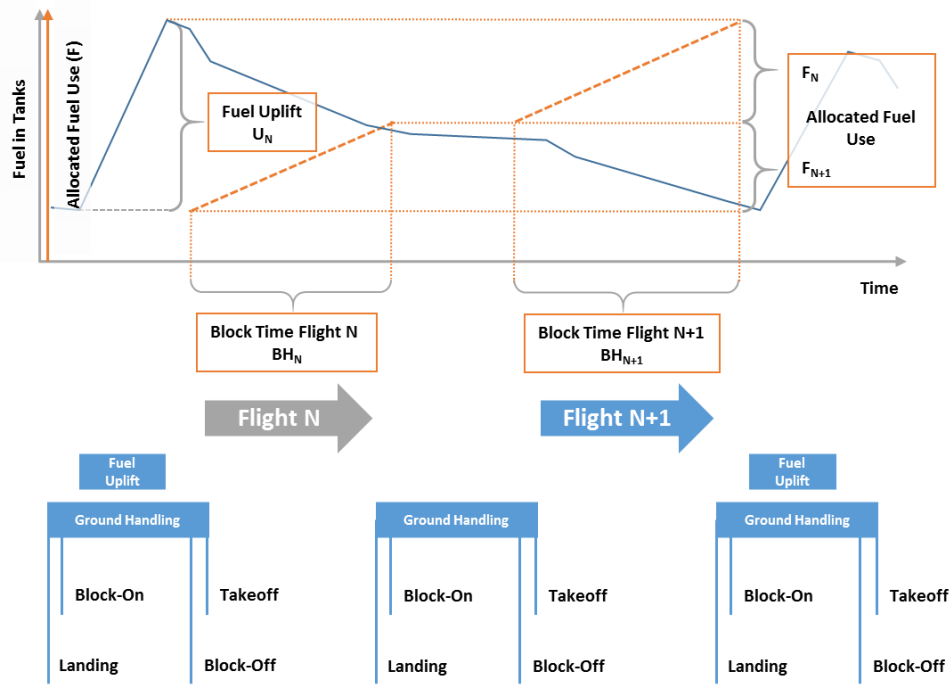


Figure 3-7. Fuel Use Monitoring Method based on fuel uplift, allocation of fuel use

Fuel used for the flight under consideration is calculated as:

$$F_N = U_N * \left[\frac{BH_N}{BH_N + BH_{N+1}}\right]$$

Fuel used for the subsequent flight is calculated as:

$$F_{N+1} = U_N * \left[\frac{BH_{N+1}}{BH_N + BH_{N+1}}\right]$$

If there are several flights in a row without fuel uplift, the formula will be extended to:

$$F_{N+n} = U_N * \left[\frac{BH_{N+n}}{BH_N + BH_{N+1} + \cdots + BH_{N+n}}\right]$$

Note. — For the correct application of this method it is essential that all flights of a specific aeroplane be sorted in chronological order. The distinction between national and international flights will be made after the calculation of the fuel consumption per flight.

Illustrative calculation:

The following table shows an illustrative calculation for the Fuel Uplift Method. Flights number 3 and 4 illustrate the distribution of fuel consumption due to the fact that flight number 4 has no fuel uplift.

Table 3-6. Illustration of calculations of fuel use based on Fuel Uplift Method

Flight details		*Uplift (in tonnes)*	*Block hours*	*Fuel use*
Consecutive number	*Date of flight*	*Uplift quantity*	*Block-time (in hours)*	*Fuel uplift method*
N		U_N	BH_N	$F_N = U_N$
1	28-Jan-16	89.3	11.8	89.3
2	29-Jan-16	43.3	6.5	43.3
3	29-Jan-16	26.9	3.1	20.8
4	30-Jan-16	-	0.9	6.1
5	30-Jan-16	71.7	9.5	71.7
…	31-Jan-16	-	-	-

3.1.4.5 Guidance on the implementation of Fuel Allocation with Block Hour

Unlike the other methods, this method requires data from the flight under consideration as well as data from other flights of a specific aeroplane type of the reporting year.

Data from flight under consideration (flight N):

Block hour of the flight under consideration (BH).

Data from other flights:

Actual fuel consumption for all international flights of the aeroplane type in the reporting year defined as fuel uplift per flight. Or, if a clear distinction between fuel uplifts for domestic and international flights is not possible, actual fuel consumption of all flights of the aeroplane type in the reporting year.

Calculation of average fuel burn ratio (AFBR):

The AFBR expresses the specific fuel consumption per block hour. The AFBR will be determined specifically for each aeroplane operator and aeroplane type used. For computing the AFBR the following formula will be used:

$$\mathrm{AFBR} = \frac{\sum_N U}{\sum_N BH}$$

Where U is fuel used for the international flight for aeroplane operator and aeroplane type determined using the Fuel Uplift Method, and block hour (BH) for the international flight of an aeroplane operator and aeroplane type.

The AFBR will be expressed in tonnes per block hour.

Calculation of fuel use (F_N):

The aeroplane operator will use the following formula to compute fuel use according to this method:

$$F_N = AFBR * BH_N$$

Illustrative calculation:

The following table shows an illustrative calculation for the fuel allocation with Block Hour Method (the assumed average fuel burn (AFBR) is 7 270 tonnes/h).

Table 3-7. Illustration of calculations of fuel use based on fuel allocation with Block Hour Method

Flight details		*Block hours*	*Fuel use i.e., allocation with block-hour (in tonnes)*
Consecutive number	*Date of flight*	*Block-time (in hours)*	
N		BH_N	$F_N = AFBR_{AT} * BH_{AT,N}$
1	28-Jan-16	11.8	85.8
2	29-Jan-16	6.5	47.3
3	29-Jan-16	3.1	22.5
4	30-Jan-16	0.9	6.5
5	30-Jan-16	9.5	69.1
…	31-Jan-16	-	

3.1.5 ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT)

Note. — Guidance on the use of the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) is available on the ICAO CORSIA website.

3.1.6 Data gaps

3.1.6.1 Guidance for State on addressing data gaps if an aeroplane operator does not submit an Emissions Report

In the event that one or more aeroplane operators fail to report their CO_2 emissions according to the compliance timeline as described in Annex 16, Volume IV, Appendix 1, or if they receive an Emissions Report with an adverse or a qualified verification opinion such that the State cannot rely on all or part of the emissions calculation provided by the reporting deadline, the State to which it is attributed should follow the process described below to address the data gaps.

If the State is not successful in contacting the aeroplane operator (Step 1), then it will be required to estimate the CO_2 emissions associated with the affected aeroplane operator for the reporting period in question. The following process should be followed:

Step 1: Contact aeroplane operator

If a State does not receive a verified Emissions Report for an aeroplane operator attributed to it by the 30 April deadline in any given year (by 31 May for the 2019-2020 period) then the State should contact the aeroplane operator to determine if the report can be expected in the near term. Any additional time awarded by the State to the aeroplane operator for completion of the Emissions Report, will reduce the amount of time available to the State for its review. To ensure enough time for State review, it is recommended that the State request the aeroplane operator to submit its report no later than 31 May (30 June for the 2019-2020 period). The State should explicitly state to the aeroplane operator that if it does not submit a verified Emissions Report by this date, then the State will estimate the aeroplane operator's annual emissions for the given year and this will form the basis for calculating the aeroplane operator's offsetting requirements.

If the State receives a verified Emissions Report by the deadline, the State may initiate the order of magnitude checks. If the State does not receive a verified Emissions Report by the deadline then the State will estimate the aeroplane operator's annual emissions for the given year.

Step 2: Obtain flight information

To calculate the aeroplane operator's annual CO_2 emissions the State will need to know, to the extent achievable, the flight information for the aeroplane operator. The State will need to identify the best available source of that information. Where possible, priority should be given to real-time or regularly updated data sources representing the full reporting period. Possible sources are:

a) Operations data collected for air traffic control (ATC) purposes;

b) Regional traffic databases;

c) Public flight schedule information;

d) Coordination with other States to access their relevant data e.g., collected ATC data;

e) Public flight tracking data; and

f) Fleet information contained in the AOC used together with typical utilizations for short, medium and long-haul aeroplane types i.e., total block hours used in the ICAO CORSIA CERT.

If an Emissions Monitoring Plan has been submitted, this may provide useful information on the State pairs which the aeroplane operator may have flown.

Note. — Operations data collected for air traffic control purposes is considered likely, in most cases, to be the best available information. However, where an aeroplane operator operates flights which do not take off from or arrive to the State, supplementary sources, or coordination with other States, may be required.

Step 3: Plausibility check for flight information

Using the flight information obtained, the State should order it by date and State pair to check for completeness. Does this seem like a plausible amount of flights to plausible destinations? Are there any obvious gaps (e.g. an aeroplane lands in State A on 1 March and then no further flights are identified until it departs from State B on 21 March, or regular daily or weekly flight is missing for a number of days or weeks)?

If the aeroplane operator has previously submitted verified data this could be used as a first order check for completeness of traffic.

Step 4: Estimation of CO_2 emissions

Once the State is confident that the best available flight information for the aeroplane operator has been obtained, the State will then need to estimate the aeroplane operator's CO_2 emissions. This could be performed using the approved ICAO CORSIA CERT if the aeroplane operator will not provide its own data. The State should enter the aeroplane operator flight data into the ICAO CORSIA CERT to estimate its emissions.

Once the calculation has been completed the State can carry out a cross check against previously verified Emissions Reports (if available) or other order of magnitude checks.

Step 5: Finalization of the Emissions Report

The aeroplane operator should be informed of the estimated flight and emissions data by 30 June (31 July for the 2019-2020 period). The State should consider including a dispute resolution mechanism as part of its compliance programme in case the aeroplane operator disputes the emissions calculation. The State should then submit the emissions data to ICAO by 31 July (31 August in the 2019-2020 period).

3.1.6.2 Guidance for States on addressing other data gaps

There is also the potential for a situation where a State receives an Emissions Report with an adverse or a qualified verification opinion such that the State cannot rely on all or part of the emissions calculation provided by the reporting deadline. This could occur if the aeroplane operator refuses to correct material discrepancies identified by the third-party verification body, or in the case of a qualified opinion, the verification body is unable to obtain sufficient appropriate evidence to determine whether there is compliance with the CORSIA requirements (e.g., fuel use records destroyed in a fire). On rare occasions a data gap can also occur if, in its review of the aeroplane operator's Emissions Report and associated Verification Report, the State identifies a critical error undetected by the verification body.

Upon receipt of the Emissions Report and associated adverse/qualified opinion from the third-party verification body, the State should contact the aeroplane operator as soon as possible to explore the reasons for the adverse or qualified opinion and to determine if there is any possibility of the aeroplane operator addressing the identified discrepancies and providing a complete data set with a positive verification opinion in the near term. Where the aeroplane operator commits to making the corrections/completing the data set and resubmitting its Emissions Report, it should do so no later than 31 May (30 June for the 2019-2020 period) to ensure enough time for State review. Where the aeroplane operator confirms that it will not be possible to make the corrections/complete the data set, the State will need to decide on how to proceed in estimating the aeroplane operator's annual emissions for the given year.

The State may choose to complete the estimation itself, or to request the aeroplane operator to carry out the estimation using a methodology as determined by the State (e.g., ICAO CORSIA CERT). In the case where the State requests the aeroplane operator to undertake the work, it is recommended that the State request the aeroplane operator to resubmit its report no later than 31 May (30 June for the 2019-2020 period). As part of this request, the State should consider whether it will be possible/realistic for the aeroplane operator to have the revised data set and report checked by the verification body. Ideally this service would have been accommodated in the contract between the verification body and aeroplane operator. Where third-party verification is not possible, the State will need to conduct a more detailed analysis of the Emissions Report than it normally would as part of the order of magnitude check.

Where the State is to provide the estimate, it should consider working with the aeroplane operator as much as possible to confirm the flight scheduling and operations for the affected period of time. In the absence of further participation by the aeroplane operator, the State should complete the estimation in accordance with steps 2-4 above. It should also consider providing its findings back to the aeroplane operator as soon as possible to minimize the likelihood for a dispute.

Regardless of the approach taken to finalizing the Emissions Report (State or aeroplane operator to lead), the aeroplane operator should be informed of the State-approved estimated flight and emissions data by 30 June (31 July for the 2019-2020 period). The aeroplane operator should have the right to dispute the State's findings if it can demonstrate an error in the estimation, or can provide evidence demonstrating that its flight activities were different from those captured in the revision. All corrections and supporting evidence should be submitted by 15 July (15 August for the 2019-2020 period). If no data are received by then, the State should submit the emissions data to ICAO by 31 July (31 August for the 2019-2020 period). If the aeroplane operator does submit updated data, these should be checked by the State and submitted by the deadline.

3.2 REPORTING

3.2.1 Emissions Report Template

An aeroplane operator will submit an annual Emissions Report to the State to which it has been attributed in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.3.1.

It is recommended that an aeroplane operator should use the standardised Emissions Report template as described in Appendix 1 to develop the Emissions Report for submission to its State.

A standardized Emissions Report in the format of a spreadsheet is available to aeroplane operators from the ICAO CORSIA website.

3.3 VERIFICATION

3.3.1 Introduction

Third-party verification of aeroplane operators' Emissions Reports by an independent accredited verification body is required annually, beginning with the Emissions Reports for 2019 data as described in Annex 16, Volume IV, Appendix 1. Each year the aeroplane operator is responsible for compiling its monitoring data, carrying out a voluntary pre-verification and preparing its report immediately after the end of the monitoring period, which ends on 31 December. In the 2019-2020 period, the verification must be finalized in advance of 31 May 2020 and 2021 respectively, which is the deadline for submitting the Emissions Report, and associated Verification Report, to the State. From the start of the 2021-2023 period, the deadline for submitting the Emissions Report and associated Verification Report is 30 April annually. After the aeroplane operator and the verification body both independently submit, upon authorization by the aeroplane operator, a copy of the Emissions Report and associated Verification Report, the State carries out an order of magnitude check and approves the Emissions Report.

3.3.1.1 Key documents

Emissions Monitoring Plan

According to Annex 16, Volume IV, Part II, Chapter 2, 2.2.2, the aeroplane operator will draft an Emissions Monitoring Plan and submit this plan for approval by the State. The aeroplane operator monitors its emissions in accordance with the approved Emissions Monitoring Plan. If a material change is made to the Emissions Monitoring Plan or if other changes occur that could affect the authority's oversight, an aeroplane operator will resubmit the updated plan for approval.

Emissions Report

Based on the procedures included in the current Emissions Monitoring Plan, the aeroplane operator will draft an annual Emissions Report. This is the main document within the CORSIA MRV as it includes all relevant CO_2 emissions-related data as described in Annex 16, Volume IV, Appendix 5. The Emissions Report will be verified by a verification body to demonstrate that it is free from material misstatements and material non-conformities. The verified Emissions Report will be submitted to the State together with the Verification Report of the verification body.

Verification Report

The verification body will draft a verification report after the completion of verification activities as described in Annex 16, Volume IV, Part II, Chapter 2, 2.4. The Verification Report contains a concluding verification statement. Both the aeroplane operator and the verification body, upon authorisation by the aeroplane operator, will forward a copy of the Verification Report together with the Emissions Report to the State. Together with the Emissions Report, the State will review the Verification Report and may contact the aeroplane operator and the verification body to receive further explanations if required.

Verification statement

The verification statement is a formal written declaration to the State that provides assurance that the aeroplane operator's CO_2 emissions assertion is stated within the defined level of assurance and materiality as described in Annex 16, Volume IV, Appendix 6, 3.1 and 3.4 respectively and is in accordance with the applicable verification criteria as described in Annex 16, Volume IV, Part II, Chapter 2, 2.4. The verification body will choose only between two types of verification statements, either 'verified as satisfactory' or 'verified as not satisfactory'.

ISO GHG standards as basis for CORSIA verification

The following ISO standards form the basis for CORSIA verification:

a) ISO 14064-3:2006 entitled "Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions"; and

b) ISO 14065:2013 entitled "Greenhouse gases – Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition".

ISO standards are applicable in their specific versions as shown above only. This includes potential revisions of the standards. Additional ISO standards are applicable in more general terms as well. For example, ISO 14066 provides the definition of team leader under CORSIA. The verification body will meet the verification requirements additional to these programme neutral ISO GHG standards which are provided in Annex 16, Volume IV, Appendix 6. It is important to note that these standards have to be documented in the contract between verification body and aeroplane operator as part of the conditions for verification in Annex 16, Volume IV, Appendix 6.

3.3.2 Verification body eligibility and accreditation

To be eligible to undertake verification activities under CORSIA, verification bodies must meet the following key requirements:

a) Be accredited to ISO 14065:2013, "Greenhouse gases - Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition", for a technical scope relevant to aviation; and

b) Satisfy the additional accreditation requirements specified in Annex 16, Volume IV, including a requirement related to maximum number of annual verifications.

These are described in more detail below.

3.3.2.1 Accreditation framework

All verification bodies must be accredited to ISO 14065:2013, "Greenhouse gases - Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition", for a technical scope relevant to aviation. In addition to ISO 14065, verification bodies must also meet the additional accreditation requirements specified in Annex 16, Volume IV, Part II, Chapter 2, 2.4. These include, but are not limited to, requirements related to avoiding conflict of interest, personnel competency and team knowledge and expertise. Verification bodies wishing to become accredited to conduct verifications under CORSIA should contact their national accreditation body (NAB) for additional information.

Accreditation of verification bodies is carried out by NABs that operate in accordance with the international standard ISO/IEC 17011:2004, "Conformity Assessment - General requirements for accreditation bodies accrediting conformity assessment bodies."

3.3.2.2 Accreditation requirements

A number of additional accreditation requirements beyond ISO 14065:2013 are specified in Annex 16, Volume IV, Appendix 6. Key CORSIA specific requirements are as follows:

Maximum number of annual verifications

Consistent with the ISO Standards 14064-3:2006 and 14065:2013, verification bodies are required to demonstrate impartiality and remain free from bias and conflict of interest at all times. To minimize the potential for a conflict of interest, the CORSIA requires that the leader of the verification team not undertake more than six annual verifications under any greenhouse gas emissions programme for the same aeroplane operator. After six years, the leader of the verification team will take a three consecutive year break from providing CORSIA verification services to the aeroplane operator. The six-year maximum includes verifications performed for the aeroplane operator prior to it requiring verification services under CORSIA.

Personnel and team competency

Annex 16, Volume IV also specifies a number of personnel and team competency requirements in addition to the ISO standards. These relate primarily to the aviation verification engagement and the competence of the team as a whole, including documenting and evaluating team competencies and ensuring continual professional development and training for verification bodies.

Confidentiality

Additional confidentiality requirements relate to the submission of the Verification Report to the State. In CORSIA, both the aeroplane operator and the verification body submit a copy of the Verification Report to the State. However, before the verification body submits the Verification Report, it must have the appropriate authorization to do so from the operator. The mechanism for authorizing this consent will be specified in the contract between the verification body and aeroplane operator.

Record keeping

Under CORSIA, verification bodies are required to keep full verification records for a minimum of 10 years.

3.3.3 Verification fundamentals

3.3.3.1 Objective of the verification

Verification activities under CORSIA ensure that the monitoring of CO_2 emissions takes place according to the approved Emissions Monitoring Plan (in accordance with Annex 16, Volume IV) and that the reported emissions are correct and reliable (free from material misstatements and material non-conformities). In accordance with Annex 16, Volume IV, Appendix 6, the verification statement must provide, inter alia, a conclusion on whether:

a) the aeroplane operator CO_2 emissions assertion is materially fair and an accurate representation of emissions over the period of the Emissions Report and is supported by sufficient and appropriate evidence;

b) the aeroplane operator has monitored, calculated and reported its emissions over the period of the Emissions Report in accordance with Annex 16, Volume IV and the approved Emissions Monitoring Plan;

c) the aeroplane operator has correctly applied the method of flight attribution documented in the approved Emissions Monitoring Plan and in accordance with Annex 16, Volume IV, to ensure a correct attribution of leased aeroplane and international flights operated by other aeroplane operators under the same corporate structure;

d) the stated amount of emission reductions from the use of CORSIA eligible fuels by the aeroplane operator is materially fair and an accurate representation of emission reductions over the reporting period, and is supported by sufficient and appropriate internal and external evidence;

e) the claimed batches of CORSIA eligible fuels from the aeroplane operator have not been claimed by another aeroplane operator under any other voluntary or mandatory schemes it has participated in (where the emission reductions from CORSIA eligible fuels may be claimed), during the current

compliance period, as well as the compliance period immediately preceding it;

f) the aeroplane operator has monitored, reported and verified its emission reductions from the use of CORSIA eligible fuels use over the period of the reporting period in accordance with Annex 16, Volume IV;

g) the aeroplane operator has accurately reported its CORSIA Eligible Emissions Unit cancellations in accordance with Annex 16, Volume IV;

h) the aeroplane operator has quantities of cancelled CORSIA Eligible Emissions Units that are sufficient for satisfying the offsetting requirements associated with the relevant compliance period, after accounting for any claimed emission reductions from the use of CORSIA eligible fuels, and the aeroplane operator can demonstrate sole right of use to such cancelled CORSIA Eligible Emissions Units; and

i) the aeroplane operator has used the cancelled CORSIA Eligible Emission Units to meet its total final CO_2 offsetting requirements for a given compliance period under Annex 16, Volume IV, and not been used to offset any other emissions.

