ICAO

Doc 9501

Environmental Technical Manual

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

Second Edition, 2019

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 second edition of the *Environmental Technical Manual* (Doc 9501), Volume IV — *Procedures for demonstrating compliance with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)* includes material that was approved by the ICAO Committee on Aviation Environmental Protection (CAEP) at its eleventh meeting (CAEP/11) in February 2019. 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 Communication 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	
EUCR	Emissions Unit Cancellation Report	
GHG	Greenhouse gas	
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 take-off mass	kg
NAB	National accreditation body	
NM	Nautical mile	NM
OFP	Operational flight plan	
OGF	Aeroplane operator’s Growth Factor	Per cent

Acronym or abbreviation	*Meaning*	*Unit*
RTK	Revenue Tonne Kilometre	tonne*km
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, the CORSIA eligible fuels supplementary information to the Emissions Report and the Verification 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 ADMINISTRATION

2.1.1 Attribution of international flights to an aeroplane operator

In accordance with Annex 16, Volume IV, the attribution of a specific international flight to an aeroplane operator will be determined on the basis of the ICAO Designator when Item 7 (aircraft identification) of the flight plan contains the ICAO Designator.

When Item 7 (aircraft identification) of the flight plan contains the nationality or common mark, and registration mark of an aeroplane that is explicitly listed in an air operator certificate (AOC) (or equivalent) issued by a State, that flight will be attributed to the aeroplane operator that holds the AOC (or equivalent). The AOC refers to an air operator certificate as defined in Annex 6 to the Convention on International Civil Aviation, i.e. a certificate authorizing an operator to carry out specified commercial air transport operations. The wording “or equivalent” allows the use of commercial aviation operating certificates other than an AOC and of other certificates permitting non-commercial air transport which could be appropriate, if they include operator-declared registration mark information, as long as these certificates are issued/approved by a State. In case neither an AOC nor an equivalent document is available, a CORSIA-approved Emissions Monitoring Plan, or Emissions Report, could also be used for the purpose of attributing flights to an aeroplane operator, as these also contain operator-declared registration mark information which has been approved by the State.

When the aeroplane operator of a flight has not been identified via an ICAO Designator or registration mark listed in an AOC (or equivalent) or in an Emissions Monitoring Plan or Emissions Report, that flight will be attributed to the aeroplane owner identified in the aircraft certificate of registration (see Annex 7 to the Convention on International Civil Aviation), who will then be considered the aeroplane operator.

In circumstances where two or more operators use the same aeroplane to perform flights within the scope of applicability of Annex 16, Volume IV, each operator should provide detailed information to facilitate the correct attribution of flights to the aeroplane operator. Such information may, for example, include a clearly defined time period during which an operator is the exclusive user of the aeroplane in question or specific State pairs which are exclusively operated by the operator. The operators may also decide to systematically include information on the aeroplane operator in Item 18 of the flight plan.

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

The applicability scope of the Monitoring, Reporting and Verification (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.

2.2.1 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.

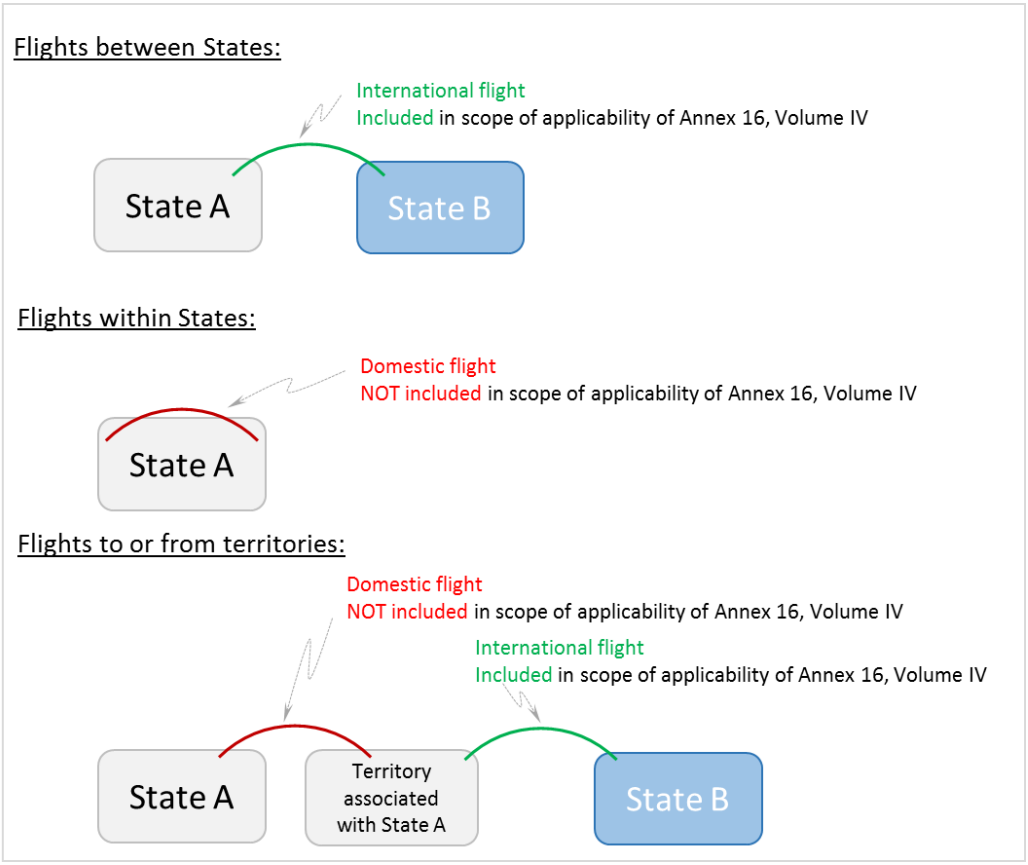


Figure 2-1. International flights as defined in Annex 16, Volume IV

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 provide this feedback to ICAO in order to support future updates.

When using Doc 7910, the State of the aerodrome should be the State contained within the last brackets of the "State Name" related to such aerodrome or, if there are no brackets, the State as indicated by the "State Name" itself.

Aeroplane operators should provide timely feedback to their State when operating a flight subject to CORSIA requirements to or from an aerodrome not listed in Doc 7910 as well as in case the information contained in Doc 7910 for a given aerodrome is found to be inaccurate.

2.2.2 Handling of diversions

A flight should be considered diverted when it makes an unplanned landing at an aerodrome different from the destination aerodrome indicated by the aeroplane operator in the last approved flight plan filed prior to the flight departure.