3.3.3.2 Scope of verification

The scope of the verification must cover the entire reporting period as stated in the Emissions Report and is determined by the activities necessary to achieve the objective of the verification. Before a verification body can accept the verification engagement, the verification body should have developed a clear understanding of the aeroplane operator's activities and the complexity of the verification activities necessary.

The scope of the verification has to be stated and defined in the contract between the aeroplane operator and verification body, including necessary site visits and access to aeroplane operator's data.

3.3.3.3 Level of assurance

In the CORSIA the verification body will provide reasonable assurance that the aeroplane operator's Emissions Report is materially fair and an accurate representation of emissions over the period of the Emissions Report. Sufficient and appropriate evidence has to be gained through the verification process to guarantee the level of assurance and to make resilient statements about the GHG assertion in the Verification Report.

3.3.3.4 Materiality

Annex 16, Volume IV prescribes the following materiality levels:

Aeroplane operators with annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1.1.2, and Chapter, 2.1 above 500 000 tonnes will meet a materiality threshold of 2 per cent, as defined in Annex 16, Volume IV, Appendix 6, 3.4. Aeroplane operators with annual CO_2 emissions from international flights equal or less than 500 000 tonnes will meet a materiality threshold of 5 per cent. Over and understatements should be allowed to balance out in both cases.
The verification activities to be undertaken by the verification body, and the data points to be sampled, can be expected to be more extensive and detailed in the case of a 2 per cent materiality level than they will for a 5 per cent materiality level. Errors, omissions and misrepresentations in the Emissions Report have to be taken into account.

3.3.4 Verification process under the CORSIA

The verification process under the CORSIA can be broken down into 12 steps involving the 3 key participants: the verification body, the aeroplane operator and the State.

In advance of seeking verification of its Emissions Report by a verification body, it is highly recommended that the aeroplane operator conducts an internal pre-verification of its Emissions Report to improve data quality and the underlying data gathering processes.

As depicted in Figure 3-8 the verification process itself, as conducted by the verification body and appointed team, involves 10 steps leading up to the submission of a final Verification Report to the aeroplane operator and the State. Each of these steps are described in further detail in this Chapter.

Following submission of the Verification Report to the State, the State will conduct an order of magnitude check in accordance with the timeline as defined in Annex 16, Volume IV, Appendix 1. The order of magnitude check will follow a mandatory set of requirements to enable global consistency among States.

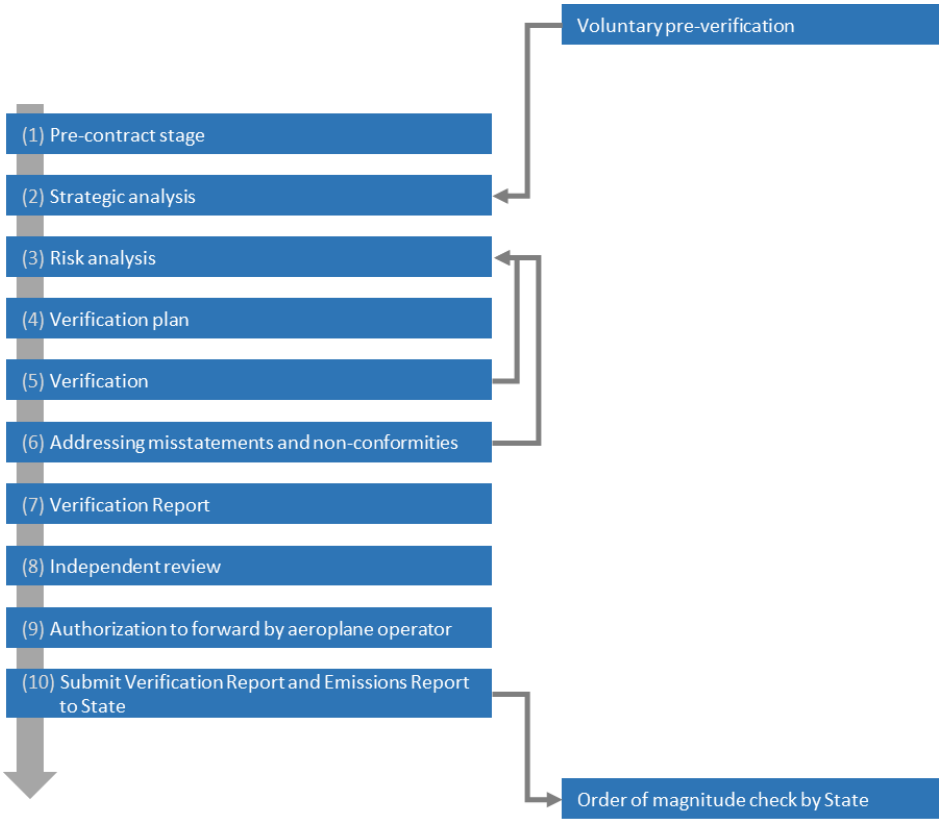


Figure 3-8. Overview of the verification process

3.3.4.1 Voluntary pre-verification by the aeroplane operator

In order to prepare for third-party external verification, aeroplane operators should consider conducting a voluntary internal pre-verification in order to ensure there will be no large data issues during the verification. The value of a pre-verification conducted internally by the aeroplane operator is to ensure quality assurance and quality control of the internal data gathering process and calculation systems and ensure that the aeroplane operator has passed certain logic checks in advance of a verification body coming on site. The team that manages the day-to-day MRV of CORSIA should select an internal auditor who will be able to assess what has already been done. While the exact internal voluntary pre-verification may differ by aeroplane operator, the checklist included in Table 3-8 should be used as a guideline on evaluating the monitoring and reporting process.

Table 3-8. Voluntary pre-verification checklist guide

Completed by	*Topic*	*Task*	*MRV*[2]	*Simplified MRV*[3]
Aeroplane operator CORSIA management team	**Selecting an internal auditor**	Choose a qualified internal auditor/audit team	x	x
		Ensure that the internal auditor(s) have the required knowledge and skills and is independent from the activity being audited	x	x
Internal auditor	**Understand aeroplane operator monitoring and reporting process**	Review Emissions Monitoring Plan and other relevant written procedures; data flow charts; preliminary draft Emissions Report versions; historical reports; communication with State etc.	x	x
Internal auditor in conjunction with aeroplane operator CORSIA management team	**Identify scope of voluntary pre-verification audit plan**	Develop data sampling plan based on analysis of documents	x	x
		Confirm that data gathering, calculation and summation processes are as per procedures. It is recommended that this analysis include quantitative analysis	x	x
		Check that data sources match what has been identified in the Emissions Monitoring Plan	x	x
		If a data flow chart exists, compare it with actual data flow and identify any determined problems	x	x
Internal auditor	**Evaluate staff competence**	Collect information through interviews, observations of activities, review of documents	x	x
		Does aeroplane operator CORSIA management team have adequate knowledge of: monitoring and reporting as relating to GHG monitoring and reporting responsibilities	x	x

2 Fuel Use Monitoring Method, as described in Annex 16, Volume IV, Appendix 2.
3 CORSIA CO_2 Estimation and Reporting Tool (CERT), as described in Annex 16, Volume IV, Appendix 3.

Completed by	*Topic*	*Task*	*MRV*[2]	*Simplified MRV*[3]
		and activities related to the CORSIA?		
		Assess the different responsibilities assigned and recorded in the Emissions Monitoring Plan for MRV and if the various staff members complete those tasks correctly	x	x
		Check if responsibilities assigned to various staff have been completed	x	x
Internal auditor	**Analysis to identify report for errors or logic gaps**	How does the data compare to previous years?	x	x
		Adequacy of input, output, and transformation error checking routines	x	x
		Are there any inconsistencies such as empty cells or error messages?	x	x
		Check completeness of list of flights by adding logical tests and consistency checks in the report i.e. below two lines	x	x
		Is the departure aerodrome for the next flight the same as the arrival aerodrome for the previous flight?	x	x
		Correlation analysis – determination of the correlation between data and dependent variables (e.g. consistency between duration of flights and fuel use, average fuel burns)	x	
		Intra-project analysis – comparison of data across multiple sites (e.g. consistency of data between aerodromes, is arrival fuel of the previous flight plus the recorded fuel uplift roughly the same figure as the departure fuel?)	x	
		Management system elements in place supporting collection and reporting of emissions data	x	
		Adequacy of reporting processes for the periodic comparisons and reconciliation of emissions data with other data (e.g. comparing emission estimates against production and capacity utilization data)	x	
Internal auditor	**Assess scope and technical exemptions**	Are the appropriate flights included for the CORSIA monitoring and reporting?	x	x
		Are the correct international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 3, 3.1?	x	x
		Are exempted flights recorded correctly (i.e. has a medical flight really been classified as a medical flight and are all classified medical flights real medical flights or have they been classified incorrectly?)	x	x

Completed by	*Topic*	*Task*	*MRV[2]*	*Simplified MRV[3]*
Internal auditor	**Emission sources and aeroplane used**	Set up a checklist of emission sources / aeroplanes used and operated by operator	x	x
Internal auditor	**Emission calculation and fuel data used**	Consult Emissions Monitoring Plan to determine how emissions are calculated and perform some cross checks to see if the applied calculation works by adding logics to the report	x	x
		If based on real fuel figures, cross-check how those are recorded and if this has been done correctly or if there are any recurring error sources e.g. below	x	
		Calculate if the arrival fuel of the previous flight plus the recorded fuel uplift are roughly the same figure as the departure fuel	x	
		Cross check if two equal fuel uplifts have been recorded for two or more consecutive flights and if those are genuine or typing errors	x	x
		Check report for very low/high fuel uplifts/figures to see if those are correct or typos	x	x
	Aviation fuel to CO_2 conversion; fuel density; CORSIA eligible fuel factors	Aviation fuel's fuel to CO_2 conversion factor used correctly	x	
		Check if the fuel density process in the Emissions Monitoring Plan has been consistently applied for all flights	x	
		Check if any volume of CORSIA eligible fuel has been used and if those have been certified as being eligible in the CORSIA	x	
Internal auditor	**Pre-verification audit documentation**	Record complete list of voluntary pre-verification findings including:	x	x
		Recommended/required actions	x	x
		Timeline for closure of finding	x	x
		Follow up checks by auditor to ensure corrective actions have been completed satisfactorily and findings are closed	x	x
Aeroplane operator CORSIA day-to-day management team	**Execute corrective actions**	Evaluate list of findings and execute corrective actions to prepare for external third-party verification by verification body	x	x

3.3.4.2 Verification by the verification body

Given the general provisions in the CORSIA relevant to ISO GHG standards (cf. reference) and the additional requirements in Annex 16, Volume IV, Appendix 6, this section provides additional guidance on the CORSIA-specific verification characteristics which are not already mentioned in the aforementioned documents.

(1) Pre-contract stage

It is recommended that aeroplane operator and verification body agree on the contractual matters of the verification engagement at the latest by July of the calendar year for which the verification will be carried out. It is advised that the verification body perform a preliminary strategic analysis on the basis of publicly available data (such as web page of the aeroplane operator) to assess the potential complexity and length of the verification engagement. The verification body may confirm with the aeroplane operator before offering a contract whether the aeroplane operator makes use of the voluntary pre-verification approach as this may result in reduced costs for the verification.

For each verification engagement, the verification body must ensure that a competent and impartial verification team and independent reviewer are appointed prior to signing a legally enforceable agreement with the aeroplane operator. Depending on the outcomes of the strategic and risk analyses, however, team composition may require adjustment to ensure its continued competence. The specific competencies required for a verification team, including knowledge requirements, technical expertise, and data and information auditing expertise are provided in:

a) ISO 14065:2013 entitled “Greenhouse gases — Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition”;

b) ISO 14066:2011 entitled “Greenhouse gases — Competence requirements for greenhouse gas validation team and verification teams”; and

c) Annex 16, Volume IV, Appendix 6.

Verification bodies must ensure that, at a minimum, the verification team include a team leader, as defined in ISO 14066:2011, who leads the engagement planning and management of the verification team. While it is possible that a single individual, or team leader, may fulfil all the competence requirements for a verification team, ISO 14065 requires that someone not directly involved with the verification activities confirm that all verification activities have been completed and determines whether the Emissions Report is free from material discrepancies. The internal reviewer is typically appointed at the same time as the verification team members, and must have competencies equivalent to a team leader. All verification team members must be identified in the Verification Report.

In order to perform all verification activities sufficiently, the verification body requires access to all relevant documents including the aeroplane operator’s data and data systems. The identification of all relevant data sources should be done in advance. Access should also be granted to premises and staff of the aeroplane operator (e.g. for interviews), if this is needed to conduct the verification in an appropriate manner.

(2) Strategic analysis

It is recommended that the verification body conduct the strategic analysis[4] by September of the ongoing reporting year. In addition to the programme-neutral content of the strategic analysis, the CORSIA-specific parts should at least include the following items:

a) Operating environment of the aeroplane operator (e.g. type of flights, number of flights and aeroplane, organizational structure, subsidiaries, key commercial data such as growing or shrinking business, web page information, AOC, technical details regarding internal and external database accesses);

b) Emissions Monitoring Plan (e.g. approved or not, data flow activities, specific conditions set out by the State, sufficient descriptions and explanations contained, meets requirements of Annex 16, Volume IV, potential modifications after approval);

c) Previous versions of Emissions Report and Verification Report;

d) Relevant communication between aeroplane operator and State; and

e) Share of reported emissions with an actual offsetting requirement.

If the verification body has not achieved a sufficient level of understanding to assess the scope and complexity of the verification, it will not be possible to perform a risk analysis, determine if a modification to the verification team is required or assess whether the contractually agreed time allocation for this specific verification engagement is indeed sufficient.

(3) Risk analysis

It is recommended that the verification body conduct the analysis of risks[5] by September of the ongoing reporting year directly after the strategic analysis. In addition to the programme-neutral content of the risk analysis, the CORSIA-specific parts should at least include the following items:

a) Complexity of the Emissions Monitoring Plan (number of aeroplane types, different monitoring methods, use of simplified MRV);

b) Maturity of the internal control activities;

c) Maturity of the data flow activities;

d) Assessment whether CORSIA data and information is part of a certified management system;

e) Internal audit reports;

f) Number of data gaps;

4 Definitions of strategic analysis are contained in the IAF Mandatory Document for the Application of ISO 14065:2013, Issue 2 (IAF MD 6:2014).

5 Definitions of the assessment of risks are contained in the IAF Mandatory Document for the Application of ISO 14065:2013, Issue 2 (IAF MD 6:2014).

g) Multiple locations for data gathering and processing;

h) Centralized vs. decentralized responsibilities for CORSIA;

i) Use of CORSIA eligible fuels; and

j) Voluntary pre-verification documentation.

Verification bodies are encouraged to check the results and documentation of the voluntary pre-verification in detail. Depending on the documentation, results of the pre-verification might significantly reduce the verification risk. On the basis of the risk analysis, verification bodies should identify and quantify inherent and control risks. As with other GHG schemes, the risk analysis is subject to revision should the verification reveal that the risk is actually much higher or lower than originally assessed. This has an influence on the verification plan as well.

(4) Verification plan

It is recommended that the verification body draft the verification plan by September of the ongoing reporting year directly after the risk analysis. The following elements should be covered:

a) Verification programme (incl. name of aeroplane operator, verification objective, verification scope, verification language, arrangements and responsibilities within the verification team, site visit arrangements, activities performed on- and off-site, document list);

b) Test plan for control activities (scope and methods of testing, including IT controls, quality assurance in outsourced processes, procedures of the Emissions Monitoring Plan); and

c) Data sampling plan (scope and methods, including specific data points such as ACARS triggers, flight logs, fuel uplift statements).

Where additional risks are identified or new information is discovered during the actual verification that changes the original assessment of a risk, the associated risk analysis and verification plan must be updated.

Site visits are an essential part of the verification activities under the CORSIA whereas the term ‘site’ refers to the place where the aeroplane operator performs the main activities of data processing to calculate the final figures of the Emissions Report (in most cases the headquarters of the aeroplane operator). Site visits are recommended for verification bodies verifying an Emissions Report of an aeroplane operator using Fuel Use Monitoring Methods as described in Annex 16, Volume IV, Appendix 2. This does also apply to verification bodies verifying an Emissions Report of an aeroplane operator eligible to use the ICAO CORSIA CERT which has chosen to apply Fuel Use Monitoring Methods as described in Annex 16, Volume IV, Appendix 2. To a large extent the risk analysis, but also evidence obtained during the verification itself, determine the scope and also the number of site visits necessary for a verification body to conclude on the Emissions Report. During the visit the verification body is, for instance, able to obtain physical evidence of the systems in place, can interview staff of the aeroplane operator, and check the practical application of control procedures.

Also, for verification bodies providing verification services for an aeroplane operator using the ICAO CORSIA CERT, site visits are an essential means through which the verification team can collect sufficient and appropriate evidence to confirm whether the Emissions Report is free from material misstatements and material non-compliances. Nevertheless, especially after the initial verification of an aeroplane operator using the ICAO CORSIA CERT, the verification body might discover in its risk analysis a very low verification risk as the processes and internal control procedures of the aeroplane operator have proven to be effective and reliable. In such cases the verification body may choose to

substitute a site visit with an alternative remote verification technique like video-conferencing and direct access to the databases of the aeroplane operator. As with physical site visits, it is very important to not base verification activities on technology which does not allow instant communication (e.g., email). In order to reduce costs for the aeroplane operator, responsible staff might also visit the verification body in its own offices and provide instant data access by carrying company notebooks with them and provide immediate answers to specific questions by initiating (video) calls to responsible staff in the headquarter. If the verification body decides to replace a site visit(s) with other means, this has to be clearly indicated in the Verification Report. This includes the reasoning for the decision on the basis of the risk analysis as well as a detailed explanation of the technical systems used. The verification body should coordinate with the State of the aeroplane operator before replacing the site visit with an alternative approach.

(5) Verification

In order to obtain sufficient insight but also to avoid any time pressure between the end of the reporting year and the submission of a verified Emissions Report, it is recommended that the verification body perform a preliminary verification during the actual reporting year as well. This can prove especially useful if the verification body was not able to build its verification plan on the basis of its own experiences obtained from previous audits of the same aeroplane operator. For a preliminary verification, at least nine months of flight and fuel consumption data has to be available and processed already. Depending on the individual risk assessment and the confidence obtained in the procedures of the aeroplane operator, a combined approach of a remote and on-site audit can be possible. Results of the preliminary verification inform the actual verification. Consequently, total time spent for a preliminary and a (shortened) actual verification might not necessarily be longer than combining all verification tasks in a single verification.

As in other GHG schemes it is expected that the verification body will use standard auditing techniques (such as interviews, analytical data testing approaches, and document reviews) when implementing the verification plan. See section 3.3.5 of this manual for CORSIA and aviation-specific considerations related to the implementation of the Emissions Monitoring Plan and data testing.

The verification body assesses the material impact the identified misstatements and non-conformities are likely to have on the reported data (as described in section 3.3.6.2 of this manual).

(6) Addressing misstatements and non-conformities

The aeroplane operator will correct all misstatements and non-conformities discovered during the verification. If it is not possible to correct the corresponding values, or if the verification body has not achieved sufficient confidence in the aeroplane operator’s Emissions Report, the verification body has to follow the instructions as described in section 3.3.6.3.

(7) Verification Report

The verification body will draft a Verification Report after the completion of verification activities as described in Annex 16, Volume IV, Appendix 6. The Verification Report contains a concluding verification statement.

(8) Independent review

Before submission of the Emissions Report to the State, all documentation of the verification engagement as well as the Verification Report itself have to be reviewed by an independent reviewer. The independent reviewer will confirm that all verification activities have been completed by the verification team and that the evidence collected is appropriate and sufficient and leads to the conclusions formed by the team.

This additional final quality check is essential for the verification body and the aeroplane operator. All identified errors by the independent reviewer have to be corrected. Due to the large amount of data involved in the CORSIA verification process, the independent reviewer should focus on assessing whether the verification team was able to gather sufficient and appropriate evidence to support the verification statement included in the Verification Report. This includes the documented sample size and the documented analytical procedures applied to the datasets of the aeroplane operator. As in other GHG schemes, the independent reviewer will not be part of the verification team.

(9) Authorization to forward Emissions Report

The verification body will forward the Verification Report and the Emissions Report to the State. To avoid the unintended submission of the Verification Report and the Emissions Report by the verification body, the verification body will forward these reports upon authorization by the aeroplane operator. Specifics regarding this provision should be contained in the contract between the verification body and the aeroplane operator.

(10) Submission of Verification Report and Emissions Report

As well as the verification body sending the Verification Report together with the Emissions Report to the State, the aeroplane operator will also provide the State with a copy of the Verification Report and the Emissions Report. The State will review the documents and may contact the aeroplane operator and the verification body to receive further explanations if required.

3.3.4.3 Order of magnitude check by State

The State will perform an order of magnitude check of the Emissions Report of the aeroplane operator as described in Annex 16, Volume IV, Part II, Chapter 2, 2.4.1.5. The order of magnitude check will follow a set of standardized requirements as outlined in Table 3-9. For an average sized aeroplane operator with a satisfactory verified Emissions Report, the order of magnitude check should not take longer than approximately three hours.

Table 3-9. State order of magnitude checklist

No.	*Question / Issue*	*Additional information*	*Status: OK/Yes/No /Not Applicable*	*Notes and results of checks*
	Aeroplane operator			
1	Aeroplane operator/verification body both separately submit Emissions Report and Verification Report. Is the content of both submissions identical?	Minimum check: reported fuel consumption and number of flights. Get back to aeroplane operator in case of deviations.		
2	Is the name of the aeroplane operator given and unambiguous?	Ensure unambiguous identification of aeroplane operator. Get back to aeroplane operator in case of uncertainties.		
3	Is there a valid ICAO Designator for aeroplane operating agencies? Does it have the correct character length?	Ensure unambiguous identification of aeroplane operator. Get back to aeroplane operator in case of uncertainties.		
4	Basic information (address, AOC etc.) plausible?	Ensure unambiguous identification of aeroplane operator. Get back to aeroplane operator in case of uncertainties.		
5	Has the aeroplane operator correctly identified its competent and responsible authority?	If there is indication of another State being in charge, get back to relevant State and aeroplane operator.		
6	Has the Emissions Report been submitted in due time?			
7	Are the documents submitted complete? Any blank boxes? Verification Report included?	If not, contact aeroplane operator.		
8	Does the verification body´s Verification Report contain special indications to follow up on?	Verification body´s indication have to be paid special attention. If they have an impact on the amount of emissions, get back to aeroplane operator.		
9	Other defects/ comments?			
	Emissions Report information			
10	Has the latest Emissions Report template version been used?	Ensures capturing and reporting fuel consumption according to latest requirements.		
11	Date of creation of Emissions Report within the underlying reporting period?	If so, there is the risk of incomplete reporting of flight data. End of year flights might be missing.		

No.	Question / Issue	Additional information	Status: OK/Yes/No /Not Applicable	Notes and results of checks
12	Requirement to report?	Check of threshold for annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1.1.2, and Chapter 2, 2.1, are greater than 10 000 tonnes.		
13	Are there any State pairs reported which are subject to offsetting requirements?	If so, in depth investigation of these reported State pairs.		
14	Has the Emissions Report been verified?	If verification is missing, get back to aeroplane operator and request verification of Emissions Report.		
15	Has the Emissions Report been created on the basis of an Emissions Monitoring Plan which is available to the State?	If not, Emissions Monitoring Plan version used by aeroplane operator should be requested. Verification body notes should be considered.		
16	Is the underlying Emissions Monitoring Plan approved by the State?	If not, investigate reason. Check and approve Emissions Monitoring Plan. It has to be ensured that the number of flights and fuel quantity are monitored completely.		
17	Are any collateral clauses part of the approval of the Emissions Monitoring Plan?	If so, implementation has to be tracked and checked.		
18	Have thresholds of approved Fuel Use Monitoring Methods been exceeded? Is the use of simplified procedure permissible?	In case of inappropriate deviation resulting in lower accuracy, get back to aeroplane operator.		
19	Is there any deviation in capturing CO_2 emissions in relation to the approved Emissions Monitoring Plan?	Mainly data flow and monitoring method have to be checked in depth. Refer to the Verification Report.		
20	If there is a deviation from approved Emissions Monitoring Plan, is it described accurately?	Is the deviation traceable? Did it lead to any material changes?		
21	If applicable, how does the Verification Report assess deviations from the approved Emissions Monitoring Plan?	Has the verification body investigated and specified any deviation in its Verification Report?		
22	In case of deviations, is reapproval of Emissions Monitoring Plan necessary?	If so, aeroplane operator has to be requested to amend Emissions Monitoring Plan and submit for approval.		

No.	*Question / Issue*	*Additional information*	*Status: OK/Yes/No /Not Applicable*	*Notes and results of checks*
23	Is the amount of reported CO_2 emissions roughly plausible?	Individual corresponding parameters like e.g. aeroplane activity and size of aeroplane fleet in relation to amount of emissions have to be considered and cross-checked.		
24	Is the number of flights plausible?	Individual corresponding parameters like e.g. aeroplane activity and size of aeroplane fleet in relation to air activity have to be considered and cross-checked.		
25	Other defects/ comments?			
	Aeroplane fleet			
26	Aeroplane fleet complete and plausible?	If applicable, cross-check with available data sources (e.g. website of aeroplane operator or public databases). Cross-check, if size of aeroplane fleet fits to reported aeroplane activities.		
27	Have registration marks been indicated multiple times?	If so, get back to aeroplane operator.		
28	Other defects/ comments?			
	OPTION 1 State pairs			
29	Are the data sets complete?	Incomplete data sets have to be clarified by aeroplane operator.		
30	Is the given information regarding number of flights plausible?	Does aeroplane operator report a noticeable small number of flights on typical destinations of the airline?		
31	Are the types of fuel reported plausible and contained in Emissions Monitoring Plan?	Since emissions factor is fuel type-specific, deviation might lead to implausible amount of calculated emissions.		
32	Generally, is the reported fuel consumption plausible?	In this regard, historical data should be consulted for plausibility checks.		
33	Have outbound and inbound flight been reported separately?	Outbound and inbound flight have to be reported separately. Aggregation is not possible. In case of uncertainty get back to aeroplane operator.		

No.	Question / Issue	Additional information	Status: OK/Yes/No /Not Applicable	Notes and results of checks
34	In case of usage of multiple fuel types on a certain State pair, has an appropriate number of State pairs been reported?	In this case State pairs have to be reported corresponding to the amount of different types of fuels. Aggregation is not possible. In case of uncertainties get back to aeroplane operator.		
35	Is classification of State pairs in regard to offsetting requirements correct?	In general, the reporting template generates the classification automatically. However, checking is recommended.		
36	State pairs with equal type of fuel listed multiple times?	In this case only one State pair has to be reported. The amounts have to be summed up. Get back to aeroplane operator if necessary.		
37	Departure and destination in the same State?	If yes, get back to aeroplane operator to reinsure.		
38	Are there State pairs with more than 250 tonnes average fuel consumption per flight?	Calculation is: fuel consumption of respective State pair divided by number of flights. In case of fuel consumption greater than 250 tonnes per flight get back to aeroplane operator. This refers to all reported State pairs.		
39	Are there State pairs with less than 2.5 tonnes of fuel consumption per flight?	Calculation is: fuel consumption of respective State pair divided by amount of flights. In case of fuel consumption below 2.5 tonnes per flight get back to aeroplane operator. This refers to all reported State pairs.		
40	Random calculation of average fuel consumption per flight (per State pair) and comparison with typical average consumption from the ICAO CORSIA CERT.	The ICAO CORSIA CERT should be consulted for cross-checks. Typically used aeroplane type can be obtained from public flight tracking data bases or official flight plans of the aeroplane operator.		
41	Other defects/ comments?			
	OPTION 2 Aerodrome pairs			
42	Are the data sets complete?	Incomplete data sets have to be clarified by aeroplane operator.		
43	Is the given information regarding number of flights	Does aeroplane operator report a noticeable small number of flights on typical destinations		

No.	*Question / Issue*	*Additional information*	*Status: OK/Yes/No /Not Applicable*	*Notes and results of checks*
	plausible?	of the airline?		
44	Are the types of fuel reported plausible and contained in Emissions Monitoring Plan?	Since emissions factor is fuel type-specific, deviation might lead to implausible amount of calculated emissions.		
45	Have outbound and inbound flights between two aerodromes been reported separately?	Outbound and inbound flights have to be reported separately. Aggregation is not possible. In case of uncertainty get back to aeroplane operator.		
46	In case of usage of multiple fuel types on a certain aerodrome pair, has an appropriate number of State pairs been reported?	In this case aerodrome pairs have to be reported corresponding to the amount of different type of fuels. Aggregation is not possible. In case of uncertainties get back to aeroplane operator.		
47	Is the classification of aerodrome pairs as regards offsetting requirements correct?	In general, the reporting template generates the classification automatically. However, checking is recommended.		
48	Is the classification of aerodrome pairs as regards offsetting requirements correct?	In general, the reporting template generates the classification automatically. However, checking is recommended.		
49	Have aerodrome pairs with equal type of fuel listed multiple times?	In this case only one aerodrome pair has to be reported. The amounts have to be summed up. Get back to aeroplane operator if necessary.		
50	Plausibility check: departure and destination in the same State?	If yes, plausibility check and get back to aeroplane operator to clarify if aeroplane operator’s intention was to report another aerodrome pair.		
51	Does the aeroplane operator report more than 3 500 flights on an aerodrome pair?	If so, get back to aeroplane operator to check plausibility.		
52	Are there aerodrome pairs with more than 250 tonnes fuel consumption per flight?	Calculation is: fuel consumption of respective aerodrome pair divided by amount of flights. In case of fuel consumption greater than 250 tonnes per flight contact aeroplane operator. This refers to all reported aerodrome pairs.		

No.	Question / Issue	Additional information	Status: OK/Yes/No /Not Applicable	Notes and results of checks
53	Are there aerodrome pairs with a fuel consumption of less than 2.5 tonnes per flight?	Calculation is: fuel consumption of respective aerodrome pair divided by amount of flights. In case of fuel consumption less than 2.5 tonnes per flight get back to aeroplane operator. This refers to all reported aerodrome pairs.		
54	Random calculation of average fuel consumption per flight (per aerodrome pair) and comparison with typical average consumption from the ICAO CORSIA CERT.	The ICAO CORSIA CERT should be consulted for cross-checks. Typically used aeroplane type can be obtained from public flight tracking data bases or official flight plans of the aeroplane operator.		
55	Other defects/ comments?			
	Data gaps			
56	Did data gaps occur during the reporting year?	If yes, detailed assessment of the State required.		
57	Is the applicable threshold of 5 per cent for significant data gaps exceeded?	If yes, which explanations have been provided by the verification body and the aeroplane operator?		
58	Has the operator closed/completed data gaps according to the Emissions Monitoring Plan?	A comparison with the method described in the Emissions Monitoring Plan must be carried out.		
59	Have data gaps been closed even though secondary data were available?	If secondary data is available, this data has to be used to close data gaps.		
60	Is the estimated fuel consumption plausible?	The ICAO CORSIA CERT can be used to perform random checks.		
61	Did the operator indicate that data gaps occurred during the reporting year, but did not report data gaps?	If so, get back to aeroplane operator.		
62	Other defects/ comments?			
	Verification body			
63	Does the verification body have a valid accreditation?	A comparison with the published list of ICAO must be carried out. The verification body will be accredited. Otherwise, the Emissions Report does not meet the requirements of Annex 16, Volume IV.		

No.	*Question / Issue*	*Additional information*	*Status: OK/Yes/No /Not Applicable*	*Notes and results of checks*
64	Have all the indications and notes of the verification body been considered?	It is important to pay close attention to the details given in the Verification Report.		
65	Are there any negative assessments from the verification body?	If so, check whether the issues identified affect the amount of reported emissions.		
66	Has the verification body not issued a statement, or issued a negative verification statement? Is the report verified as “not satisfactory”?	The reasons must be examined in depth. Contact the aeroplane operator.		
67	Was the verification statement issued during the underlying reporting period already?	If so, the reasons have to be clarified with the verification body. It is necessary to check whether the verification body verified the entire reporting year.		
68	Has the verification body issued a satisfactory verification opinion with comments?	The verification comments must be examined in depth.		
69	Is the content provided in the Verification Report sufficient? Size of data sample and verification programme sufficient?	It is necessary to determine whether the verification body carried out a proper and complete verification.		
70	Is there any evidence that the verification body violated the principle of independence? e.g. has the verification body supported with the Emissions Monitoring Plan? Has the verification body provided support in drafting the Emissions Report?	It is important to inform the responsible accreditation body.		
71	How is the quality of the verification body assessed?	A rating (good, medium, poor) is useful. Contact with verification body if necessary. It is important to provide feedback to the responsible accreditation body about the performance of verification bodies.		
72	Other defects/ comments?			
	Change of data by State			
73	Change of data necessary?			

No.	Question / Issue	Additional information	Status: OK/Yes/No /Not Applicable	Notes and results of checks
74	Changing of general data?	If so, this must be documented. The aeroplane operator should be informed.		
75	Have emissions-relevant data been changed?	If so, these must be documented. The aeroplane operator is to be informed in any case.		
76	Other defects/ comments?			
	Communication with aeroplane operator			
77	Hearing necessary?			
78	Content of hearing			
79	Has hearing been sent?			
80	Date of hearing, date of sending			
81	Deadline for reply			
82	Hearing conclusions			
	Communication with verification body			
83	Hearing necessary?			
84	Content of hearing			
85	Has hearing been sent?			
86	Date of hearing, date of sending			
87	Deadline for reply			
88	Hearing conclusions			

3.3.5 Conducting the verification activities

It is anticipated that a typical verification will include:

a) the collection of evidence to support the Emissions Report through interviews and observation (site visits or remote verification techniques);

b) review of the greenhouse gas information system and its controls; and

c) comparison of the implemented data flow, procedures, control activities and Fuel Use Monitoring Method against the requirements set out in Annex 16, Volume IV and the aeroplane operator's Emissions Monitoring Plan.

Before initiating the verification activities, however, it is important that the verification team understand the current status of the aeroplane operator's Emissions Monitoring Plan, and has built up a sufficient understanding of the aeroplane

operator's data flow, procedures and control activities, as detailed in the Emissions Monitoring Plan. These two important considerations are described in more detail below.

3.3.5.1 Status of the Emissions Monitoring Plan

The verification body will take the Emissions Monitoring Plan as the starting point to conduct verification activities. This includes an assessment whether the approved Emissions Monitoring Plan is in accordance with Annex 16, Volume IV and whether procedures described in the Emissions Monitoring Plan have been sufficiently implemented by the aeroplane operator (e.g. data flow and control activities). The verification body verifies the Emissions Report against the Emissions Monitoring Plan and assesses whether the Emissions Report is free from material misstatements and material non-conformities. If the aeroplane operator has based its monitoring activities on a not-yet-approved Emissions Monitoring Plan or an updated but not yet approved Emissions Monitoring Plan, the verification body will pay particular attention whether the Emissions Monitoring Plan is in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.2. This has to be considered a very rare situation. However, a State might not always be in the position to approve an update of an Emissions Monitoring Plan on short notice in situations where the aeroplane operator discovers the need for a change to clarify a description between the Emissions Monitoring Plan and the actually implemented process shortly before the verification. In such situations, the verification body has to check whether the changes in the Emissions Monitoring Plan are likely to be acceptable under Annex 16, Volume IV to avoid a verification on the basis of an Emissions Monitoring Plan which is later not considered to be in conformity with the CORSIA MRV requirements. The aeroplane operator should also be advised by the verification body to contact the State to clarify the situation. If an approved (or not yet approved) Emissions Monitoring Plan fails to provide sufficient scope or certainty to design the verification approach, the verification body might conclude that the Emissions Report cannot be verified. It is recommended that the verification body advise the aeroplane operator to immediately contact the State in such cases.

3.3.5.2 Understanding data flow

Data flow activities undertaken by the aeroplane operator should be defined in the Emissions Monitoring Plan along with primary data sources and the procedures controlling these data flows. It is essential that the verification body verify along the described data flows of the Emissions Monitoring Plan. The starting point of this verification activity is always the (external and internal) primary data source such as the fuel supplier invoices, fuel uplift statements, flight or technical logs, invoices from air navigation service providers, or ACARS messages. See Table 3-10 of additional examples of aviation data sources and related documentation.

Table 3-10. Aviation reference data sources and documentation

Examples	*Categorization*	*Technical explanation*	*Usability rating*
Airline software systems	Secondary internal data	— Operational data containing details on flights, loads, routing etc. — Includes already processed data — Potentially internal quality assurance against primary data	Medium-Low
Flight / technical logs and typically included data	Primary internal data	— Operational data containing details on flights, loads, routing etc. — High level of reliability as safety relevant — Flight logs can be completed manually (hand written) or automatically	High
ATC flight plan and OFP	Primary internal data	— Operational data needed to operate a flight; contains i.e., aeroplane identification, flight route details — Does not provide evidence on fuel consumption or whether the flight has indeed taken place or not	Medium
Air traffic control data and invoices	Primary external data	— Operational data containing flight details, aeroplane, routing including speed and altitude — Data generated by third party (ATC); high reliability with sufficient evidence whether a flight took place or not	High
Fuel invoices	Primary external data	— Invoice from the fuel supplier (per flight) — Cross check with accounting data possible — Can be used for cross-checking fuel uplift e.g. with data contained in flight/ technical logs and airline software systems	High
Fuel slips	Primary external data	— Transaction document (per flight) — Can be used for cross-checking fuel uplift and (sometimes) density e.g. with data contained in flight/ technical logs and airline software systems	High
Maintenance /downtime records	Primary and secondary internal data	— Documentation/information in diverse forms, which document the block-off hours of each specific aeroplane due to maintenance or other down-time reasons — Maintenance reports might be necessary to track effects like emptying of tanks or longer periods of inactivity of a specific aeroplane due to technical reasons	Medium

Examples	*Categorization*	*Technical explanation*	*Usability rating*
Fuel density records	Primary external data	— Usually supplied by external source (e.g. into plane agent, tank farm) — Density sometimes also included in fuel slip — Assessment of actual measuring method important	High
Blend tickets		— Information concerning the blending of CORSIA eligible fuels located within the fuel's associated Certificate of Analysis or Refinery Certificate of Quality (RCQ)	
Sustainability documentation		— Information concerning CORSIA eligible fuels.	
Reports generated for other purposes, e.g. sustainability report	Secondary internal data	— Reports might have undergone data quality checks and verification	Medium
Wet lease agreements	Primary internal data	— Including specific CORSIA related information such as provisions on forwarding of fuel and emissions calculations to the lessor	High
Air operator certificate (AOC)	Primary external data	— A certificate authorising an operator to carry out specified commercial air transport operations (ICAO Annex 6) — Usually includes fleet information	High
Flight plans	Primary internal data	— Needed to operate a flight; contains i.e., aeroplane identification, route details — Planning document only — Does not provide evidence on fuel consumption or whether the flight has indeed taken place or not	Low-Medium

The verification body should build up a clear understanding of the actual relation of these primary data sources to the data flow, the information system and the data and information handling procedures contained in the Emissions Monitoring Plan (including any intermediate steps such as processing of the data, rounding of data, and interfaces between different IT systems). To assess the inherent risk, the verification body should assess whether the responsible staff of the aeroplane operator demonstrates a sufficient level of knowledge and experience with the specific data flow activities.