A diverted flight and the subsequent flight are to be treated as two consecutive and separate flights operating, respectively, to and from the aerodrome the diverted flight actually landed at, rather than that which was originally planned.

A diversion is by its nature unplanned. However, according to the rules of CORSIA, whether a flight is international or subject to offsetting requirements is based on where it landed, not where it meant to land.

If in a given year an aeroplane operator is subject to the CORSIA offsetting requirements only because of diverted or subsequent flights (all other flights being operated on routes not subject to offsetting), the aeroplane operator will still be required to offset the emissions of those flights.

Should an aeroplane operator that is approved to use the ICAO CORSIA CO_2 Estimation and Reporting Tool (CERT) exceed in a given year the threshold of 50 000 tonnes of CO_2 on the routes subject to offsetting requirements due to diverted or subsequent flights, then the aeroplane operator will still be permitted to use the ICAO CORSIA CERT in that year and the following year (year (y+1)) according to Annex 16, Volume IV, Part II, Chapter 2, 2.2.1.3.3. However, if the aeroplane operator also exceeds the 50 000 tonne threshold in that following year (year (y+1)), then it should submit a new Emissions Monitoring Plan by 30 September in year (y+2) and begin using a Fuel Use Monitoring Method from 1 January in year (y+3).

2.2.3 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.

2.2.4 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.

If an aeroplane operator falls below the 10 000 tonne threshold in a given year then they fall outside the scope of applicability of Annex 16, Volume IV and would not have any requirements in that year. In such instance, it is suggested that the aeroplane operator contact the State to which it is attributed to advise that it is below the threshold. The State may choose to engage with the aeroplane operator to confirm that the aeroplane operator is out of the scope of applicability.

2.2.5 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:

State flights

The Chicago Convention relates to international civil aviation. Article 3 of the Chicago Convention provides that it is not applicable to State aeroplanes 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.

2.2.6 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". Both of the following conditions should be checked and should prove true to determine when an activity, understood to mean the operation of one or more international flights, as defined in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, 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 have 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, with at least one of the other aeroplane operator(s) being or having been subject to CORSIA;

b) At least one of the aeroplane operators identified under a) had a business relationship with the potential new entrant, such as being in a parent-subsidiary relationship or part of a common holding; or at least one of the aeroplane operators identified under a) was 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.

In the application of Annex 16, Volume IV, Part II, Chapter 2, 2.1.4, a new entrant will have to monitor its emissions from 1 January from the year after it meets the requirements in Annex 16, Volume IV, Part II, Chapter 2, 2.1.1 and 2.1.3 and submit an Emissions Monitoring Plan at the latest by 31 March of the year when it begins monitoring. For example, if an aeroplane operator produces annual CO_2 emissions greater than 10 000 tonnes in 2026 on flights within the applicability of Annex 16, Volume IV, it will be required to start monitoring its emissions from 1 January 2027 and submit an Emissions Monitoring Plan at the latest by 31 March 2027. It is however recommended that an aeroplane operator close to the threshold engages with the State to which it is attributed as soon as possible. With the approval of the State, an aeroplane operator may also decide to monitor its emissions in the year during which it meets or expects to meet the requirements in Annex 16, Volume IV, Part II, Chapter 2, 2.1.1 and 2.1.3.

2.3 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.

2.3.1 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.

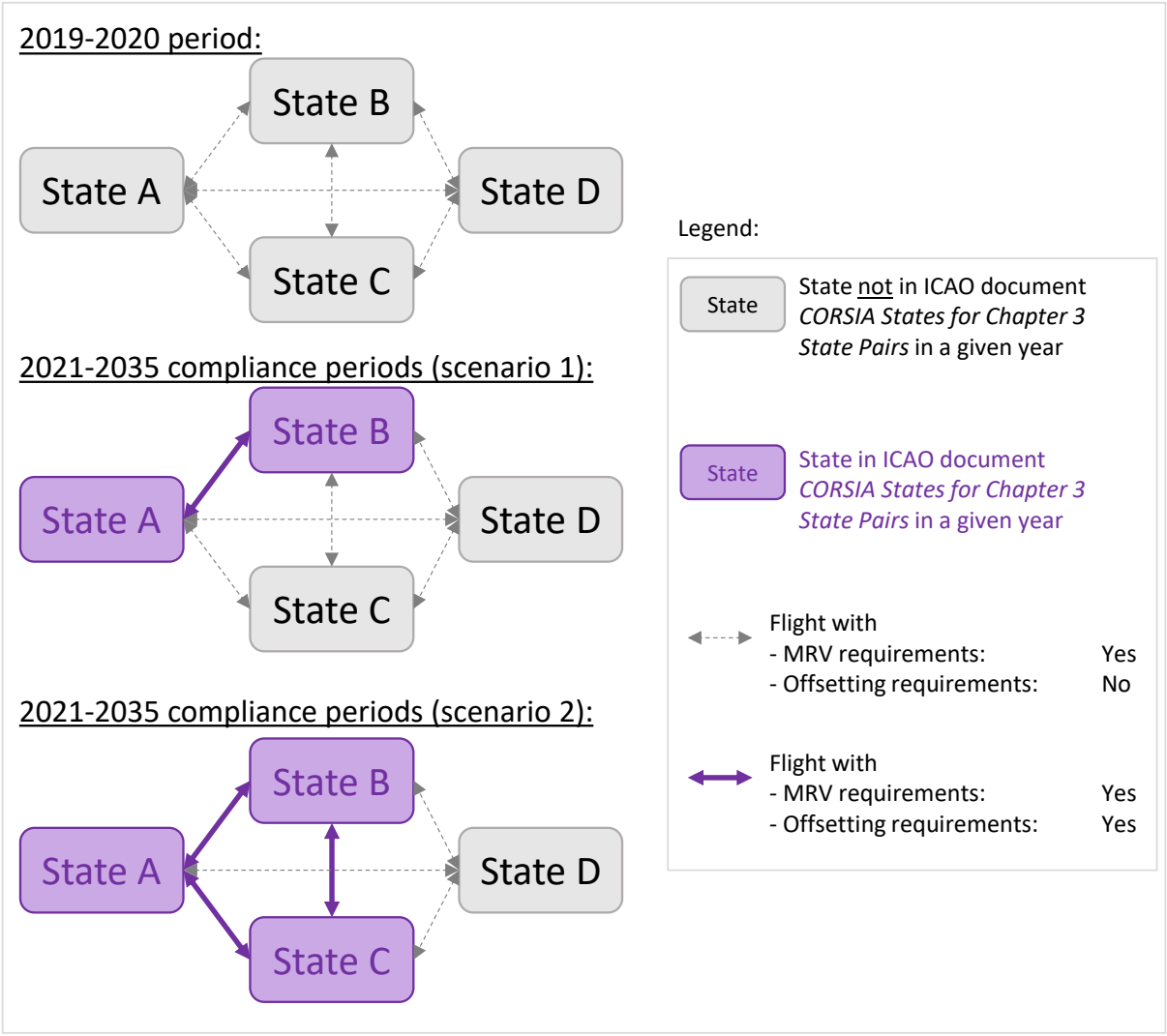


Figure 2-2. Illustration of MRV and offsetting requirements

2.3.2 New entrants

A new entrant aeroplane operator is not subject to 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 non-applicability 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.