After a sufficient understanding of the data flow has been achieved, specific emphasis should be given to assessing the procedures controlling the data flows in order to ensure their actual implementation and their effectiveness. This includes, but is not limited to, assessing procedures documented in the Emissions Monitoring Plan related to attributing flights, tracking the fleet and fuel consumption, tracking flights and their status within CORSIA, and handling data gaps, to name but a few.

3.3.5.3 Assessing the GHG information systems and controls

The procedures for controlling data flows are defined by the aeroplane operator and included in the Emissions Monitoring Plan. The objective is to ensure the quality of the data and to avoid bias in data processing that can lead to misstatements and non-conformities. In assessing controls, the verification body will compare the implemented control activities against the requirements set out in Annex 16, Volume IV and the aeroplane operator's Emissions Monitoring Plan to ensure these:

a) are present and properly documented and retained;

b) reflect the information listed in the summary of the procedures in the approved Emissions Monitoring Plan;

c) have been correctly implemented and are up to date;

d) are applied throughout the year; and

e) are effective to mitigate the inherent and control risks.

To check an appropriate implementation of control activities as described in the Emissions Monitoring Plan, the verification body should develop a list of practical examples while accessing primary data sources. On the basis of these examples, interviews with responsible staff of the aeroplane operator can be conducted and/or the behaviour of automatic or manual control activities can be observed. Moreover, the inspection of internal documentation (e.g. internal audits such as the pre-verification approach or procedural instructions) might support the verification body to assess the reliability and robustness of control activities.

Within CORSIA it is recommended to especially check the following control activities (including frequency, effectiveness with regard to their implementation, whether they are carried out manually or automatically, different responsibilities for data flow / processes and control activities, and sufficient documentation):

a) Quality assurance and procedures for updating State pairs with and without offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 3, 3.1;

b) Data filters to identify abnormal or obviously incorrect primary data such as unreasonably low average fuel burns, technically not feasible fuel uplifts, or questionably long downtimes;

c) Control activities for avoiding the use of data gap procedures despite the fact that alternative primary data may be available;

d) Existing control activities to ensure the consistency and completeness of the flight plan per aeroplane registration (e.g. following a flight from aerodrome A to aerodrome B, and checking that the following flight indeed departs from aerodrome B and not aerodrome C), including the use of invoices from air navigation service providers; and

e) Effectiveness of control activities in place for any outsourced processes.

After analysing the effectiveness of the control activities and together with the inherent risks related to the data flow activities as described in (a), the verification body has to assess the overall risk for misstatements and non-compliances in the aeroplane operator's Emissions Report. New observations have to be reflected in the risk analysis and in the verification plan.

Testing of IT controls

Data on aviation emissions will, most of the time, be collected and analyzed by means of the aeroplane operator's IT system. Against this background, IT systems play an important role in complying with the CORSIA requirements. Therefore, assessing IT related risk is an essential task for the verification body. IT systems consist of hardware, software, IT environment/organization, IT based processes, IT applications as well as IT infrastructure. IT system related risks can be subdivided as follows:

a) Risks associated with IT infrastructure refer to the vulnerability to interference and breaches of information security. This may lead to an increased risk for the collation, transfer, processing, analysis, aggregation, storage and reporting of data;

b) Risks concerning IT applications relate to a malfunctioning of these applications, a lack of backup procedures, a lack of input controls, process controls as well as output controls, and possible software coding or scripting errors;

c) Risks related to IT processes include a lack of data-flow transparency (black boxes), a malfunctioning of the interface(s), the general risk that control measures only address part of the process, and IT system failures. The latter risk may lead to a failure in data collecting from automated monitoring equipment during the time of the IT system break-down; and

d) Human errors may, of course, also lead to risks associated with the aeroplane operator's IT system. For instance, deleting current emission data by mistake.

It is important that the verification body have a good understanding of the potential risks associated with the aeroplane operator's IT system for complying with the CORSIA requirements. Verification bodies also need to consider whether the IT system and processes are being managed under an effective IT Management System such as ISO/IEC 20000 (ISO /IEC 20000-1:2011 "Information Technology -- Service Management -- Part 1: Specification"; and ISO /IEC 20000-2:2012 "Information Technology -- Service Management -- Part 2 -- Code of Practice". Also, the appropriate use of calculation formulae and access controls, the possibility of recovering data, continuity planning and security with respect to IT will have to be taken into account by the verification body.

The verification body checks the control measures implemented in the IT system and electronic interfaces to provide for:

a) timeliness, availability and reliability of data;

b) the correctness and accuracy of data, e.g. to avoid, among other things, double counting;

c) the completeness of data;

d) the continuity of the data to avoid data being lost and to ensure traceability of data;

e) access rights: i.e. who has the right to access and modify data; and

f) the integrity of data: i.e. to ensure that data are not modified by unauthorized persons.

These measures could include a manual check on whether the IT system is functioning and whether the aforementioned points are met. It will include control activities and maintenance tools built into the IT system such as access controls, backups, recovery, continuity planning, change management and security. The type of testing carried out by the verification body depends on whether these control measures are manual or electronic.

Testing of outsourced processes by the verification body

Even though many parts of the data flow can be outsourced to third parties in principle, the aeroplane operator remains responsible for the data resulting in the Emissions Report. Activities such as flight planning are in fact outsourced by many commercial aeroplane operators. Therefore it is important that the aeroplane operator controls the quality of these activities.

In this respect, the verification body has to investigate two questions: Firstly, to what extent has a certain data flow activity been outsourced by the aeroplane operator? Secondly, how does the aeroplane operator control that its service providers carry out their activities in accordance with the necessary quality? The latter refers to conducting tests for e.g. assessing the procedures for procurement, internal audit (including the frequency of audits), carrying out plausibility checks on the data, checking service level agreements with fuel suppliers, instrument engineers, checking how an aeroplane operator ensures that its service providers carry out their activities according to the service level agreement, etc.

3.3.5.4 Assessing CO_2 emissions data and information

The emissions data and information are usually assessed at the same time as the information system and controls, in accordance with the verification and sampling plans. If any issues that have the potential to lead to an error, omission or misrepresentation are identified during the collection of evidence, the sampling and testing activities can be amended to gather more evidence. For example, if one data sample proves to have discrepancies, the sample number may increase for the data set.

Examples of things to consider when assessing the data and information include:

a) Completeness, consistency, accuracy, transparency, relevance and conservativeness of the greenhouse gas information, including raw data;

b) Application of the Annex 16, Volume IV emissions monitoring and reporting requirements by the aeroplane operator in accordance with the Emissions Monitoring Plan; and

c) Maintenance and calibration programme for measurement and monitoring equipment.

The verification body should be aware that verifications within the CORSIA involve large amounts of data. Depending on the monitoring method (and other factors) more than 10 data points per flight can be needed to calculate CO_2 emissions and attribute these emissions correctly within CORSIA. Consequently, actual data verification by using analytical procedures should always be the dominating part of the entire verification engagement. This also includes the check between primary data (e.g. fuel invoice or uplift statement) against corresponding data in the IT systems of the aeroplane operator. The sampling technique and method (number of samples) is based on the results of the risk analysis which has to be adjusted if for instance the samples reveal an insufficient data transfer process between the primary data and the corresponding value in the IT systems of the aeroplane operator (whose values do not match). The sampling has to be representative of the overall population (reporting year and control activities in place). The sample size will be stated in the Verification Report. It is highly recommended to use computer assisted auditing techniques and not rely solely on samples.

Despite the comparison between primary data and the data included in the IT system (and later processed in the Emissions Report) of the aeroplane operator, it is important to also develop an understanding of the data quality of all data which will be used to calculate the emissions figures in the Emissions Report. Therefore, it is absolutely essential that the verification body have a sufficient understanding and also practical experience in applying analytical procedures to large datasets. In most cases it will be necessary that the verification body request the aeroplane operator to provide an export file of all relevant data from the IT system of the aeroplane operator in order to apply cross and consistency

checks. Verification bodies should develop a set of standard cross checks already implemented in an appropriate spreadsheet software. This allows verification bodies to instantly calculate key indicators regarding data quality and consistency by simple copy paste of data in the spreadsheet software. Data supplied by the aeroplane operator can be split into separate files if the spreadsheet software is not capable of processing large amount of data sets. The verification body should invest a sufficient amount of time in developing its own appropriate cross checks, this can include for example:

a) Calculation of average fuel burns and applying them on individual flights as reference (check whether maximum, minimum and average fuel burn per hour is reasonable or can be explained by aeroplane operator);

b) Maximum tank capacity and uplift per flight;

c) Average fuel burn according to aeroplane age;

d) Calculation of average densities, including graphical representation to identify any data pattern, average fuel density at specific aerodromes and potential deviations;

e) Expected fuel burn for data gaps in comparison to estimated emissions;

f) Tracking of aeroplane registrations within the aeroplane operator's data to check consistency of data;

g) Use of data (e.g. invoices) from air navigation service providers if available in a digital format; and

h) Checks to ensure the correct set of State pairs included in the offsetting requirements of the CORSIA.

3.3.5.4.1 Fleet and operations data

Critical to the verification is confirmation that the aeroplane operator has correctly identified all of its international flights for accounting purposes in the CORSIA. Verification of the flight data set should include:

a) Comparing the fleet provided in the Emissions Report, and therefore being used to track CORSIA-related flight activities, with the information of the applicable air operator certificate(s) throughout the reporting period;

b) Identification of lease agreements within the reporting year and their impact on the reported emissions, including contractual beginning and end of lease, cause for lease, responsibilities, data transfer, and applicable control procedures;

c) Systematic cross-checks with air traffic control invoices;

d) Confirmation of the attribution method used by the aeroplane operator to ensure that all international flights during the reporting year have been appropriately accounted for including data filters or procedures used to determine the correct offsetting requirements under the CORSIA for a specific year (included and excluded State pairs);

e) Confirmation that the aeroplane operator has correctly applied technical exemptions, including internal attribution of specific flight service types such as humanitarian and medical which qualify for an exemption under the CORSIA, are assigned correctly and in accordance with the Annex 16, Volume IV. Data filters used for exempted flights are working properly; and

f) Evaluating the completeness and accuracy of the data set.

Further considerations related to each of these are detailed below.

Reported aeroplane fleet

The verification team should compare the fleet of aeroplanes reported in the Emissions Report with that reported in the Emissions Monitoring Plan for the purpose of identifying any major differences between the two. For the most part, differences are expected and would not be considered material. If a major difference is identified, for example, where very few of the aeroplane listed in the approved Emissions Monitoring Plan appear to have been used during the actual reporting year, the verification body should investigate further. Both commercial fleet databases and free solutions available online may help building up confidence in the actual fleet size and composition.

Flight attribution

The verification body must confirm that all flights have been accounted for and attributed appropriately to the aeroplane operator. In this context, it is important to check that all flights are included in the reporting. As a basis for such a check, the verification body must understand how flights are to be attributed to aeroplane operators in the CORSIA framework.

The Emissions Monitoring Plan requires that aeroplane operators specify the means for having its international flights attributed to it. Accordingly, the Emissions Report should specify any differences from the Emissions Monitoring Plan. Two potential means of flight attribution are possible. These are as follows:

a) ICAO Designator: where the ICAO Designator (or Designators) is used in Item 7 of the operator's flight plans as means for flight attribution. It should be noted that more than one ICAO Designator may only be used by an aeroplane operator in exceptional cases where the State has explicitly approved this; and

b) Registration marks: where the operator does not use an ICAO Designator, but rather, uses the nationality or common mark, and the registration mark of the aeroplane in Item 7 of the flight plan as a means for flight attribution. This option requires that the operator possess an AOC and that a copy of this AOC be provided with the Emissions Monitoring Plan to the State.

Using a risk-based approach, the verification body should conduct verification activities focused on testing the accuracy and reliability of the attribution method used by the aeroplane operator to ensure that all international flights during the reporting year have been appropriately accounted for. This includes access to the aeroplane operator's flight operations management software and databases, interviews with responsible staff of the aeroplane operator, as well as cross-checks with air traffic control invoices.

In the context of aeroplane designation, the verification body should be aware of the following:

a) In many cases, persons or firms are shown as (business) aeroplane owners in a State's aeroplane register. These may not be the actual aeroplane operator;

b) An aeroplane registration may be shown on more than one Emissions Report, as the aeroplane concerned may be operated by a number of aeroplane operators during the same year;

c) Some State aeroplane registries reissue aeroplane registrations during the year. It is therefore possible for more than one aeroplane to carry the same registration during a reporting year;

d) An aeroplane operator with a wholly owned subsidiary aeroplane operator that is legally registered in the same State can be treated as a single consolidated aeroplane operator liable for compliance with the requirements under CORSIA. If such a consolidated approach is taken for a group of carriers, verification has to be conducted at the group level and not at the individual aeroplane operator level; and

e) Leasing arrangements including code sharing, dry leasing, wet leasing and long or short term leasing should have no bearing on flight attribution. The ICAO Designator in Item 7 of the flight plan or, if the ICAO Designator is not available, the registration mark of the aeroplane is the determining factor for assessing whether a flight falls under the responsibility of an aeroplane operator to monitor and report on that particular flight. If it cannot be determined by the ICAO Designator or the registration mark that a particular flight falls under the responsibility of an aeroplane operator, the flight should be allocated to the owner of the aeroplane.

Data set completeness and accuracy

An important verification activity includes assessing the completeness of the reported flight data set to provide assurance that the aeroplane operator has appropriately accounted for its international flights in its Emissions Report. This requires access to the aeroplane operator's traffic data, and may also be assisted by timetable data and other data on aeroplane operator's traffic from e.g. air traffic control sources. It should be noted that timetable and other data submitted within the CORSIA framework (Emissions Monitoring Plan, Emissions Report) may not always be a perfect match, (e.g. because data from external providers may not be totally aligned with the applicability requirements of Annex 16, Volume IV, because a flight included in a timetable may not actually be operated on a given day or because the geographical scope of external data may not be fully consistent with the geographical scope of the CORSIA). The verification body also needs to check the procedures and control activities that the aeroplane operator has in place to ensure completeness of flights.

Short-term aeroplane leasing arrangements (either dry or wet leased) can increase the verification risk depending on their complexity. Hence, the verification team should be aware of any leasing arrangements and should confirm that international flights using leased aeroplane are appropriately accounted for in the Emissions Report. In general, the collection of data by the aeroplane operator is regulated through the leasing agreement.

During the verification, the verification body will check the control activities the aeroplane operator has in place to ensure accurate data is transferred (e.g. leasing agreements, cross-checks on manual input of collected data in internal systems, electronic interface if IT systems are used etc.). To ensure reproducibility of the determination of the emissions by verification bodies or the State, the aeroplane operator will ensure that data on the leased aeroplane is documented.

Application of technical exemptions

Annex 16, Volume IV, Part II, Chapter 2, 2.1 defines the scope of applicability of MRV requirements and also includes specific exemptions. During the verification, the verification body has to check whether the aeroplane operator has indeed applied the scope of applicability and exemptions correctly. It is not sufficient to just rely on the applied filters in the flight database to identify or mark specific flights that are outside the scope of applicability. The aeroplane operator

should be able to provide procedural instructions on how flight service types (e.g., medical) are being attributed to specific flights. The verification body has to check whether these procedures and the corresponding understanding is in accordance with the requirements of Annex 16, Volume IV. In very rare cases there might be the need to define additional flight service types. Interviews in the control centre of the aeroplane operator might support to gain sufficient evidence that staff applies flight service types correctly.

3.3.5.4.2 Detailed assessment of Fuel Use Monitoring Methods (as described in Annex 16, Volume IV, Appendix 2) applied by the aeroplane operator

Given the ability to choose from different Fuel Use Monitoring Methods as described in Annex 16, Volume IV, Appendix 2, the verification body should not only ensure the correct application of the method(s) but also verify that the chosen approach is appropriate in terms of data availability and robustness given the unique operating environment of the specific aeroplane operator. In this regard the verification body can, if deemed useful and if data is sufficiently available, use other Fuel Use Monitoring Methods as described in Annex 16, Volume IV, Appendix 2 to cross-check whether the reported emissions are reasonable. Some additional CORSIA and aviation specific details are given underneath.

General

a) The verification body has to evaluate whether the aeroplane operator applies the Fuel Use Monitoring Method(s) correctly throughout the entire fleet and different aeroplane types, as specified in the Emissions Monitoring Plan. This also includes whether ACARS triggers used for the CORSIA are identically set on different aeroplane types (if applicable and if not specified differently in the Emissions Monitoring Plan). This also has to be evaluated for leased aeroplanes (e.g. wet leasing, short-time arrangements);

b) Annex 16, Volume IV, Appendix 2 does contain specific limitations on what can be defined as block-off and block-on values under the CORSIA. It is the responsibility of the verification body to assess whether the actual measurement points are within the applicable definitions;

c) Different systems of the aeroplane operator might contain different values regarding the block-off and block-on fuel, fuel uplift, block hours, and density values for precisely the same flight. It is the responsibility of the verification body to determine the actual value which is closest to the true value;

d) IT systems might include provisions for rounding when processing data into the next application (e.g. emissions module). It is the responsibility of the verification body to determine the impact of this rounding;

e) The verification body should check whether the block hour calculation follows the definitions as outlined in Annex 16, Volume IV, Appendix 2, especially with regard to the definitions of block-off and block-on; and

f) The verification body should make use of other potential data sources to cross-check the general plausibility of the total fuel consumption determined by the application of a Fuel Use Monitoring Method. This could include cross-checking the total fuel consumption as purchased from financial accounting systems versus total fuel consumption as recorded from flight operations systems.

Method A and Method B

a) Due to the complexity of this Fuel Use Monitoring Method, the verification body should assess in detail whether the aeroplane operator has indeed applied the method correctly. This especially refers to Method A as the value 'fuel in tanks once fuel uplift is completed' is a rather unusual data point in aeroplane operations which should not be mistaken with the far more common block-off fuel.

b) Due to the high number of data points per flight required to calculate the fuel consumption, these fuel monitoring methods are rather error prone.

c) The verification body should evaluate whether the actual quality of data, data flows and processes of the aeroplane operator indeed allow for the application of this Fuel Use Monitoring Method.

d) Potential results of the above assessment should be reflected in the risk analysis.

Block-off / Block-on

a) This Fuel Use Monitoring Method does include data points which are commonly used in aeroplane operations.

Fuel Uplift

a) The verification body should give special attention to the actual data source used to determine the fuel uplift. Different options (e.g., fuel slip vs. fuel uplift) may be available.

b) The verification body should make use of accounting information.

c) The verification body should evaluate if the distribution of fuel uplifts in case of flights without fuel uplift is applied in accordance with Annex 16, Volume IV, Appendix 2, 2.5.

Fuel Allocation with Block Hour

a) The average fuel burn ratio (AFBR) is critical for the determination of the total fuel consumption (small deviation has a large impact on the total emissions). Therefore, it is essential that the verification body thoroughly checks the correct determination of the AFBR. This includes the assessment whether the AFBRs have been indeed determined by using actual data from the current reporting year.

b) The verification body might use the Fuel Uplift monitoring method to cross check calculation results as this fuel monitoring method is implicitly included in the fuel allocation with Block Hour method.

3.3.5.4.3 Detailed assessment of fuel monitoring methods applied by the aeroplane operator (ICAO CORSIA CERT)

Annex 16, Volume IV, Appendices 2 and 3 provide Fuel Use Monitoring Methods and CO_2 Estimation methods (implemented in the ICAO CORSIA CERT), respectively. Fuel Use Monitoring Methods as described in Annex 16, Volume IV, Appendix 2 must be used by aeroplane operators that have annual CO_2 emissions equal to or greater than the specified threshold for the 2019-2020 period and for the 2021-2035 periods. Aeroplane operators whose annual CO_2 emissions fall under this same threshold have the option of using the ICAO CORSIA CERT. Annex 16, Volume IV, Part II, Chapter 2, 2.2.1 also specifies the procedures that the aeroplane operator must follow when the threshold is crossed

in any one year. For this reason, a key verification activity involves confirming that the aeroplane operator continues to be eligible for the monitoring method it is using, as approved in its Emissions Monitoring Plan. If the aeroplane operator crosses the thresholds for eligible monitoring methods, the verification body must check that the aeroplane operator continues to be in compliance with the requirements related to changing monitoring methods, as specified in Annex 16, Volume IV, Part II, Chapter 2, 2.2.1. Additional guidance relating to the thresholds as specified in Annex 16, Volume IV, Part II, Chapter 2, 2.2.1 and its interpretation is provided in section 3.1.

If the verification body finds that an aeroplane operator using the ICAO CORSIA CERT was not eligible to use the tool in accordance with Annex 16, Volume IV and the approved Emissions Monitoring Plan, it should immediately halt the verification and advise the aeroplane operator to contact the State for further guidance.

The verification body should first check the aeroplane operator's eligibility to use the ICAO CORSIA CERT i.e., for the 2019-2020 period, that its annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1, are less than 500 000 tonnes; and for the 2021-2035 period, that its annual CO_2 emissions from international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 3, 3.1, are less than 50 000 tonnes. For aeroplane operators using the ICAO CORSIA CERT, the verification body should evaluate the correct application of the ICAO CORSIA CERT to estimate emissions (e.g. by carrying out interviews with responsible staff of the aeroplane operator).

3.3.5.4.4 Checking fuel density

If the fuel in tanks and fuel uplift is measured in volumes, the aeroplane operator has to use a fuel density value (actual or standard) to convert these volumes to mass. Within the CORSIA, every measurement of fuel in tanks performed by the aeroplane operator to determine the mass of fuel does not need special attention by the verification body as it is assumed that such safety critical (maintenance) aspects have been sufficiently addressed by the responsible national aviation authority. Consequently, the verification body should focus its activities on verifying the CORSIA density requirements regarding fuel uplift, as described in Annex 16, Volume IV, Part II, Chapter 2, 2.2.3 and specified in the aeroplane operator's Emissions Monitoring Plans, have been correctly applied according to the aeroplane operator's standard operating fuel data management procedures regarding density. The verification body will check whether the same fuel density values used for actual aeroplane operations are being applied in determining fuel mass for reporting purposes under Annex 16, Volume IV.

3.3.5.4.5 Assessing handling of data gaps for aeroplane operator using Fuel Use Monitoring Methods as described in Annex 16, Volume IV, Appendix 2

If relevant data for the calculation of the aeroplane operator's emissions for one or more flights are missing or unreasonable, the aeroplane operator must use secondary data as described in the approved Emissions Monitoring Plan (e.g. data from paper records instead of automatically transmitted ACARS data items) to close the data gaps. If this should not be possible, the aeroplane operator will estimate the emissions according to the approved ICAO CORSIA CERT as described in Annex 16, Volume IV, Appendix 3. The verification body has to check whether the procedures described in the Emissions Monitoring Plan are sufficiently established at the aeroplane operator to allow the use of secondary data, whether the ICAO CORSIA CERT has been applied correctly, and whether the total amount of estimated data gaps exceeds the applicable threshold of 5 per cent, as described in Annex 16, Volume IV, Part II, Chapter 2, 2.5. In such cases the verification body has to evaluate whether the given explanations of the aeroplane operator in the Emissions Report are detailed enough to allow an assessment by the State on whether the data gaps were inevitable from a technical or commercial point of view, and what activity may have been initiated to reduce the number of data gaps below 5 per cent in future Emissions Reports. The provided details should also serve as a basis for the State to assess whether the Emissions Monitoring Plan of the aeroplane operator will need to be updated.

A specific data gap occurring several times over a longer period of time may also show that the control activities of the aeroplane operator are not functioning correctly. The verification body has to therefore assess the frequency of specific

data gaps and the effectiveness of control activities implemented to avoid these data gaps. The verification body needs to assess whether the control activities are effective (e.g., whether IT systems, automatically transferring data, are secure and functioning properly, or whether the aeroplane operator has built in manual controls to ensure that no data gaps occur).

3.3.5.5 Use of CORSIA eligible fuels

In accordance with Annex 16, Volume IV, Part II, Chapter 3, 3.3, aeroplane operators may claim emissions reductions from the use of CORSIA eligible fuels that meet the CORSIA Sustainability Criteria as defined within the ICAO Document entitled "CORSIA Sustainability Criteria for CORSIA eligible Fuels" that is available on the ICAO CORSIA website. These CORSIA eligible fuels can be produced and uplifted anywhere in the world. However, to be eligible for recognition under the scheme, the total volume of CORSIA eligible fuel purchased must satisfy reporting requirements, in accordance with Annex 16, Volume IV, Part II, Chapter 2 and Annex 16, Volume IV, Appendix 5.

In general, verification bodies are not expected to audit the CORSIA eligible fuel producers directly. Focus should be on confirming that the sustainability documentation provided by the fuel producers through the aeroplane operator is reliable and from CORSIA approved Sustainability Certification Schemes, and that the reported batch volumes/mass are reasonable and align with Certificates of Analysis and other supporting internal and external documentation (e.g., invoices, delivery documentation).

A verification body should assess aeroplane operator controls ensuring that the fuel they are purchasing meets CORSIA sustainability criteria. Any concerns with the sustainability certification or amount of fuel purchased should be flagged to the aeroplane operator, whom should request the producer to allow access to additional records for the purpose of the verification (right to audit provision). In most cases this will only involve the exchange of additional information such as certification report or internal audit documents. An on-site visit by a verification body would only be expected in extremely rare cases where the CORSIA eligible fuel claim is large but the gathered evidence very limited.

Although the aeroplane operator and verification body should have access rights to this information, auditing of fuel producers should only be conducted on an "as needed" basis and should not be considered a regular activity within the verification.

The assessment of verification risk should focus primarily on the risk associated with any gaps between the underlying sustainability certification scope and the required scope to gather sufficient evidence for the accounting for an emissions reductions claim within the CORSIA. This includes:

a) The assessment of potential risks due to the potentially limited certification scopes of CORSIA eligible fuels used, which result in procedures outside the responsibility of the aeroplane operator that are not subject to a third party oversight and analysis whether the aeroplane operator takes part in any other voluntary or mandatory scheme with the option to claim CORSIA eligible fuels. As with all other risk related evidence gathered, it is necessary to adjust the verification plan regarding data requirements (e.g., contact with CORSIA eligible fuel producer necessary or not). A verification body should take verification and certification statements from other accredited bodies into account.

b) Based on the identified need for documentation as per (a) above, the verification body should assess whether the aeroplane operator has all required internal and external documentation associated with CORSIA eligible fuels claim available (documentation complete).

c) Data analysis to confirm that all fuels documentation is correct for the full emissions reductions claim:

    1) Confirm fuel type(s)/pathway(s) identified is eligible under the CORSIA;

2) Confirm correct life cycle emissions value(s) identified and applied;

3) Review an aeroplane operator's data flows, procedures, control activities (standalone for CORSIA eligible fuels or combined with other aviation fuels), access internal audit documentation where available;

4) Cross-check volumes and/or mass of CORSIA eligible fuels claimed with purchase agreements, invoices, delivery documentation, certificates of analysis, acknowledgements of receipts, etc.;

5) Identify whether the aeroplane operator has sold any batches of CORSIA eligible fuels and ensure that appropriate control activities are in place;

6) Confirm with sufficient evidence that the CORSIA eligible fuels satisfy the CORSIA Sustainability Criteria and is reliable for each CORSIA eligible fuels claim:

i) Fuel producer satisfied the criteria at the time of batch production;

ii) Certification was valid at the time of batch production;

iii) Aeroplane operator controls to monitor status of certification are appropriate and sufficient;

iv) Undertake mitigation measures according to the risk assessment in (a) above (e.g., contact with CORSIA eligible fuels producer, access to internal audit reports).

d) Confirm that emission reductions calculation is correct and in accordance with Annex 16, Volume IV, Part II, Chapter 3, 3.3.

e) Confirm that there are no indications that claimed batches have been claimed by the aeroplane operator under any other schemes it has participated in during the current compliance period, as well as the compliance period immediately preceding it:

1) Checking declarations by aeroplane operator on other schemes it participated in within the current, and previous compliance period (internal documentation, however also externally available information such as sustainability report);

2) Seeking additional paperwork/info from aeroplane operator related to claims made under these other programmes and cross checking with the claim;

3) If available, cross-checking the claim with relevant information from the other scheme about the claim made by the aeroplane operator (i.e., public info about the aeroplane operator's claim, any associated fuel registry etc.); and

4) Following any additional guidance from the State on how to check this element within State.

3.3.6 Completing the verification

In order to form a conclusion on whether in all material respects, the amount of emissions stated in the Emissions Report is fairly presented and quantified in accordance with Annex 16, Volume IV and the Emissions Monitoring Plan, the following must be considered:

a) The appropriateness and sufficiency of the evidence;

b) The verification objectives, scope and criteria;

c) The adherence of the aeroplane operator to the Emissions Monitoring Plan and requirements in Annex 16, Volume IV; and

d) The materiality of any identified misstatements/discrepancies.

3.3.6.1 Misstatements and non-conformities

In general, two types of issues might appear in the process of verification: misstatements and non-conformities. A misstatement is an error, omission or misrepresentation in the aeroplane operator's Emissions Report while a non-conformity signifies any act or omission of an act that is not in accordance with the requirements in the Emissions Monitoring Plan approved by the State. A non-conformity may cause a misstatement if this non-conformity leads to errors, omissions or misrepresentations in the reported data.

Examples for misstatements within the CORSIA:

a) Missing flights in the sequence of flights;

b) Non addressed data gaps such as missing block-on fuel value or missing fuel uplift; and

c) Implausible data such as fuel uplifts larger than tank capacity, higher block-on fuel than block-off fuel, noticeably higher or lower fuel burn per flight in comparison to an average fuel burn, distinct patterns of applying standard density or filling data gaps, wrong units, etc.

Examples for non-conformities within CORSIA:

a) Incorrect application of the Fuel Use Monitoring Method;

b) Incorrect application of the ICAO CORSIA CERT to estimate CO_2 emissions;

c) Incorrect version of the Emissions Monitoring Plan used to draft Emissions Report; and

d) Required quality procedures not respected.

3.3.6.2 Assessing materiality

Similar to other GHG schemes, materiality refers in the CORSIA to the concept that individual misstatements and non-conformities, or the aggregation of them, could affect the correct amount of CO_2 emissions stated in the Emissions Report. A specific piece of information is considered to be material if, by its inclusion or exclusion, it can influence the emissions calculation or actions or decisions taken based on it. In other words, materiality is linked to the quality of the Emissions Report and therefore its acceptance.

The concept of materiality is included in all major GHG reporting methods and initiatives although some use slightly different terminology.

In order to reach an opinion on reported data or information, a verification body needs to form a view on the materiality of all identified misstatements and non-conformities. This is usually performed at the end of the whole verification process, and before drafting the verification statement. In the materiality assessment procedure all findings are evaluated and an analysis on any misstatements and non-conformities is conducted.

Materiality threshold

The materiality threshold in Annex 16, Volume IV establishes an acceptable percentage discrepancy between the declared amount of emissions in the Emissions Report and the verification body's estimation of the total amount of emissions. It is the point at which a discrepancy becomes material and therefore can influence any actions or decision taken. Figure 3-9 illustrates the materiality threshold concept in this context.

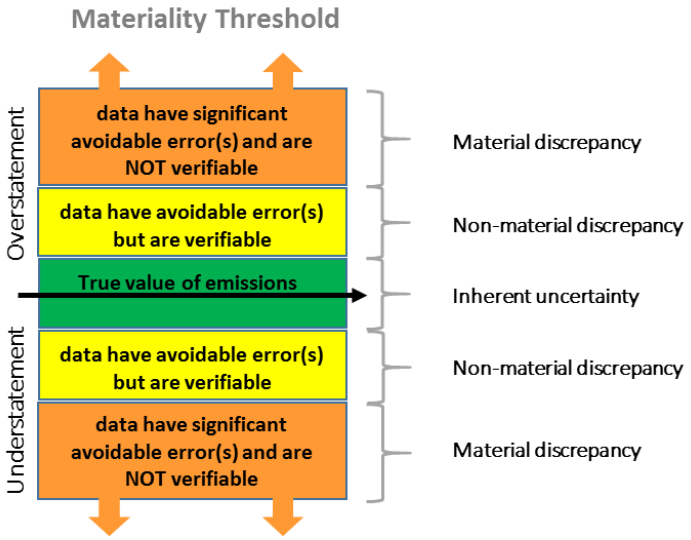


Figure 3-9. Illustration of the materiality threshold concept in the context of verification

When preparing a verification, this threshold must be defined in advance and serves as an indicator to the verification body to decide upon the question of whether a definitive conclusion can be drawn in order to provide a verification statement. It is important to note that a materiality threshold is not a permissible quantity of emissions that a company can exclude from its inventory.

In the context of the CORSIA, misstatements and non-conformities (including errors, omissions and misrepresentations) relate to all information that an aeroplane operator is required to submit in the Emissions Report. When misstatements in the data are present, additional information is required from the operator to resolve the issue. This information should be verifiable to confirm that any corrections made are valid. Otherwise, any misstatements and/or nonconformities must be evaluated as part of the materiality assessment to determine if, in aggregate, they exceed the defined materiality threshold.

Non-conformities can have some overlap with misstatements irrespective of whether they have a material effect. A material non-conformity is not dependent on the materiality threshold, but more on whether it directly affects the calculation of emissions or whether it is a more technical non-compliance such as an incomplete procedure, missing signature etc.

Application of the materiality threshold in the CORSIA

The following example shows how a verification body can calculate whether the materiality level has been exceeded. In this simplified example the Emissions Report contains only three flights.

Table 3-11. Illustration of calculation of materiality levels

Item	*Verification*	*Reported value*	*Verification body's value*	*Difference*	*Material?*
Flight 1	Incorrect fuel uplift	A	B	A-B = C	C/Z %
Flight 2	Correct	F	F	F-F = 0	0 %
Flight 3	Incorrect block-on fuel	I	J	I-J=K	K/Z%
Total		Z	X	Z-X=Y	Y/Z %

If the difference in value (error) between the aeroplane operator's reported value and the verification body's value is negative, then the original reported value was understated. If the difference value is positive, the original reported value was overstated. The total aggregated values of all differences (i.e. positive and negative values) is used by the verification body to assess whether the defined materiality threshold is exceeded or not.

On another example that regards flight information, the verification body can recreate an internal version of the report provided by the company using external information (e.g. information based on traffic recorded by air navigation service providers and invoiced to airline). The discrepancies between the verification body's report and the aeroplane operator's report are then assessed.

Limitations of the concept

Professional judgment must be exercised when evaluating the significance of issues with regards to materiality. This requires the verification body to have relevant knowledge and experience. This is important especially as misstatements and non-conformities can have a qualitative nature which means that it very much depends on the specific circumstances and the professional judgment of a verification body whether a misstatement or a non-conformity has material effect. In specific situations the materiality threshold might not be exceeded, however, the issues still might influence the decision of the State whether the Emissions Report can be accepted or not. This might be the case if the aeroplane operator does not follow the procedures of the approved Emissions Monitoring Plan or the Annex 16, Volume IV, or if systematic underestimation of emissions below the materiality threshold have taken place for several Emissions Reports submissions.

3.3.6.3 Completing the Verification Report and statement

If the Emissions Report includes non-material misstatement and/or non-material non-conformities, the Emissions Report will be 'verified as satisfactory with comments', clearly specifying the misstatements and non-conformities and confirming that these are non-material. This can be done in a list including an indication whether the root cause for a misstatement or non-conformity had been existing in previous reporting years as well.

If the Emissions Report contains material misstatements and/or material non-conformities or if the scope of the verification is too limited or the verification body is not able to obtain sufficient confidence in the data, the Emissions Report will be 'verified as not satisfactory'. In such cases it is recommended that the verification body advises the aeroplane operator to immediately contact the State. Potential examples for situations where the scope of verification is too limited are listed below:

a) Sufficient access to relevant information of the aeroplane operator is not granted or relevant information is not available; or

b) There is no Emissions Monitoring Plan available, or the Emissions Monitoring Plan does not contain sufficiently precise information (e.g., on the data gathering processes such that it remains unclear on which processes data contained in the Emissions Report is based).

3.3.7 After the verification

Facts discovered after the verification

Issues may come to the attention of the verification body that render a previously issued verification statement invalid or inaccurate. Although verification bodies are not required to actively monitor the validity of their verification statements after they are issued, where such issues are brought to the attention of the verification body, it must implement procedures to respond in accordance with ISO 14064-3 and ISO 14065. The verification body should also notify the State of the issue.

Records management

If a State becomes aware that a previously issued verification statement is rendered invalid or inaccurate, then the State may request access to the internal verification documentation on a confidential basis.

Chapter 4

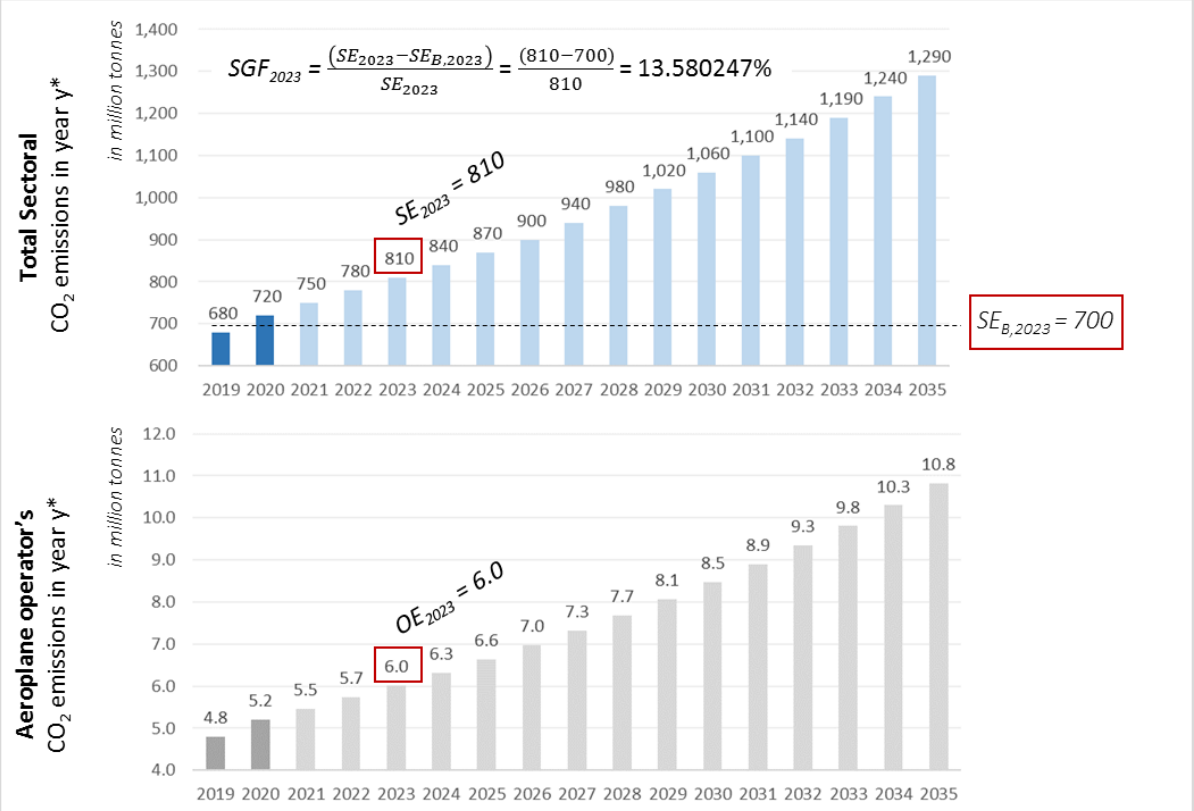
GUIDELINES ON CALCULATION OF OFFSETTING REQUIREMENTS

The information presented in this Chapter illustrates the calculations of CO_2 offsetting requirements, rounded up to the nearest tonne, as described in Annex 16, Volume IV, Part II, Chapter 3: "CO_2 offsetting requirements from international flights and emissions reductions from the use of CORSIA eligible fuels".

4.1 CALCULATION OF OFFSETTING REQUIREMENTS DURING THE 2021-2029 COMPLIANCE PERIODS

4.1.1 Case of 2021-2023 period

Figure 4-1 shows how a State would calculate an aeroplane operator's annual offsetting requirements during the 2021-2023 period (i.e., in 2023 for the purpose of illustration) if it chooses to use the aeroplane operator's CO_2 emissions in a given year.



** from flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 3, 3.1*

Illustration of calculation of offsetting requirements in year y e.g., 2023
(if the aeroplane operator chooses to use its CO_2 emissions in the given year y)

$$OR_{2023} = OE_{2023} * SGF_{2023} = 6\,000\,000 \text{ tonnes} * 13.580247\% = 814\,815 \text{ tonnes}$$

where:

OR_y = Aeroplane operator's offsetting requirements in the given year y;

OE_y = Aeroplane operator's CO_2 emissions covered by Annex 16, Volume IV, Part II, Chapter 3, 3.1 in the given year y; and

SGF_y = Sector's Growth Factor.