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 the 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* summarizing 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 as soon as practicable after 30 June 2020 and will be updated on an annual basis:

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 totalling 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.

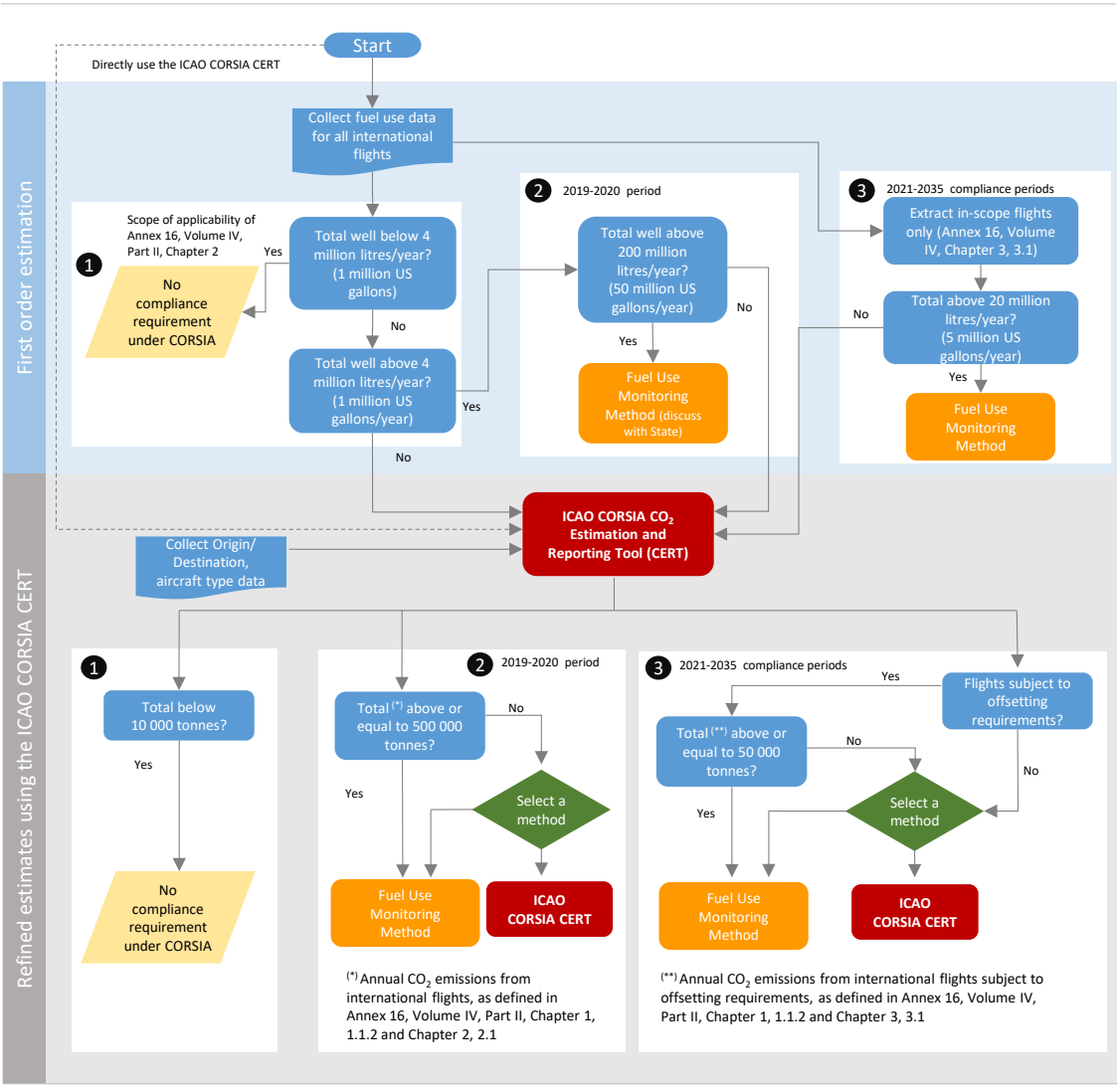


Figure 3-1. Overview of a decision tree for operators to determine whether they are outside the applicability scope of CORSIA

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.

When 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

In accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.3.2, the aeroplane operator will record the fuel density (which may be an actual or a standard value of 0.8 kg per litre) that is used for operational and safety reasons (e.g., in an operational, flight or technical log). The procedure for informing the use of actual or standard density will be detailed in the Emissions Monitoring Plan along with a reference to the relevant aeroplane operator documentation.

When the aeroplane operator uses a standard density, 0.8 kg per litre should be used for the Emissions Report even if the aeroplane operator uses a different standard value in its operations.

Measurement of actual 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 specifics of the data on fuel density recorded by an aeroplane operator 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 actual fuel density

Figure 3-2. Process of monitoring and collecting actual 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 standardized methods to measure density;

c) The density information is then recorded and passed to the 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 the aeroplane operator for their records;

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

Aeroplane operator

An aeroplane operator may record fuel density data for each individual flight through different pathways, depending on their fuel management processes and procedures. Fuel density data may be recorded on paper or electronically, before being entered manually or transmitted automatically into the aeroplane operator's fuel data management system.

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.

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

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
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 purposes; copy of the air operator certificate; or place of juridical registration.	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.
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 certificated maximum 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.

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
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.
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.

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
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, 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.	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.	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 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.

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
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 establishing individual 2019-2020 CO_2 emissions for the parent and subsidiary (or subsidiaries).	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 corporate entities.	Can be material – if the aeroplane operator changes systems and procedures for segregating the information.
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	Subject to review and approval by the State; reviewer to review and confirm that aeroplane	Can be material – if the aeroplane operator changes methods or seeks to revise its approach to fuel density, that

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
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.	operator has properly identified an applicable Fuel Use Monitoring Method(s) as described in Annex 16, Volume IV, Appendix 2.	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 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 aeroplane 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 whom.	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,	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has noted methodology for handling data	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.

Emissions Monitoring Plan provision	*Checklist for State review*	*Material change or notice of change*
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?	gaps and erroneous data values.	
Documentation and record keeping plan.	Information provided? Check “Yes” or “No”.	Not material.
Brief assessment of the risks associated with the data management processes and means for addressing significant risks.	Subject to review and approval by the State; reviewer to review and confirm that aeroplane operator has noted methodology for addressing.	Can be material – if the aeroplane 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.

For the purpose of the implementation of the CORSIA Fuel Use Monitoring Methods, block-off and block-on are defined as follows:

a) Block-off: any time between last door closed and first engine on. Any deviation from this definition should be in accordance with the aeroplane operator's existing operational practices as defined in the Emissions Monitoring Plan. The aeroplane operator shall state the points at which block-off measurements will be taken in its Emissions Monitoring Plan, with a reference to the relevant aeroplane operator documentation, to be approved by the administrating authority; and

b) Block-on: any time between last engine out and first door open. Any deviation to this definition should be in accordance with the aeroplane operator's existing operational practices as defined in the Emissions Monitoring Plan. The aeroplane operator shall state in its Emissions Monitoring Plan the points at which block-on measurements will be taken, with a reference to the relevant aeroplane operator documentation, to be approved by the administrating authority.

Note.— Flight time is synonymous with the terms "block-to-block time", "block time", or "chock-to-chock time" in general usage, which is measured from the time an aeroplane first moves for the purpose of taking off until it finally stops at the end of the flight.

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).

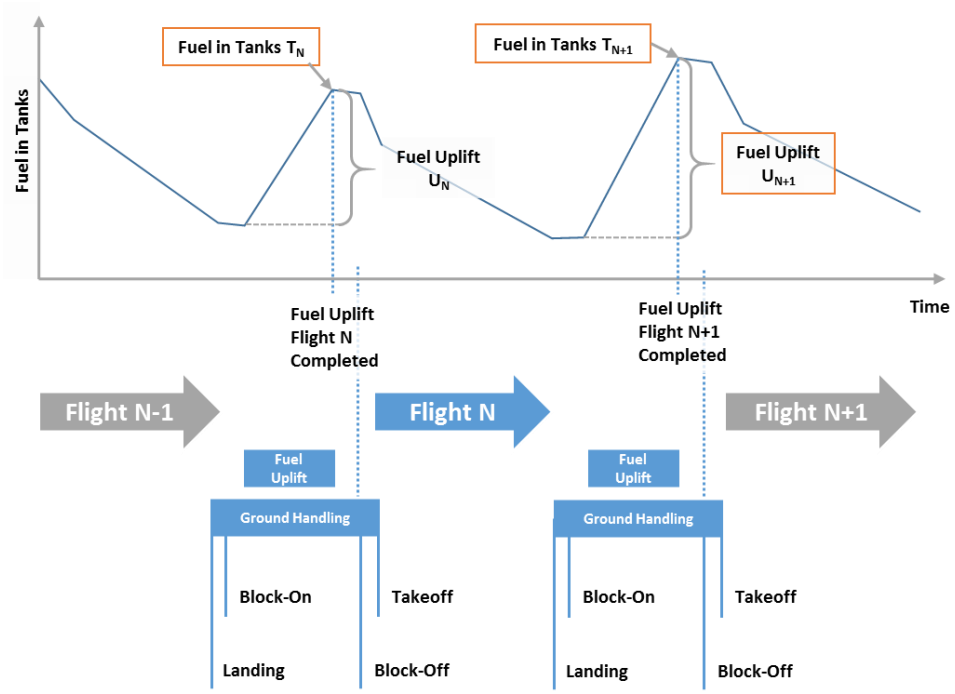


Figure 3-3. Fuel Use Monitoring Method A

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	23.2
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).

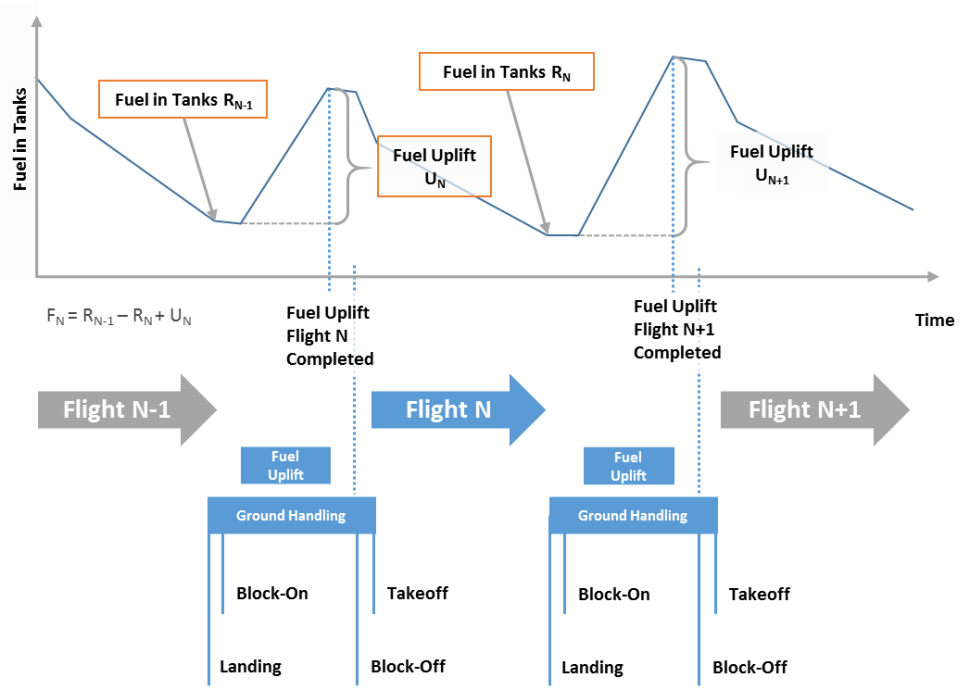


Figure 3-4. Fuel Use Monitoring Method B

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 the Block-off/Block-on method

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.