Figure 4-1. Illustration of calculation of an aeroplane operator's annual offsetting requirements during the 2021-2023 period (i.e., in 2023 for the purpose of illustration): Case of OE based on aeroplane operator's CO_2 emissions in a given year

Figure 4-2 shows how a State would calculate an aeroplane operator's annual offsetting requirements during the 2021-2023 period (i.e., in 2023 for the purpose of illustration) if it chooses to use the aeroplane operator's CO_2 emissions in 2020.

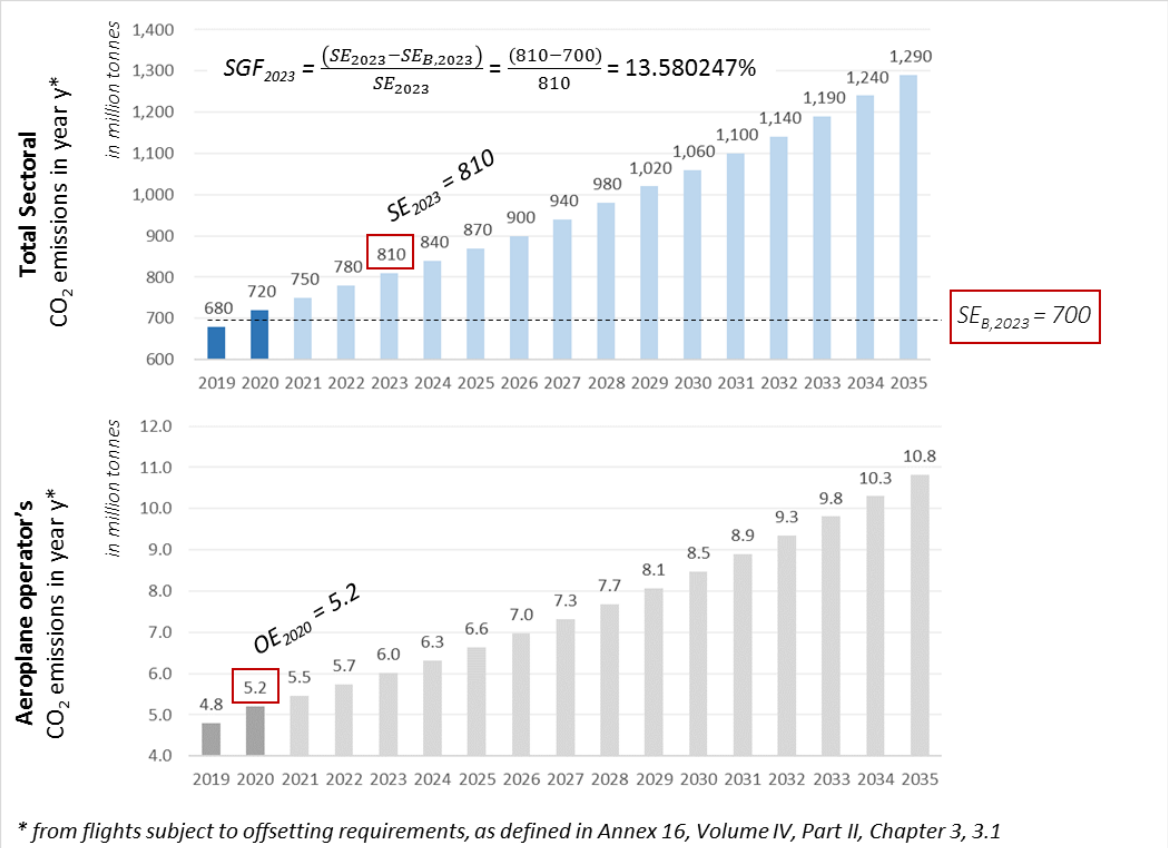


Illustration of calculation of offsetting requirements in year y e.g., 2023
(if the aeroplane operator chooses to use its CO_2 emissions in 2020)

$$OR_{2023} = OE_{2020} * SGF_{2023} = 5\,200\,000 \text{ tonnes} * 13.580247\% = 706\,173 \text{ tonnes}$$

where:

OR_y = Aeroplane operator's offsetting requirements in the given year y;

OE_y = Aeroplane operator's CO_2 emissions covered by Annex 16, Volume IV, Part II, Chapter 3, 3.1 in 2020; and

SGF_y = Sector's Growth Factor.

Figure 4-2. Illustration of calculation of an aeroplane operator's annual offsetting requirements during the 2021-2023 period (i.e., in 2023 for the purposes of illustration): Case of OE based on aeroplane operator's CO_2 emissions in 2020

4.1.2 Case of 2024-2029 period

Figure 4-3 shows how a State would calculate an aeroplane operator's annual offsetting requirements during the 2024-2029 period (i.e., in 2026 for the purpose of illustration).

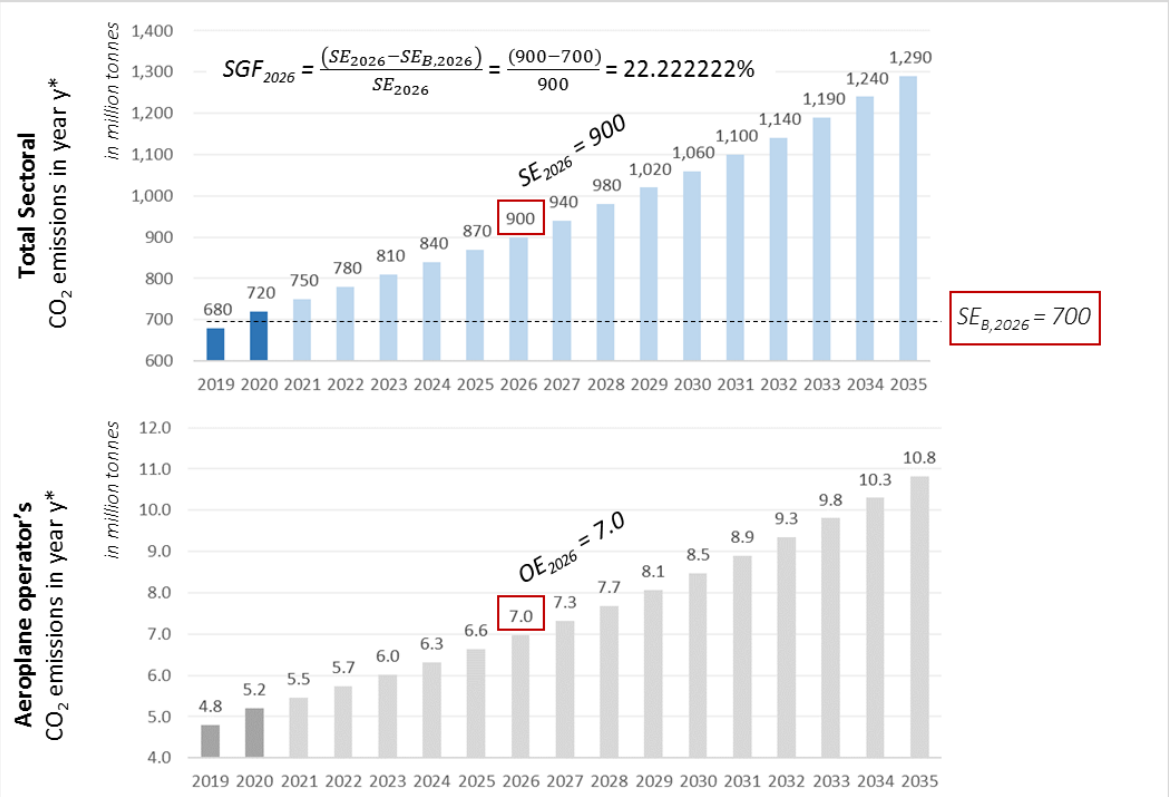


Illustration of calculation of offsetting requirements in year y e.g., 2026:

$$OR_{2026} = OE_{2026} * SGF_{2026} = 7\,000\,000 \text{ tonnes} * 22.222222\% = 1\,555\,556 \text{ tonnes}$$

where:

OR_y = Aeroplane operator's offsetting requirements in the given year y;

OE_y = Aeroplane operator's CO_2 emissions covered by Annex 16, Volume IV, Part II, Chapter 3, 3.1 in the given year y; and

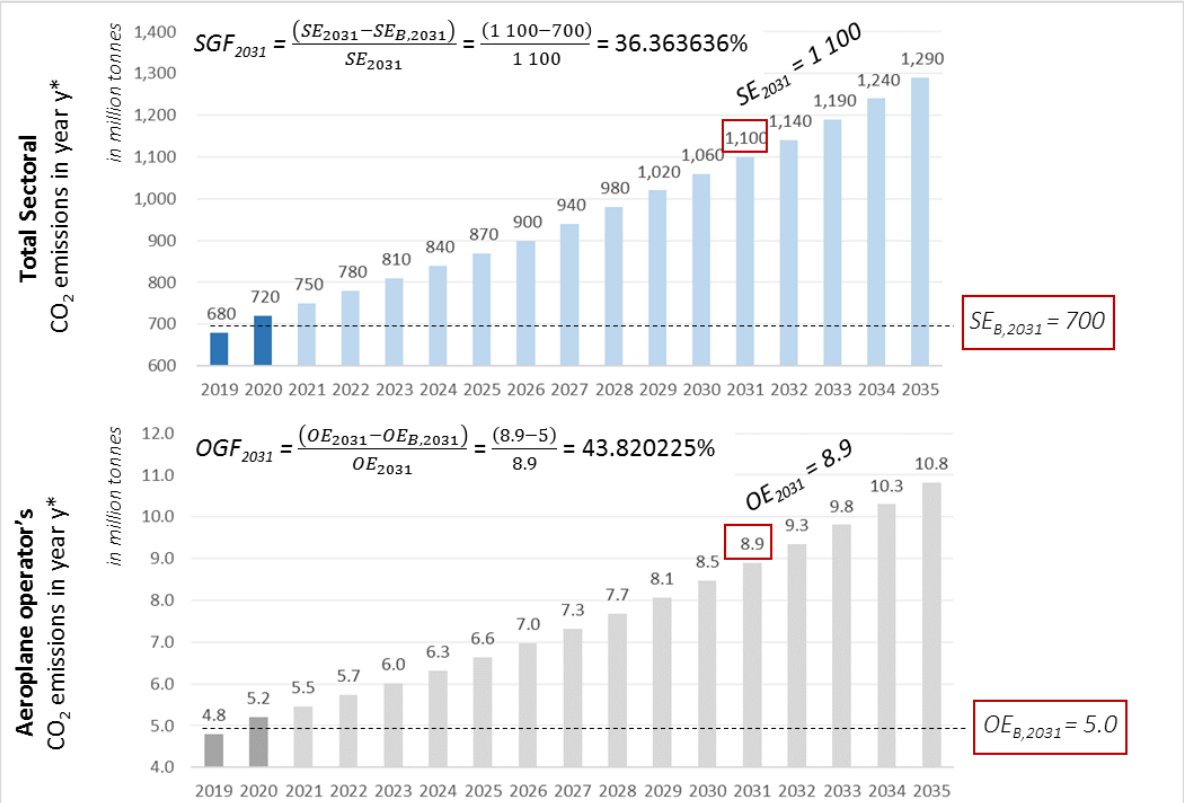
SGF_y = Sector's Growth Factor.

Figure 4-3. Illustration of calculation of an aeroplane operator's annual offsetting requirements during the 2024-2029 period (i.e., in 2026 for the purpose of illustration)

4.2 CALCULATION OF OFFSETTING REQUIREMENTS DURING THE 2030-2035 COMPLIANCE PERIODS

4.2.1 Case of 2030-2035 period

Figure 4-4 shows how a State would calculate an aeroplane operator's annual offsetting requirements during the 2030-2035 period (i.e., in 2031 for the purpose of illustration).



** from flights subject to offsetting requirements, as defined in Annex 16, Volume IV Part II, Chapter 3, 3.1*

Illustration of calculation of offsetting requirements in year y e.g., 2031

$$OR_{2031} = \%S_{2031} * (OE_{2031} * SGF_{2031}) + \%O_{2031} * (OE_{2031} * OGF_{2031})$$

$$OR_{2031} = \%S_{2031} * (8\,900\,000 \text{ tonnes} * 36.363636\%) + \%O_{2031} * (8\,900\,000 \text{ tonnes} * 43.820225\%)$$

where:

OR_y = Aeroplane operator's offsetting requirements in the given year y;

OE_y = Aeroplane operator's CO_2 emissions covered by Annex 16, Volume IV, Part II, Chapter 3, 3.1 in the given year y;

$\%S_y$ = Per cent Sectoral in the given year y;

$\%O_y$ = Per cent Individual in the given year y where $\%O_y = (100\% - \%S_y)$;

SGF_y = Sector's Growth Factor; and

OGF_y = Aeroplane operator's Growth Factor.

Note. – The specified percentage (i.e., $\%O_y$) will be determined by the ICAO Assembly in 2028.

Figure 4-4. Illustration of calculation of an aeroplane operator's annual offsetting requirements during the 2030-2035 period (i.e., in 2031 for the purpose of illustration)

4.3 CO_2 EMISSIONS FROM 2019-2020 FOR CALCULATION OF OFFSETTING REQUIREMENTS

4.3.1 Changes in States participating within CORSIA

The ICAO document entitled "CORSIA States for Chapter 3 State Pairs" that is available on the ICAO CORSIA website will be updated on an annual basis. This will define the State pairs which have offsetting requirements within CORSIA, and the associated average total sectoral CO_2 emissions during 2019 and 2020 on those State pairs.

4.3.2 Mergers and acquisition of aeroplane operators

Where there is a complete acquisition of an aeroplane operator or a complete merger of two or more aeroplane operators the reference CO_2 emissions in the 2019-2020 period for the resulting aeroplane operator should be the sum of the reference CO_2 emissions in the 2019-2020 period that had been attributed to the acquired or merged entities.

In all other cases, including partial acquisitions, where the aeroplane operator is deemed not eligible to the new entrant status, the reference CO_2 emissions in the 2019-2020 period should remain unchanged.

4.4 SECTOR'S GROWTH FACTOR

Based on the reported CO_2 emissions data from States, ICAO will calculate the Sector's Growth Factor (SGF_y) every year. A State will use the SGF_y for a given year as defined in the ICAO document entitled "CORSIA Annual Sector's Growth Factor (SGF)" that is available from the ICAO CORSIA website.

Chapter 5

ADMINISTRATIVE PARTNERSHIPS UNDER CORSIA

5.1 EXAMPLE OF A BILATERAL AGREEMENT

5.1.1 Given the recognized need for cooperation between States to build partnerships in implementing CORSIA, this Chapter provides an example of a bilateral agreement on an administrative partnership (BAAP) between administrating authorities to facilitate such cooperation.

a) Contracting administrating authorities to the BAAP:

1) Capacity obtaining authority (COA): _____

Designated point of contact: administrating authority, name, address, phone and email
_____
_____
_____

2) Aeroplane operators of COA affected by BAAP (aeroplane operators):

i) Aeroplane operator (1): _____

Designated point of contact: institution, name, address, phone and email
_____
_____
_____

ii) Aeroplane operator (2): _____

Designated point of contact: institution, name, address, phone and email
_____
_____
_____

iii) Aeroplane operator (3): _____

Designated point of contact: institution, name, address, phone and email
_____
_____
_____

3) Contracting capacity providing authority (CPA):_____

Designated point of contact: administrating authority, name, address, phone and email
_____
_____
_____

b) Guiding principle of cooperation

The administrative partnership (AP) will be governed by the guiding principle of cooperation between CPA and COA.

1) CPA and COA enter into BAAP voluntarily and reassure that they will act in good-faith towards the CORSIA goals.

2) COA or aeroplane operators may not claim for any damages with regard to BAAP from either CPA or ICAO.

3) BAAP will not release a COA from its compliance obligations under CORSIA; COA remains obliged to enact any enforcement measures against its aeroplane operators as CPA will not undertake any enforcement measures against the aeroplane operators.

c) Basic principles of BAAP

1) COA obliges aeroplane operators to fulfil their obligations under the CORSIA vis-à-vis CPA instead of COA. BAAP will not commence until COA has notified and provided proof to CPA that aeroplane operators are obliged to fulfil their obligations under CORSIA vis-à-vis CPA.

2) CPA will immediately notify ICAO about the contracting administrating authorities and the aeroplane operators (para. a) affected by the BAAP as well as the agreed scope (para. f) and duration of BAAP (para. g)

3) Instead of COA, CPA will execute the agreed scope of BAAP offered according to the options on MRV administrative tasks (para. f) vis-à-vis aeroplane operators.

4) CPA will be the sole point of contact for aeroplane operators with regard to obligations under the CORSIA pursuant to the agreed scope to prevent any administrative confusion in competence.

d) Legal grounds

Annex 16, Volume IV and the Environmental Technical Manual (Doc 9501), Volume IV will serve as the sole legal basis within BAAP and are to be directly applied by CPA in executing its compliance tasks towards aeroplane operators.

e) Language, formalities, deadlines, failure of compliance

1) Language

CPA and COA have agreed to use _____ (agreed language) for all communication. COA will notify aeroplane operators to act accordingly.

2) Formalities

i) Communication between CPA and aeroplane operators may be oral or in written form using the agreed language. The submission of data and (__) will be processed electronically via _____. All formal decisions of CPA vis-à-vis aeroplane operators under CORSIA will be in written form.

ii) CPA will be accessible for aeroplane operators during business days and will react promptly to requests of aeroplane operators within (__) business days.

iii) COA will notify aeroplane operators that aeroplane operators submit their data directly and promptly to CPA according to the form provided for in the Annex 16, Volume IV.

3) Deadlines

i) All deadlines of Annex 16, Volume IV and Environmental Technical Manual (Doc 9501), Volume IV are directly applicable between CPA and aeroplane operators.

ii) Should CPA be of the opinion that an aeroplane operator is not compliant to Annex 16, Volume IV, Part II, Chapter 2, CPA may set a minimum deadline of (10) business days to aeroplane operators to resubmit missing information/data to CPA.

4) Failure of compliance

Should an aeroplane operator fail to comply with the formalities or deadlines, CPA may notify COA, respective aeroplane operator and ICAO about the potential non-compliance (para. h).

f) Scope

Table 5-1. Scope of tasks covered under bilateral agreement

No.	*Task (examples)*	*Detailed specification of tasks (examples)*	*Scope?*
1	Help desk function	Provide telephone and email support to answer questions from aeroplane operators and verification bodies regarding technical and administrative aspects of the CORSIA. This includes services such as an email newsletter and reminders (e.g. to start contracting a verification body) and clarification questions on (very) specific technical details (e.g. of the voluntary pre-verification).	
2	Registration of aeroplane operators	Maintain and update a database of master data such as identification, contact persons, and legal status. This includes the generation of automatic alerts in internet search engines to establish a process of ongoing monitoring of aeroplane operator activities (such as merger and acquisition activities).	
3	Establishing of communication channels for secure and traceable communication	Especially for the submission of the Emissions Monitoring Plan and Emissions Report, e.g. via encrypted email. Including proof for the aeroplane operator that a submission has indeed taken place.	
4	Establishing of communication channels with ICAO and participation in relevant CORSIA-related administrative coordination	To receive updates on the CORSIA administrative aspects, to submit aggregated emissions data.	

5	Establish database access	E.g. to external flight data from ATC or aeroplane registration databases to support the assessment process of the Emissions Monitoring Plan and the order of magnitude check of the Emissions Report.	
6	Distribution of templates and additional guidance material	Download of Emissions Monitoring Plan, Emissions Report templates, additional guidance material.	
7	Check of Emissions Monitoring Plan	Assessment of Emissions Monitoring Plan on the basis of Annex 16, Volume IV and Environmental Technical Manual (Doc 9501), Volume IV (including communication with aeroplane operator and submission of potentially revised versions).	
8	Approval of Emissions Monitoring Plan	Formal approval of the Emissions Monitoring Plan through an official statement.	
9	Check of Emissions Report	Perform order of magnitude check (including communication with aeroplane operator and submission of potentially revised versions).	
10	Communication with NAB	Provide feedback to national accreditation body regarding the performance of verification bodies.	
11	Announcing offsetting requirements (sectoral share) to aeroplane operator	Secure and reliable communication with aeroplane operator on the basis of submitted data of the Emissions Report.	
12	Register related tasks	Enter or confirm data relevant for any register activities.	
13	Ensuring completeness and addressing data gaps	Estimation of emissions if the aeroplane operator failed to submit an Emissions Report.	

g) Duration

1) Administrative partnership (AP) may start any time after the Annex 16, Volume IV has entered into force and COA has fulfilled its obligation under para. c 1) of BAAP. The starting date will be agreed on with a reference to the compliance periods and timeline in Annex 16, Volume IV, Appendix 1.