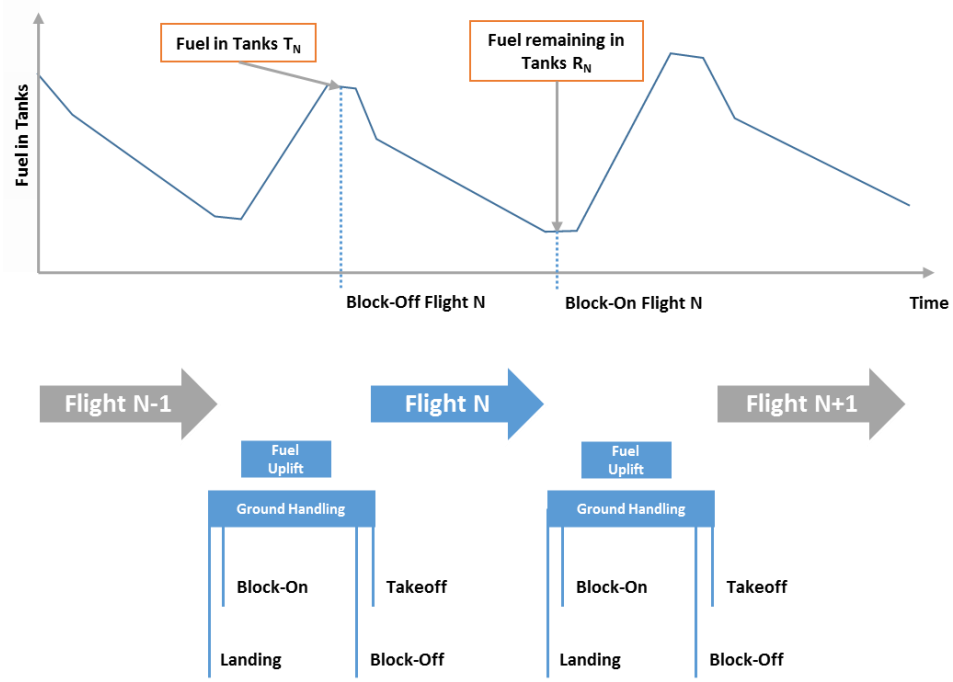


Figure 3-5. Fuel Use Monitoring Method Block-off/Block-on

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 the implementation of the Fuel Uplift method

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.

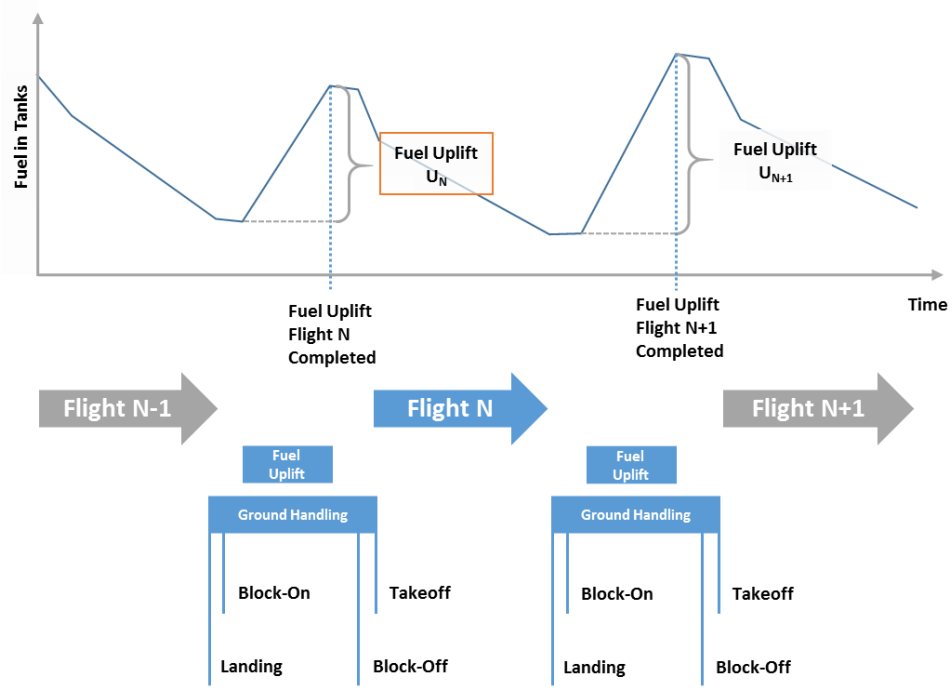


Figure 3-6. Fuel Use Monitoring Method Fuel Uplift

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.

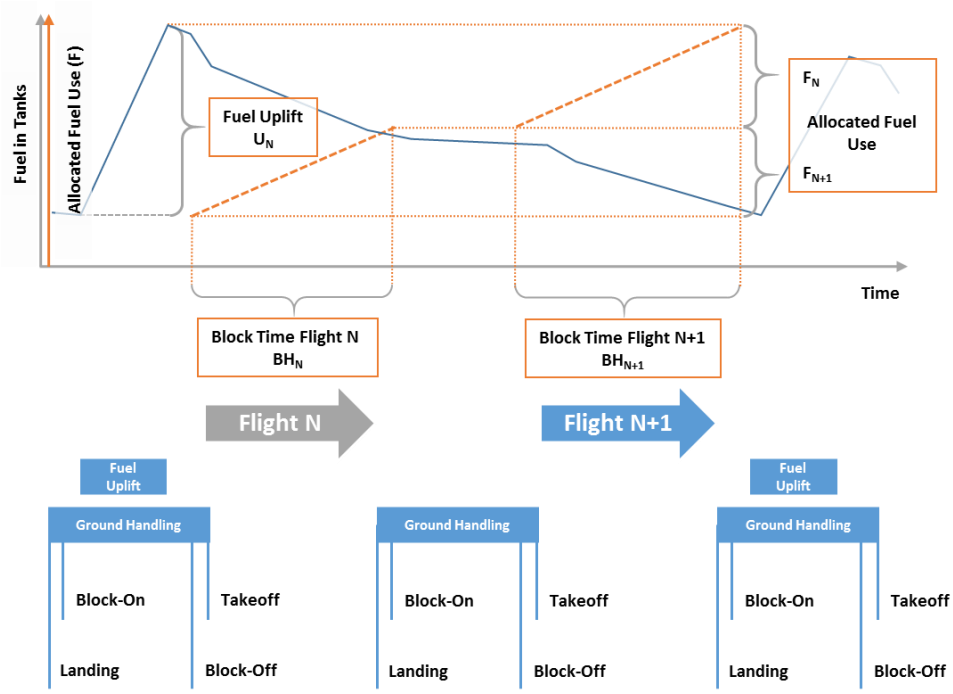


Figure 3-7. Fuel Use Monitoring Method Fuel Uplift (allocation of fuel use)

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 the Fuel Allocation with Block Hour method

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 of the same aircraft type (ICAO aircraft type designator level) in the same year:

a) When it can be clearly distinguished between fuel uplifts for domestic and international flights: actual fuel use (determined using the fuel uplift methodology) and block hour per flight for all international flights of the aeroplane type in the reporting year.

b) When it cannot be clearly distinguished between fuel uplifts for domestic and international flights: fuel uplift and block hour 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 hour. The AFBR will be determined specifically for each aeroplane operator and aeroplane type used. The “computation of average fuel burn ratios” and the “computation of fuel use for individual flights” are defined in Annex 16, Volume IV, Appendix 2, 2.6.1 and 2.6.2, respectively. 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:

$$F_N = AFBR * BH_N$$

Addressing missing data under the Fuel Allocation with Block Hour method:

The Fuel Allocation with Block Hour method requires the collection of block time and fuel uplift data to calculate the AFBR in a given year for a given aeroplane type.

In the case where no primary and secondary data sources are available to determine the block time and/or fuel uplift for one or more flights (i.e., there are data gaps), the aeroplane operator will use the ICAO CORSIA CERT to estimate and report CO_2 emissions for each flight with data gaps, in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.5.1.

For all remaining flights (i.e., excluding flights with data gaps), the aeroplane operator will apply the Fuel Allocation with Block Hour method for the respective aeroplane(s) in accordance with Annex 16, Volume IV, Appendix 2, 2.6. The AFBR should be computed without considering the flights for which a data gap occurred. The AFBR is not to be applied on flights with data gaps.

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 CERT is available on the ICAO CORSIA website.

3.1.6 Data gaps at aeroplane operator level

Data gaps occur when an aeroplane operator is missing data relevant for the determination of its fuel use for one or more international flights in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.1.1. Gaps in emissions-related data can occur due to various reasons, including irregular operations, data feed issues or critical system failures. Examples include cases where there is a missing block-off value, a missing fuel invoice, or a missing fuel density measurement, and no secondary source is available. The data gap may, on occasion, include information about the actual flight itself, such as Aerodrome of Departure (ADEP) or Aerodrome of Destination (ADES) incorrectly recorded, or unavailable from, on board system.

When data from a primary source is missing but an agreed secondary source can be used instead, as detailed and approved in the aeroplane operator's Emissions Monitoring Plan, this is sufficient to provide the information and it is not considered a data gap. The primary data source refers to the electronic or paper process and documentation which are used by default by the aeroplane operator to record fuel data measurements. A secondary data source is any other process and documentation which can be used by the aeroplane operator to record fuel data measurements required for the application of the approved Fuel Use Monitoring Method. The secondary data source must provide a fuel data measurement and cannot be estimated or statistically reconstructed. The measurement must be equivalent to the measurement which would have been obtained through the primary source, and it should not be measured at a materially different point in time. Such secondary sources may include, for example, the technical log or a fuel invoice.

Using a data source from an equivalent point in time as the missing measurement allows the approved Fuel Use Monitoring Method to be completed so as to achieve the measurement of fuel for the flight in question according to the requirements of that monitoring method. To use a simple example, the secondary data source for block-off/block-on provides a recorded measurement of block-off fuel at an equivalent time to when the regular block-off measurement would be taken and/or it provides a recorded measurement of block-on fuel at an equivalent time to when the regular block-on measurement would be taken. If such a data source is not available, it is not permitted, for example, to use the Fuel Uplift method instead for that flight, but the fuel should be estimated using the ICAO CORSIA CERT.

A data gap occurs when approved primary and secondary data are not available (i.e., the data is incomplete to calculate the emissions for the flight) and, as a result, the approved fuel monitoring method cannot be applied to determine fuel use. In this case, the emissions for the flight in question will be estimated using the ICAO CORSIA CERT, in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.5.1.

Flights with incomplete primary and secondary data are the flights which count towards the 5% data gap threshold.

It should be noted that all flights subject to the applicability of CORSIA need to be reported in the Emissions Report; no "flight gaps" are allowed in the final report.

3.1.7 Data gaps at State level

3.1.7.1 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).

3.1.7.2 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. If 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. In the case 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. If 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.

In the case 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 Aeroplane operator reporting to the State

3.2.1.1 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. In line with the timeline reflected in Annex 16, Volume IV, Appendix 1, aeroplane operators subject to MRV requirements in CORSIA are to submit an Emissions Report for the first time by 31 May 2020 for data corresponding to 2019 CO_2 emissions.

An aeroplane operator should use the standardized 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.

A State may require their aeroplane operators to report emissions using their own template and/or may require the reporting of information additional to that contained in Annex 16, Volume IV, Appendix 5, Table A5-1. Each aeroplane operator should therefore check with their reporting State to determine any such State-specific requirements.

3.2.1.2 Emissions Unit Cancellation Report Template

An aeroplane operator will submit an Emissions Unit Cancellation Report (EUCR) to the State to which it has been attributed in accordance with Annex 16, Volume IV, Part II, Chapter 4, 4.3. In line with the timeline reflected in Annex 16, Volume IV, Appendix 1, aeroplane operators subject to offsetting requirements in CORSIA are requested to submit an EUCR for the first time by 30 April 2025 for the cancellation of emissions units related to the offsetting requirements accrued by the operator in the 2021-2023 period.

An aeroplane operator should use the standardized EUCR template that will be included in Appendix 1 of a future revision of this manual to develop the EUCR for submission to its State. A standardized EUCR in the format of a spreadsheet will be made available to aeroplane operators from the ICAO CORSIA website.

A State may require their aeroplane operators to report emissions unit cancellations using their own template and/or may require the reporting of information additional to that contained in Annex 16, Volume IV, Appendix 5, Table A5-7. Each aeroplane operator should therefore check with their reporting State to determine any such State-specific requirements.

3.2.2 State reporting to ICAO

In addition to the data fields in Annex 16, Volume IV, Appendix 5, Table A5-6, Field 1, States should also report the production location of the neat CORSIA eligible fuel for inclusion in the ICAO document entitled *CORSIA Central Registry (CCR): Information and Data for Transparency* that is available on the ICAO CORSIA website. Likewise, for the data Field 3, States should report the default or actual life cycle emissions value (LSf) for a given CORSIA eligible fuel. Sharing this additional information and its publication through the CCR is expected to ensure transparency and avoid double claiming of CORSIA eligible fuels.

In addition to the data fields in Annex 16, Volume IV, Appendix 5, Table A5-3, Field 2, States should also report the relevant web link of the national accreditation body that contains a list of verification bodies accredited, in the State, to the requirements in Annex 16, Volume IV, Chapter 2, 2.4.2.1. States are encouraged to provide updates to the list of accredited verification bodies, in line with Annex 16, Volume IV, Part II, Chapter 1, 1.3.7, on a more frequent basis than the once-a-year minimum reporting timeline as defined in Annex 16, Volume IV, Appendix 1.