2) AP may last for an unlimited period or until a specified ending date preferably after each compliance period. AP may be terminated as specified according to para. i) of BAAP.

3) Optionally, CPA may agree with COA on a capacity building programme to support COA in administering aeroplane operators under CORSIA. It will be designed as a phase-out programme to foster the technical and administrative proceedings for CORSIA-MRV obligations. CPA and COA agree on the timeline and content of the capacity-building programme individually.

h) Notification on non-compliance

CPA, COA and aeroplane operators will notify each other about any potential failures in communication between the parties or in compliance with BAAP, Annex 16, Volume IV or Environmental Technical Manual (Doc 9501), Volume IV. CPA and COA will address issues between the concerned entities to foster compliance of the aeroplane operators as CPA may not undertake any enforcement measures against the aeroplane operators. The notification will foster the cooperation between the entities concerned to find a satisfying solution in compliance with the provisions of the Annex 16, Volume IV and Environmental Technical Manual (Doc 9501), Volume IV.

1) If CPA, COA or aeroplane operators request to address any matter a meeting will be held with the points of contact of CPA, COA or aeroplane operators within a period of (__) business days. Only CPA and COA may propose and decide on the proceedings to solve the matter, aeroplane operators may be heard.

2) If CPA or COA do not agree on a certain matter vis-à-vis the aeroplane operators, CPA or COA may continue to negotiate.

3) If a matter is not resolved CPA will notify ICAO about aeroplane operators potential non-compliance with obligations under the CORSIA and/or under the BAAP.

i) Termination

The administering authorities to the AP may withdraw from the AP upon prior notification resulting in a termination of the AP at the end of the reporting year. The statement of withdrawal has to be in written form. Aeroplane operators and ICAO have to be notified within (__) working days about the withdrawal from the BAAP.

j) Protection of aeroplane operator data

CPA will provide the same or higher standards for the protection of personal and business related data of aeroplane operators as the COA. Such data of aeroplane operators will be processed solely for the purposes of the performance, management and monitoring of the obligations under the CORSIA. CPA will refrain from any use, transmission or collection of such data for any other purposes, unless otherwise agreed. CPA will submit a copy of the full administrative data set to the COA within (__) months after each compliance period. Upon termination of BAAP the aeroplane operator may request to delete all data after the end of the following compliance period.

APPENDIX 1

STANDARDIZED EMISSIONS MONITORING PLAN AND REPORTING TEMPLATES

Note. — The templates of the Emissions Monitoring Plan, the Emissions Report and the CORSIA eligible fuels supplementary information to the Emissions Report are available on the ICAO CORSIA website.

1.1. TEMPLATE OF EMISSIONS MONITORING PLAN (FROM AEROPLANE OPERATOR TO STATE)

This section provides a template version of the Emissions Monitoring Plan as described in Annex 16, Volume IV, Appendix 4.

CORSIA

EMISSIONS MONITORING PLAN (EMP)

CONTENTS

Template Information

Template provided by:	
Version (publication date):	

Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1.

1 VERSION CONTROL OF EMISSIONS MONITORING PLAN

a) Version No.

Please enter version number of the current version.

b) Version control

If necessary, please fill in the table.

Version No.	No. of previous version	Date of update	Emissions Monitoring Plan is valid from	Chapters where modifications have been made. Brief explanation of amendments.

2 AEROPLANE OPERATOR IDENTIFICATION AND DESCRIPTION OF ACTIVITIES

(Annex 16, Volume IV, Appendix 4, 2.1)

a) Name of the aeroplane operator

Please enter the name of the aeroplane operator. This name should be the legal entity engaged in the aeroplane operation, or the legal entity seeking to be the single entity for the CORSIA administration under a parent-subsidiary arrangement.

b) Address of the aeroplane operator

Please enter the address of the aeroplane operator.

Address line:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

c) Legal representative

Please enter a contact address of a representative who is legally resonsible for the aeroplane operator for official correspondence.

Title:	
First name:	
Surname:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

d) Aircraft identification of the aeroplane operator for international flights (Item 7 of the flight plan)

Select the options planned to be used for reporting flight attribution to the aeroplane operator.

ICAO Designator
Does Item 7 (aircraft identification) of the flight plan begin with an ***ICAO Designator*** *according to Doc 8585* — Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*? If yes, please select "ICAO Designator" from the drop down list and complete d2).*

Registration marks
Does Item 7 (aircraft identification) of the flight plan correspond to the ***nationality or common mark, and registration mark****, as explicitly stated in an* ***AOC*** *(or equivalent)? If yes, please select "Registration marks" from the drop down list and complete d3).*

ICAO Designator and registration marks

d1) Responsibility under the CORSIA

d2) ICAO Designator

Provide the ICAO Designator (or Designators) used for Air Traffic Control purposes, as listed in Doc 8585 — Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*, if the aeroplane operator has an ICAO Designator(s).*

d3) List of registration marks

Please list all aeroplanes including the nationality or common mark, and registration mark, of the aeroplane. If your fleet exceeds 30 registration marks, please attach a separate document to the EMP.

No.	Registration mark	No.	Registration mark	No.	Registration mark
1		11		21	
2		12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

d4) Additional information on flight attribution

Please provide additional information to support the approach followed for flight attribution.

e) Do you have an air operator certificate (AOC)?

The air operator certificate (AOC) is a certificate authorizing an operator to carry out specified commercial air transport operations i.e., a document issued to an aeroplane operator by a Civil Aviation Authority which affirms that the aeroplane operator in question has the professional ability and organization to secure the safe operation of the aeroplane for the aviation activities specified in the certificate.

e1) Identification code of the AOC

Please enter the unique identification number of the air operator certificate of the issuing Civil Aviation Authority. If you hold several AOCs, list the additional certificates in the field "Information about the certificate".

e2) Date of issue

Please enter the date on which the air operator certificate was issued. Use the entry format yyyy-mm-dd.

e3) Date of expiry

Please enter the date on which the air operator certificate expires (if applicable). Use the entry format yyyy-mm-dd.

e4) Competent authority for the AOC

Please enter the address of the authority that issued the AOC.

Name of the authority:	
Address line:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

e5) Information about the certificate

Please give information about the scope of aviation activities the AOC permits to carry out. Are there any temporal, regional or other restrictions? Have any obligations been imposed?

e6) Please attach the current versions of the AOCs covered in this Emissions Monitoring Plan; please confirm below

f) Description of the ownership structure of your company

Details of ownership structure relative to any other aeroplane operators with international flights, including identification of whether the aeroplane operator is a parent company to other aeroplane operators with international flights, a subsidiary of another aeroplane operator (or operators) with international flights and/or has a parent and or subsidiaries that are aeroplane operators with international flights. Please describe the ownership structure of the operating company.

f1) Parent-subsidiary relationship recognized as a single entity for the CORSIA administration?

Please specify whether the aeroplane operator is in a parent-subsidiary relationship which should be recognized as a single entity for the CORSIA administration?

f2) Name of the subsidiary company(ies)

If your company heads a group, please specify the names of the subsidiaries which also carry out international aviation activities and select how aircraft identification of the subsidiary for international flights is managed. Where appropriate, please attach additional explanatory files to the Emissions Monitoring Plan.

Name of the subsidiary	Aircraft identification of the subsidiary for international flights (Item 7 of the flight plan)

f3) Confirmation that parent and subsidiary(ies) are administered by the same State

If the aeroplane operator in a parent-subsidiary relationship seeks to be considered a single aeroplane operator for purposes of the CORSIA, confirm that the parent and subsidiary(ies) are subject to CORSIA administration by the same State.

f4) Confirmation that parent and subsidiary(ies) are wholly-owned by the parent

If the aeroplane operator in a parent-subsidiary relationship seeks to be considered a single aeroplane operator for purposes of the CORSIA, confirm that the subsidiary(ies) are wholly-owned by the parent.

f5) Additional information on the subsidiary(ies)

Step 1: On the basis of the provided information in f3), please specify the aircraft identification of the subsidiary(ies) for international flights (Item 7 of the flight plan) according to the same level of detail as requested in d) (e.g., state ICAO Designator or list registration marks). Please indicate how flights are assigned to the parent/subsidiary operation.
Step 2: Please specify whether the are any other items covered in this Emissions Monitoring Plan where the subsidiary(ies) deviate from the monitoring of the parent.

In case of insufficient space below, please attach additional documents to your Emissions Monitoring Plan submission.

g) Description of the aeroplane operator´s activities

Please describe the aeroplane operator´s activities. Provide details of main State pairs, typical leasing arrangements, scheduled/non-scheduled, pax/cargo/executive and geographic scope of operations.

h) Contact person

Please enter the contact information of the person within the aeroplane operator who is responsible for the Emissions Monitoring Plan.

Title:	
First name:	
Surname:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

h1) Alternate contact person

Please enter the contact information of an additional person within the aeroplane operator who is responsible for the Emissions Monitoring Plan.

Title:	
First name:	
Surname:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

3 FLEET AND OPERATIONS DATA

(Annex 16, Volume IV, Appendix 4, 2.2)

a) Fleet declaration

List all aeroplane types, including owned aeroplanes as well as leased aeroplanes, with an MTOM greater than *5 700 kg (12 566 lbs) operated on international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1, at the time of submission of the Emissions Monitoring Plan as specified in Doc 8643* — Aircraft Type Designators.

Additional information about Doc 8643 — Aircraft Type Designators *can be found at:*

http://www.icao.int/publications/DOC8643/Pages/Search.aspx

No.	ICAO type designator	Fuel type	Number of aeroplanes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

No.	ICAO type designator	Fuel type	Number of aeroplanes
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			

b) Additional aeroplane types

Will new aeroplane types always be monitored using the same methods as aeroplane types identified in section 4 of this plan?

b1) Details about the procedure for defining the monitoring methodologies for additional aeroplane types

Define clearly the methods which are used for monitoring new aeroplane types that are not already in use.

Responsible department	
Description of procedure	
Location of records	

c) Changes in aeroplane fleet and fuel type

Please provide information on the procedure for how changes in aeroplane fleet and fuel used will be tracked and integrated in emissions monitoring.

Responsible department	
Description of procedure	
Location of records	

d) Completeness of all aeroplanes and all flights

Please provide information on the means that will be used to track/document each aeroplane operated and the specific flights of the aeroplane to ensure completeness of monitoring.

Responsible department	
Description of procedure	
Location of records	

e) List of State pairs operated by the aeroplane operator

*Please list **all** State pairs where international flights are currently operated. If applicable, please list State pairs from the State of origin to the State of destination (*). If your State pairs exceed 50, please attach a separate document to the Emissions Monitoring Plan.*
(*) For example, flights from State A to State B will require inserting a State pair A-B in the list; flights from State B to State A will require inserting a State pair B-A in the list.

No.	State of origin	State of destination
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
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41		
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f) Determination of all international flights

Please provide information on procedures for determining which aeroplane flights meet the definition of international flights for the purpose of Annex 16, Volume IV, and therefore are subject to the emissions monitoring requirements subject to applicability of Annex 16, Volume IV, Part II, Chapter 2, 2.1.

Responsible department	
Description of procedure	
Location of records	

g) Determination of international flights with offsetting requirements

Please provide information on the procedures for determining which international flights are subject to CO_2 offsetting requirements under the CORSIA as described in Annex 16, Volume IV, Part II, Chapter 3, 3.1.

Responsible department	
Description of procedure	
Location of records	

h) Determination of flights with no monitoring requirements

If the aeroplane operator conducts any domestic flights and/or humanitarian, medical or firefighting international operations that would not be subject to the emissions monitoring requirements, information on the procedures for how those operations will be separated from those subject to the emissions monitoring requirements.

Responsible department	
Description of procedure	
Location of records	

4 METHODS AND MEANS FOR CALCULATING EMISSIONS

(Annex 16, Volume IV, Appendix 4, 2.3)

a) Fuel Use Monitoring Method and / or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT)

Please specify whether the aeroplane operator plans to use one or more Fuel Use Monitoring Method(s) (as described in Annex 16, Volume IV, Appendix 2) and / or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) (as described in Annex 16, Volume IV, Appendix 3) for the 2019-2020 and 2021-2035 periods. When deciding on the monitoring method, consideration should be given to whether the aeroplane operator is eligible for the same method in the 2019-2020 period as in the 2021-2035 period.

For the reporting years 2019 and 2020 (in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.1.2)

• a Fuel Use Monitoring Method is mandatory for aeroplane operators with annual emissions equal to or above 500 000 tonnes of CO_2 from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1.

• an aeroplane operator with annual CO_2 emissions from international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2 and Chapter 2, 2.1 of less than 500 000 tonnes, shall use either a Fuel Use Monitoring Method or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT).

For the reporting years 2021 until 2035 (in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.1.3)

• a Fuel Use Monitoring Method is mandatory for aeroplane operators with annual emissions equal to or above 50 000 tonnes of CO_2 from international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 3, 3.1. For international flights not subject to offsetting requirements, the aeroplane operator shall use either a Fuel Use Monitoring Method or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT).

• an aeroplane operator with annual emissions from international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 3, 3.1, of less than 50 000 tonnes, shall use either a Fuel Use Monitoring Method or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT).

a1) Option for simplified monitoring on routes not subject to offsetting requirements

Aeroplane operators which use a Fuel Use Monitoring Method (as described in Annex 16, Volume IV, Appendix 2) for the 2021-2035 period have an option for simplified monitoring with the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) (as described in Annex 16, Volume IV, Appendix 3) on State pairs not subject to offsetting requirements. Please specify whether the aeroplane operator intends to use this option.

b) Fuel Use Monitoring Methods

Please provide information on the use of different monitoring methods per sub fleet (by ICAO aircraft type designator).

Monitoring method	Applicable for the following sub-fleets of aeroplanes (by ICAO aircraft type designator)	2019-2020 period	2021-2035 period
Method A			
Method B			
Block-off / Block-on			
Fuel Uplift			
Fuel Allocation with Block Hour			

c) Simplified monitoring method

Please provide information on use of the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT).

2019-2020 period	2021-2035 period

c1) Estimated annual CO_2 emissions

Please demonstrate the eligibility to use the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) by providing an estimate of fuel use in order to calculate an estimate of the total CO_2 emissions for international flights, as defined in Annex 16, Volume IV, Part II, Chapter 2, 2.1. If the ICAO CORSIA CERT was used to estimate the CO_2 emissions, enter the information in the field "Estimate from the ICAO CORSIA CERT". For 2019, the estimate can be based on data within the 2017-2018 period or another appropriate period.

Fuel type	Annual fuel use (in tonnes)	Fuel conversion factor	Annual CO_2 emissions (in tonnes)
Jet-A		3.16	
Jet-A1		3.16	
Jet-B		3.10	
AvGas		3.10	
Estimate from the ICAO CORSIA CERT			

c2) Supporting information on estimation

Provide supporting information on how the estimation of emissions in c1) has been determined, including on how fuel use has been estimated. In case the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) has been used, a copy of the tool has to be attached and the input method (i.e., Great Circle Distance or Block Time) has to be stated.

c3) Input method for reporting

Please specify for the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) whether Great Circle Distance or Block Time is used to estimate emissions for the reporting periods.

d) Separation of parent-subsidiary related emissions in 2019-2020

If the aeroplane operator is in a parent-subsidiary relationship and intends to be considered a single aeroplane operator for purposes of the CORSIA, identify the procedures that will be used for maintaining separate 2019-2020 fuel and emissions monitoring of the various corporate entities for the purpose of establishing individual 2019-2020 reference CO_2 emissions for the parent and subsidiary (or subsidiaries).

4.1 Fuel Use Monitoring Method: METHOD A

a) Time of measurement and corresponding documentation for the chosen method

Please specify the exact points in time for the three measurements necessary to calculate the fuel consumption per flight and outline the measurement equipment and procedures for recording, receiving, transmitting and storing of fuel data. Please provide a reference to the corresponding documentation.

b) Fuel density for international flights

Please provide information on the procedures for determing and recording fuel density values (standard or actual) as used for operational and safety reasons and provide reference to the relevant internal documentation. These procedures shall be applied when calculating the fuel consumption for the CORSIA.

4.2 Fuel Use Monitoring Method: METHOD B

a) Time of measurement and corresponding documentation for the chosen method

Please specify the exact points in time for the three measurements necessary to calculate the fuel consumption per flight and outline the measurement equipment and procedures for recording, receiving, transmitting and storing of fuel data. Please provide a reference to the corresponding documentation.

b) Fuel density for international flights

Please provide information on the procedures for determing and recording fuel density values (standard or actual) as used for operational and safety reasons and provide reference to the relevant internal documentation. These procedures shall be applied when calculating the fuel consumption for the CORSIA.

4.3 Fuel Use Monitoring Method: BLOCK-OFF / BLOCK-ON

a) Time of measurement and corresponding documentation for the chosen method

Please specify the exact points in time for the two measurements necessary to calculate the fuel consumption per flight and outline the measurement equipment and procedures for recording, receiving, transmitting and storing of fuel data. Please provide a reference to the corresponding documentation.

4.4 Fuel Use Monitoring Method: FUEL UPLIFT

a1) Measurement of the block hours (per flight) and corresponding documentation for the chosen method

Please specify the exact points in time for the measurement of block hours per flight (necessary to calculate the fuel consumption per flight for international flights with zero uplift and for the following flight) and outline the measurement equipment and procedures for recording, receiving, transmitting and storing of fuel data. Please provide a reference to the corresponding documentation.

a2) Assignment and adjustment for flights with zero fuel uplift

Please explain the data handling and calculations necessary to meet the adjustment requirement for flights with zero fuel uplift.

b) Fuel uplift

Please specify which fuel uplift record will be used.

c) Fuel density for international flights

Please provide information on the procedures for determing and recording fuel density values (standard or actual) as used for operational and safety reasons and provide reference to the relevant internal documentation. These procedures shall be applied when calculating the fuel use for the CORSIA.

4.5 Fuel Use Monitoring Method: FUEL ALLOCATION WITH BLOCK HOUR

a) Option for calculating the specific fuel burn

Please choose from the options listed below and enter the ICAO type designators and the model for each option. Should one option for all aeroplane types be used, simply enter "all".

	Option	ICAO aircraft type designator / model
☐	1st Option for aeroplane operators which can clearly distinguish between fuel uplifts for international and domestic flights on a flight by flight basis. In case this option is selected, please also complete section 4.4 (Fuel uplift, a1 and a2), as this monitoring method is used to calculate the total fuel burn on international flights for a specific ICAO type designator or aircraft model.	
☐	2nd Option for aeroplane operators which cannot clearly distinguish between international and national fuel uplifts on a flight by flight basis.	

b) Measurement of the block hours (per flight) and corresponding documentation for the chosen method

Please specify the exact points in time for the measurement of block hours per flight and outline the measurement equipment and procedures for recording, receiving, transmitting and storing of fuel data. Please provide a reference to the corresponding documentation.

c) Fuel uplift

Please specify which fuel uplift record will be used.

d) Fuel density for international flights

Please provide information on the procedures for determing and recording fuel density values (standard or actual) as used for operational and safety reasons and provide reference to the relevant internal documentation. These procedures shall be applied when calculating the fuel use for the CORSIA.

4.6 ICAO CORSIA CO_2 ESTIMATION AND REPORTING TOOL (CERT)

(Annex 16, Volume IV, Appendix 3)

a) Description of relevant input data

Please specify whether Great Circle Distance and/or Block Time is used as input into the ICAO CORSIA CERT. If applicable, please specify the procedures for determining Block Time and potentially aggregating them to be used in the ICAO CORSIA CERT. This includes specifying the exact points in time for the two time measurements per flight necessary to calculate the Block Time.