3.2.3 Publication of information by States

Note.— The recommendations in this section are also applicable in instances where several States choose to publish the information on the same web page(s).

In accordance with Annex 16, Volume IV, Part II, Chapter 4, 4.3.3, States should publish the “total final offsetting requirements over the compliance period for each aeroplane operators attributed to the State”. States are encouraged to publish this information as soon as practicable, but no later than 28 February 2025. The same day and month should apply to subsequent compliance periods.

In accordance with Annex 16, Volume IV, Part II, Chapter 4, 4.3.3, States should publish the “total quantity of emissions units cancelled over the compliance period by each aeroplane operators to reconcile the total final offsetting requirements, as reported by each aeroplane operator attributed to the State”. States are encouraged to publish this information as soon as practicable, but no later than 31 October 2025. The same day and month should apply to subsequent compliance periods.

To allow ease of access, harmonization and greater transparency, States are encouraged to format presented information, described above, in a manner consistent with the presentation of public information on the ICAO CORSIA public website, including but not limited to the use of language and numeric characters. States are encouraged to present information in the national language(s) and in English. Additional use of the other five official ICAO languages would be welcome.

To ensure a high level of consistency of data published by ICAO and States, States should ensure that the identification of aeroplane operators used for the purposes of publishing information on the States’ websites are identical to those notified by them to ICAO.

States are encouraged to include links to the ICAO CORSIA public website and any other information States deem relevant, such as their national accreditation body's CORSIA accreditation programme (where relevant).

States are encouraged to design CORSIA web page(s) to be accessible and user friendly to the extent possible, such as through the use of lists or tables for datasets, and allowing users to search, filter and download information.

States are encouraged to provide public information free of charge. The web page(s) containing this information should be available to the general public, with no credentials required, and with no prior authorization necessary to access them.

When there is an update to the published information, States are encouraged to provide explanations of the changes. For data for which this is relevant, the change log should include the beginning of the validity of the modifications. Previous versions of the information or documents may be required for various purposes and should be archived (but downloadable) for State and public use.

When a State identifies a discrepancy of data already published, the State should coordinate with ICAO in order to publish the correction with minimum delay, to reduce the time interval when the data is discrepant between the State's web page and the ICAO CORSIA public website. To ensure transparency, previous versions (editions) of documents which have been modified should be retained and made available on the State's web page, while making clear they have been subsequently updated.

In addition to any web-based presentation/summary of information, and any presentation of information in a downloadable document, where large quantities of information are to be published, States are encouraged to publish this information in a machine-readable, downloadable format, e.g. XLSX.

3.3 VERIFICATION

3.3.1 Introduction

This section addresses the verification of both the aeroplane operators' Emissions Reports and the Emissions Unit Cancellation Reports (EUCRs).

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. 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 then carries out an order of magnitude check and approves the Emissions Report.

Third-party verification of aeroplane operators' EUCRs by an independent accredited verification body is required every three years, beginning with the EUCR for the 2021-2023 period to be verified between 1 December 2024 and 30 April 2025 as described in Annex 16, Volume IV, Appendix 1. In advance, and to enable aeroplane operators to cancel the correct number of CORSIA Eligible Emissions Units, the State will inform the aeroplane operator by 30 November 2024 of their final offsetting requirements for the 2021-2023 period (30 November 2027 for the 2024-2026 period and so on). To enable the verification, it is required that the aeroplane operator requests that the cancellation of CORSIA Eligible

Emissions Units is communicated on the respective CORSIA Eligible Emissions Unit Programme registry public website in accordance with Annex 16, Volume IV, Part II, Chapter 4, 4.2.2 b). On the basis of further guidance contained in this manual, aeroplane operators are invited to perform a voluntary pre-verification of the EUCRs before the verification. The deadline for submitting the EUCR and associated Verification Report is the same as for the Emissions Report (30 April). The aeroplane operator and the verification body both independently submit, upon authorization by the aeroplane operator, a copy of the EUCR and associated Verification Report. The State then carries out an order of magnitude check and approves the EUCR.

3.3.1.1 Key documents and systems

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.

Emissions Unit Cancellation Report (EUCR)

The aeroplane operator will draft an EUCR for each compliance cycle, in accordance with the requirements of Annex 16, Volume IV, Part II, Chapter 4, 4.3.1 and Appendix 5. This is the main document through which the aeroplane operator will demonstrate it has fulfilled its cancellation requirements under CORSIA. The EUCR will be verified by a verification body and submitted to the State together with the Verification Report of the verification body.

Programme registry

An emissions unit registry is a registry that a programme designates to provide its registry services, and is described in the information the programme submits to ICAO. A registry is an electronic database system which contains accounts and emission certificates (units) and can be accessed through the internet. The accounts belong to account holders who in turn authorize representatives to access the accounts and act on their behalf. Units are generated within the registry and contain serial numbers like banknotes. In the registry the serial numbers are mostly implemented as blocks, with a start block and an end block (batch). The serial number systems are not uniform in the various registries. A registry can manage different unit types, such as those from climate projects or sink projects. Account representatives initiate transactions of units to other accounts. Once used for a specific purpose, the units cannot be used again. The used units remain in this account indefinitely and the status cannot be changed, reversed or transferred to another account for another purpose. Some systems distinguish between the purpose for which a cancellation has taken place, offering a predetermined option (i.e. cancellation towards a specific compliance obligation), whereas others may offer a generic cancellation option, sometimes referred to as retirement, under which the account use can indicate the purpose/entity in whose name a unit has been cancelled.

Verification Report

The verification body will draft a verification report that reflects the scope of the verification after the completion of verification activities as described in Annex 16, Volume IV, Part II, Chapter 2, 2.4 and/or Chapter 4, 4.4. The Verification Report contains a concluding verification statement. Both the aeroplane operator and the verification body, upon authorization by the aeroplane operator, will forward a copy of the Verification Report together with the associated Emissions Report and/or EUCR to the State. Together with the Emissions Report and/or EUCR, the State will review the Verification Report and may contact the aeroplane operator and the verification body to receive further explanations if required. Annex 16, Volume IV, Appendix 6, 3.10 sets out the content requirements associated with the Verification Report. Differences in the content of a Verification Report, depending on whether the Verification Report is associated with an Emissions Report, an EUCR, or both, is specified in Annex 16, Volume IV, Appendix 6, 3.10.2. A Verification Report template for use by verification bodies is included in Appendix 1 of this manual. A standardized Verification Report in the format of a spreadsheet is available to verification bodies from the ICAO CORSIA website.