5. DATA MANAGEMENT, DATA FLOW, CONTROL SYSTEM, RISK ANALYSIS AND DATA GAPS

(Annex 16, Volume IV, Appendix 4, 2.4)

a) Description of data management

Please provide a description of each step in the data flow and data processing, including controls to assure data quality, beginning with the source data up to the Emissions Report. Please reference the responsible departments. Please attach a data flow chart to the Emissions Monitoring Plan summarizing the systems used to record, store and control the quality of data associated with the monitoring and reporting of emissions.

b) Threshold for data gaps

If employing a Fuel Use Monitoring Method, please provide a description of the systems and procedures for identifying data gaps and for assessing whether the 5 per cent threshold for significant data gaps has been reached (in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.5.1).

b1) Description of available secondary sources

Please specify data sources that can be alternatively used for reporting purposes.

b2) Handling of data gaps and erroneous data values

Aeroplane operators using a Fuel Use Monitoring Method shall use the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) to fill data gaps, in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.5.1, where the secondary data sources listed above are not available. For aeroplane operators not using a Fuel Use Monitoring Method, please provide a description of the method that will be used to fill data gaps in the event a secondary data reference source listed above is not available.

b3) Data gaps despite secondary sources

Does the existing data management system allow for data gaps when secondary data sources exist?

b4) Explanations of data gaps for which existing secondary sources cannot be used

Please describe the conditions (e.g., cost, time to resolve, data availability, data quality) under which this occurs.

c) Documentation and record keeping plan

Please specify where process directives are stored. Please indicate the IT system used, if applicable. List of applied data management and IT standards, where relevant.

d) Explanation of risks

Data management systems and controls are critical for ensuring data completeness, security, quality and minimizing the risk of a material error or mistatement in the emissions report. Please provide a list of the risks associated with the data management system and the corresponding internal or external control activity(ies) for addressing each.

e) Revisions of Emissions Monitoring Plan

Please provide information on procedures for identifying: i) material changes to the Emissions Monitoring Plan requiring revision and resubmission to the State and ii) non-material changes to the Emissions Monitoring Plan for disclosure in the Emissions Report.

1.2 TEMPLATE OF EMISSIONS REPORT (FROM AEROPLANE OPERATOR TO STATE)

This section provides a template version of the reporting requirements described in Annex 16, Volume IV, Appendix 5, Table A5-1.

CORSIA

EMISSIONS REPORT (ER)

CONTENTS

Template Information

Template provided by:	
Version (publication date):	

Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1.

1 AEROPLANE OPERATOR IDENTIFICATION AND DESCRIPTION OF ACTIVITIES

a) Name of aeroplane operator

Please enter the name of the aeroplane operator. This name should be the legal entity carrying out the aviation activities.

a1) Address of the aeroplane operator

Please enter the address of the aeroplane operator.

Address:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

a2) Contact person

Please enter the contact information of the person within the aeroplane operator who is responsible for the Emissions Report.

Title:	
First name:	
Surname:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

a3) Alternate contact person

Please enter the contact information of an additional person within the aeroplane operator who is responsible for the Emissions Report.

Title:	
First name:	
Surname:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

a4) Legal representative

Please enter a contact address of a representative who is legally resonsible for the aeroplane operator for official correspondence.

Title:	
First name:	
Surname:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

b) Aircraft Identification of the aeroplane operator for international flights (Item 7 of the flight plan)

Select the options used for reporting flight attribution to the aeroplane operator.

ICAO Designator
Does Item 7 (aircraft identification) of the flight plan begin with an ***ICAO Designator*** *according to Doc 8585* — Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*? If yes, please select "ICAO Designator" from the drop down list and complete b1).*

Registration marks
Does Item 7 (aircraft identification) of the flight plan correspond to the ***nationality or common mark, and registration mark****, as explicitly stated in an* ***AOC*** *(or equivalent)? If yes, please select "Registration marks" from the drop down list.*

ICAO Designator and registration marks

Responsibility under the CORSIA

b1) ICAO Designator

Provide the ICAO Designator (or Designators) used for Air Traffic Control purposes, as listed in Doc 8585 — Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*, if the aeroplane operator has an ICAO Designator(s).*

b2) Additional information on flight attribution

If during the monitoring period an additional attribution approach has been used to that identified in section b) and as explained in the EMP, please provide detailed information on the attribution process.

c) Verification body

Contact information of the engaged accredited verification body.

Verification body:	
Title:	
First name of verifier:	
Surname of verifier:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

c1) Accreditation details

Please provide information regarding the national accreditation body.

Authorization based on:	
Body / Authority:	
Number:	
Country:	

2 UNDERLYING BASIC INFORMATION OF THE EMISSIONS REPORT

a) Reporting year

Please provide the reporting year.

b) End of reporting period

Usually the last day of the reporting year, as long as the operator has not ceased flight operations during the reporting year. Use the format yyyy-mm-dd.

c) Date of issue

Date on which the Emissions Report was compiled. Use the format yyyy-mm-dd.

d) Version

In case of multiple submissions, please enter the Emissions Report version number.

e) Current Emissions Monitoring Plan

Please enter the version number of the approved Emissions Monitoring Plan on which this Emissions Report is based.

e1) Approval of the current Emissions Monitoring Plan

Please enter the date of the approval of the Emissions Monitoring Plan. Use the format yyyy-mm-dd.

e2) Emissions Monitoring Plan is valid from

Please enter the date of validity of the current Emissions Monitoring Plan. Use the format yyyy-mm-dd.

e3) Last update of the Emissions Monitoring Plan

Please enter the date of the Emissions Monitoring Plan on which basis this report was created. Use the format yyyy-mm-dd.

e4) Was more than one approved Emissions Monitoring Plan version used during the reporting year?

Please choose "yes" if the Emissions Report is based on more than one Emissions Monitoring Plan.

e4.1) Explanation

Please explain in detail the implications of the use of several Emissions Monitoring Plans during the reporting year.

e5) Previous Emissions Monitoring Plan (if applicable)

Please list the previous Emissions Monitoring Plan version with version number and date of approval (if applicable).

f) Fuel Use Monitoring Method and / or the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT)

Please indicate whether the aeroplane operator used the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) and whether the tool was used for all international flights or only for international flights not subject to offsetting requirements.

g) Fuel Allocation with Block Hour

Please indicate whether the aeroplane operator used the Fuel Use Monitoring Method "Fuel Allocation with Block Hour" during the reporting year.

g1) Underlying aeroplane fuel burn

Please complete the table below with the average fuel burn ratio (AFBR) for each aeroplane type as specified in Doc 8643 — Aircraft Type Designators. *AFBR will be provided in tonnes per hour (rounded to at least three decimal places) for the current reporting year.*

Additional information about Doc 8643 — Aircraft Type Designators can be found at: http://www.icao.int/publications/DOC8643/Pages/Search.aspx

No.	ICAO aircraft type designator	Specific fuel burn (in tonnes per hour)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
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3 AEROPLANE FLEET AND FUEL TYPES

a) Registration of all aeroplanes operated in the reporting year

Please list all aeroplanes with an MTOM greater than 5 700 kg (12 566 lbs) operated on international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1, during the reporting period. If necessary, please attach a separate list.
Please enter the ICAO aircraft type designator, as specified in Doc 8643 — Aircraft Type Designators, *the registration marks and state whether the aeroplane is owned or leased. Please mark with an "X" applicable fuel(s) type(s) for each ICAO aircraft type designator.*

Additional information about Doc 8643 — Aircraft Type Designators can be found at:

http://www.icao.int/publications/DOC8643/Pages/Search.aspx

No.	ICAO aircraft type designators	Registration marks	Owned or leased	Fuel used			
				Jet-A	Jet-A1	Jet-B	AvGas
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
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21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

4 FUEL DENSITY

a) Fuel density

Please specify whether standard and / or actual density was used to determine the fuel uplift in the reporting year.

a1) Consistency

Please confirm that the application of density data for CORSIA purposes is fully identical to the actual procedures used for operational and safety reasons.

5 REPORTING

a) Aggregation level of reported data

Please select whether the aeroplane operator reports on a State pair or at an aerodrome pair level as advised by the State. If State pair level is chosen, please continue with ***"5.1 Reporting - State pairs"****. If aerodrome pair level is selected, please continue with* ***"5.2 Reporting - Aerodrome pairs"****.*

5 REPORTING - STATE PAIRS

Explanation: *Please complete the list underneath. All State pairs operated during the reporting year have to be reported.*

Note I: *Please report both directions between State pairs if applicable (A-B and B-A).*
Note II: *If you used different type of fuels on the same State pair with different fuel converstion factors, you need to create an identical State pair and report this portion of fuel separately. Please note, emissions from CORSIA eligible fuels are calculated with the fuel conversion factor(s) from corresponding aviation fuels.*
Note III: *Please also complete the CORSIA eligible fuels report template, if CORSIA eligible fuels were used during the reporting period.*

a) Summary of reported international flights and emissions

Total CO_2 emissions from international flights (in tonnes):	
Total CO_2 emissions from flights subject to offsetting requirements (in tonnes):	
Total number of international flights during reporting period:	
Total number of international flights subject to offsetting requirements:	
Total emissions reductions claimed from the use of CORSIA eligible fuels (in tonnes):	

b) Summary of fuel quantities (in tonnes):

Jet-A	
Jet-A1	
Jet-B	
AvGas	

b1) CORSIA eligible fuels claimed

If claiming emission reductions from the use of CORSIA eligible fuels, please complete the table below. Supplementary information about the claim is also required, and can be reported using the CORSIA eligible fuels supplementary information template.

Fuel type			Total mass of the neat CORSIA eligible fuel (in tonnes)	Approved Life Cycle Emissions values	Emission reductions claimed
Fuel type (e.g., Jet-A)	Feedstock	Conversion process			
Total emission reductions from the use of CORSIA eligible fuel(s) claimed					

c) Table of all State pairs

Please list all State pairs on which international flights were performed and enter the number of flights and the amount of CO_2 emissions.

State of departure	State of arrival	CO_2 emissions estimated with CERT?	Total No. of flights	Fuel type	Total mass of fuel (in tonnes)	Fuel conversion factors	Total CO_2 emissions (in tonnes)	Subject to offsetting requirements?

5 REPORTING - AERODROME PAIRS

Explanation: *Please complete the list underneath. All aerodrome pairs that were operated during the reporting year have to be reported.*

Note I: *Please report both directions between aerodrome pairs if applicable (A-B and B-A).*
Note II: *If you used different type of fuels on the same aerodrome pair with different fuel conversion factors, you need to create an identical aerodrome pair and report this portion of fuel separately. Please note, emissions from CORSIA eligible fuels are calculated with the fuel conversion factor(s) from corresponding aviation fuels.*
Note III: *Please also complete the CORSIA eligible fuels supplementary information to the Emissions Report, if CORSIA eligible fuels were used during the reporting period.*

a) Summary of reported international flights and emissions

Total CO_2 emissions from international flights (in tonnes):	
Total CO_2 emissions from flights subject to offsetting requirements (in tonnes):	
Total number of international flights during reporting period:	
Total number of international flights subject to offsetting requirements:	
Total emissions reductions claimed from the use of CORSIA eligible fuels (in tonnes):	

b) Summary of fuel quantities (in tonnes):

Jet-A	
Jet-A1	
Jet-B	
AvGas	

b1) CORSIA eligible fuels claimed

If claiming emission reductions from the use of CORSIA eligible fuels, please complete the table below. Supplementary information about the claim is also required, and can be reported using the CORSIA eligible fuels supplementary information template.

Fuel type			Total mass of the neat CORSIA eligible fuel (in tonnes)	Approved Life Cycle Emissions values	Emission reductions claimed
Fuel type (e.g., Jet-A)	Feedstock	Conversion process			
Total emission reductions from the use of CORSIA eligible fuel(s) claimed					

c) Table of all aerodrome pairs

Please list all aerodrome pairs on which international flights were performed and enter the number of flights and the amount of CO_2 emissions.

Departure		Arrival		CO_2 emissions estimated with CERT?	Total No. of flights	Fuel type	Total amount of fuel used (in tonnes)	Fuel conversion factors	CO_2 emissions (in tonnes)	Subject to offsetting requirements?
ICAO airport code	State	ICAO airport code	State							

6 DATA GAPS

Explanation: *"Data gaps" are missing data which is necessary for the correct determination of CO_2 emissions but cannot be taken from primary sources anymore and cannot be reconstructed from secondary sources.*

a) Did any data gaps occur during the reporting year?

b) Is the threshold of 5 per cent for data gaps exceeded?

In 2019 and 2020, 5 per cent refers to international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1.
From 2021 onwards, 5 per cent refers to international flights subject to offsetting requirements, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 3, 3.1.

The aeroplane operator using a Fuel Use Monitoring Method shall fill data gaps using the ICAO CORSIA CERT, provided that the data gaps during a compliance period do not exceed the thresholds described above.
Estimated emissions should then appear in spreadsheet ***5.1 Reporting - State Pairs*** *as separate State pairs (if reporting is done at State pair level) or in spreadsheet* ***5.2 Reporting - Aerodrome Pairs*** *as separate aerodrome pairs (if reporting is done at aerodrome pair level).*

b1) Per cent of data gaps

Please enter per cent of data gaps (according to criteria defined in Part II, Chapter 2, 2.5.1 and rounded to the nearest 0.1 per cent)

b2) List of data gaps if the 5 per cent threshold has been exceeded in the reporting year

Please complete the list underneath if the threshold has been exceeded.

No.	Reference *(Describe the data gap, either by referencing the aeroplane, aerodrome, flight number, etc. for which the data gap occurred and/or the start and end date of the period where the data gap occured.)*	Cause *(Please describe the cause why the data gap ocurred.)*	Type *(Describe the type of data gap, such as "density measurement not avialable", "fuel uplift not available", etc.)*	Replacement method *(Describe the method of determining alternative data, such as referencing the procedure in your Emissions Monitoring Plan, "by ... Tool", etc.)*	CO_2 emissions (in tonnes) *(Provide the amount of CO_2 emissions which are effected by the data gap).*	Remarks
1						
2						
3						
4						
5						
6						

1.3 TEMPLATE OF CORSIA ELIGIBLE FUELS SUPPLEMENTARY INFORMATION TO THE EMISSIONS REPORT (FROM AEROPLANE OPERATOR TO STATE)

This section provides a template version of the reporting requirements as described in Annex 16, Volume IV, Appendix 5, Table A5-2.

CORSIA

CORSIA ELIGIBLE FUELS SUPPLEMENTARY INFORMATION*

(*supplementary information to the Emissions Report from aeroplane operator to State)

CONTENTS

Template Information

Template provided by:	
Version (publication date):	

AEROPLANE OPERATOR IDENTIFICATION AND REPORTING INFORMATION

a) Name of aeroplane operator

Please enter the name of the aeroplane operator. This name should be the legal entity carrying out the aviation activities.

a1) Address of the aeroplane operator

Please enter the address of the aeroplane operator.

Address:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

b) Reporting year

CORSIA ELIGIBLE FUEL CLAIM FORM

Note: for each claim of emissions reductions from the use of CORSIA eligible fuels, please replicate this form and fill separately.

Fuel Claim #:

a) Purchase date

Please enter the date when the neat CORSIA eligible fuel was purchased. Use the format yyyy-mm-dd.

b) Identification of the producer of the CORSIA eligible fuel

b1) Name of producer of the neat CORSIA eligible fuel

Please enter the name of the fuel producer.

b2) Address of the producer of the neat CORSIA eligible fuel

Please enter the address of the producer of the neat CORSIA eligible fuel.

Address:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

c) Fuel production

c1) Date of production of the neat CORSIA eligible fuel

Please enter the date of production of the neat CORSIA eligible fuel. Use the format yyyy-mm-dd.

c2) Location of the production of the neat CORSIA eligible fuel

Please enter the address of the production of the neat CORSIA eligible fuel.

Address:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

c3) Batch identification number:

c4) Mass of each batch of neat CORSIA eligible fuel produced

Please enter the total mass of each batch of neat CORSIA eligible fuel produced (in tonnes).

d) Fuel type

d1) Type of fuel

Please enter the type of fuel (i.e., Jet-A, Jet-A1, Jet-B, AvGas) for the purpose of computation of Life Cycle Emissions factors.

d2) Feedstock type

Please enter the information on the feedstock used to create the neat CORSIA eligible fuel.

d3) Conversion process

Please enter the conversion process (i.e., a type of technology used to convert a feedstock into neat CORSIA eligible fuel).

d) Portion of batch purchased (if needed)

d1) Percentage

If less than an entire batch of neat CORSIA eligible fuel is purchased, please enter the proportion of neat CORSIA eligible fuel batch purchased (in percentage terms).

d2) Mass of batch purchased

Please enter the mass of CORSIA eligible fuel batch purchased (in tonnes).

e) Mass of neat CORSIA eligible fuel

Please enter the total mass of all batches of neat CORSIA eligible fuel included in the claim (in tonnes).

f) Sustainability documentation

Please provide evidence that the fuel satisfies the CORSIA Sustainability Criteria i.e., reference of attached valid certification document.

g) Life Cycle Emissions Values of the CORSIA eligible fuel

g1) Default or Actual Life Cycle Emissions value (LS_f)

Please enter the Life Cycle Emissions value (in gCO_2e/MJ).

g2) Default or Actual Core Life Cycle Assessment (LCA) value

Please enter the Core Life Cycle Assessment (LCA) value (in gCO_2e/MJ).

g3) Default Induced Land Use Change (ILUC) value

Please enter the Induced Land Use Change (ILUC) value (in gCO_2e/MJ).

h) Intermediate purchaser 1 (if needed)

If the aeroplane operator claiming emissions reductions from the use of CORSIA eligible fuels is not the original purchaser of the fuel from the producer (e.g., the aeroplane operator purchased fuel from a broker or a distributor), include the identity and contact information of these purchaser(s).

h1) Name of the intermediate purchaser 1.

Please enter the name of the intermediate purchaser 1.

h2) Address of the intermediate purchaser 1.

Please enter the address of the intermediate purchaser 1.

Address:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

i) Intermediate purchaser 2 (if needed)

Please include the identity and contact information of the intermediate purchaser 2.

i1) Name of the intermediate purchaser 2.

Please enter the name of the intermediate purchaser 2.

i2) Address of the intermediate purchaser 2.

Please enter the address of the intermediate purchaser 2.

Address:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

j) CORSIA eligible fuel shipper

j1) Name of the CORSIA eligible fuel shipper.

Please enter the name of the party responsible for shipping of the neat CORSIA eligible fuel to the fuel blender.

j2) Address of the CORSIA eligible fuel shipper.

Please enter the address of the party responsible for shipping of the neat CORSIA eligible fuel to the fuel blender.

Address:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

k) Fuel blender

k1) Name of the fuel blender

Please enter the name of the party responsible for blending neat CORSIA eligible fuel with aviation fuel.

k2) Address of the fuel blender

Please enter the address of the party responsible for blending neat CORSIA eligible fuel with aviation fuel.

Address:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

l) Location of blending

Please enter the location where the neat CORSIA eligible fuel is blended with aviation fuel.

Address:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

m) Neat CORSIA eligible fuel received

m1) Date the neat CORSIA eligible fuel was received

Please enter the date the neat CORSIA eligible fuel was received by blender. Use the format yyyy-mm-dd.

m2) Mass of neat CORSIA eligible fuel received

Please enter the mass of neat CORSIA eligible fuel received (in tonnes).

n) Blend ratio of neat CORSIA eligible fuel and aviation fuel

Please enter the blend ratio of neat CORSIA eligible fuel and aviation fuel.

o) Documentation demonstrating blending

Please provide documentation demonstrating that the batch or batches of CORSIA eligible fuel were blended into aviation fuel (e.g., the subsequent Certificate of Analysis of the blended fuel).

p) Mass of neat CORSIA eligible fuel claimed

Please enter the mass of neat CORSIA eligible fuel claimed (in tonnes).

SUMMARY OF CORSIA ELIGIBLE FUELS INFORMATION

a) Summary of CORSIA eligible fuels (by fuel claim #)

Please provide a summary of the CORSIA eligible fuels claimed for the reporting year.

Fuel claim #	Fuel type			Total mass of neat CORSIA eligible fuel claimed (in tonnes)	Life cycle emissions values of the CORSIA eligible fuel	Emissions reduction from CORSIA eligible fuels claimed (in tonnes)
	Type of fuel	Feedstock type	Conversion process			
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

b) Summary of information of CORSIA eligible fuels claimed

b1) Total of emissions reduction from CORSIA eligible fuels claimed (in tonnes)

Please enter the sum of the values included in column "Emissions reduction from CORSIA eligible fuels claimed (in tonnes)" of the table above

— END —

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