Verification statement

The verification statement is a formal written declaration to the State that provides assurance that the aeroplane operator's assertion of CO_2 emissions and/or emissions unit cancellation 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 and Chapter 4, 4.4. 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

Under CORSIA, two different reports need to be verified. The Emissions Report, which states the annual CO_2 emissions, and the EUCR, which provides information on the cancelled CORSIA Eligible Emissions Units for each three-year compliance period. In principle, an aeroplane operator could engage with two different verification bodies, each for one report. A verification body could also be accredited to provide verification services for the Emissions Report and/or the EUCR. Consequently, aeroplane operators have to carefully consider whether the verification body is indeed accredited to verify the report in question. However, most verification bodies are expected to be accredited to verify both reports.

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 the scope of the verification being carried out; and

b) Satisfy the additional accreditation requirements specified in Annex 16, Volume IV, Appendix 6, section 2, which are different depending on whether a verification body is verifying an Emissions Report or an EUCR. There is also 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 and the scope of the verification being carried out. In addition to ISO 14065, verification bodies must also meet the additional accreditation requirements specified in Annex 16, Volume IV, Appendix 6. 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. The following specific key CORSIA requirements are relevant for the verification of both the Emissions Report and the EUCR:

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. Verification services under CORSIA include the verification of the Emissions Report and/or the EUCR. When CORSIA verification services include both the verification of the Emissions Report and the EUCR, it counts as only one year towards the six-year maximum.

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 requirements are different for the verification of the Emissions Report and of the EUCR. Technical

aviation knowledge and expertise is emphasized for the verification of the Emissions Report whereas the requirements for the verification of the EUCR are more focused on quality assurance and basic knowledge of greenhouse gas markets and emissions units programme registries. In circumstances where a verification body is engaged to verify an EUCR only, Annex 16, Volume IV, Appendix 6, 2.5.2 and 2.6.4 provide the applicable requirements for verification body knowledge and technical expertise, respectively. It is important to point out that knowledge and expertise requirements do not have to be met by each single verifier but by the verification team as a whole. Documenting and evaluating team competencies, and ensuring continual professional development and training for verification bodies, play a key role in achieving the required knowledge and expertise requirements.

a) Knowledge requirements for verification teams (Annex 16, Volume IV, Appendix 6, 2.5).

With the exception of any relevant national additional provisions required by Annex 16, Volume IV, Appendix 6, 2.5.1 e) or relevant national stipulations[2], the knowledge requirements listed in Annex 16, Volume IV, Appendix 6, 2.5 can be fully met by an in-depth study of Annex 16, Volume IV and the *Environmental Technical Manual* (Doc 9501), Volume IV.

Since knowledge of these requirements is of upmost importance, other means may be important additions for the overall education of verification teams. The following list of options can facilitate the development of training approaches to ensure knowledgeable verification teams:

1) Internal training: this type of training refers to an individual or group study within the verification body. Internal courses are prepared by internal trainers or verifiers based on Annex 16, Volume IV, Appendix 6, the *Environmental Technical Manual* (Doc 9501), Volume IV and other potentially relevant or supporting information, e.g. ICAO website. It is essential to document the courses, including the content of the training, training material, time and duration of meetings and lists of attendees. It is recommended to conclude these training courses with a written knowledge test and a minimum pass rate.

2) Contracting an external trainer (customized training): verification bodies can contract with an external trainer to receive training for their teams. This does not replace an internal process within the verification body to ensure that the full content of Annex 16, Volume IV and the *Environmental Technical Manua*l (Doc 9501), Volume IV was included in the training and that the training was documented. This approach can reduce overall demands on the verification body but the availability of external trainers might be limited, especially at the beginning of the scheme.

3) Attendance on external training course or participation in external information session: the verification body can place team members on an external training course or have them participate in external information sessions (e.g. ICAO or State organized events). The verification body would retain responsibility for ensuring that the full content of Annex 16, Volume IV and the *Environmental Technical Manual* (Doc 9501), Volume IV was included in the training, and that the training was documented and completed to a satisfactory standard, e.g. with an exam and minimum pass rate at the end. However, it is recognized that there may be limited availability of such courses at the beginning of the scheme.

2. For example, the decision by the State to require aeroplane operators to submit data on a State Pair or Aerodrome Pair level in the aeroplane operators' Emissions Report. It is important to point out that the verification body would also need to demonstrate knowledge of any additional relevant national requirements or procedures for determining national requirements related to flexibilities within Annex 16, Volume IV.

4) Combination of options outlined above: in order to reach a sufficient understanding of the CORSIA provisions (including the specific national legislation), verification bodies might use different sources of information (e.g. an internal training approach with self-study based on available ICAO information, followed by a one-day customized internal training to address any open or remaining questions). Finally, any State information sessions should be attended so that team members can inform themselves about the relevant national legislation and CORSIA characteristics.

b) Technical expertise requirements for verification teams (Annex 16, Volume IV, Appendix 6, 2.6).

The technical expertise requirements listed in Annex 16, Volume IV, Appendix 6, 2.6 refer in most cases to expertise which cannot be obtained by an intensive study of Annex 16, Volume IV and this manual. However, the listed items form the minimum technical understanding which is necessary for a verification team to conduct a verification.

During the accreditation, the verification body must demonstrate that it has processes in place to ensure the appointment of technically competent verification teams. One example of such a process involves conducting a detailed comparison of the requirements outlined in Annex 16, Volume IV, Appendix 6, 2.6.1 and 2.6.2 in the form of a matrix, specifying for each verification team member to what extent each of the requirements listed are being met (gap analysis) and which documents were used to prove a specific expertise.

As stated in Annex 16, Volume IV, Appendix 6, 2.6.2, technical competency may be demonstrated through previous, direct professional experience in a technical capacity within the aviation sector, complemented by appropriate training and education credentials. At least one member of the verification team is required to provide evidence of “direct professional experience in a technical capacity within the aviation sector”. If the existing verification team does not have previous work experience in the aviation sector, but is able to provide sufficient evidence to meet the requirements in Annex 16, Volume IV, Appendix 6, 2.6.1, the verification body should engage with the accreditation body to determine if external training by aviation professionals with a strong emphasis on the “hands-on” practical operational aspects of an aeroplane operator could offer an acceptable form of professional experience. Most aeroplane operators with their own training facility offer aviation courses which external participants may attend, as do other aviation bodies such as independent flight crew training facilities. In addition to such applied training programmes, other possibilities for demonstrating experience in a technical capacity within the aviation sector may include internships or work placements in the field of civil aviation.

After analysing the verification team technical expertise, it is the task of the verification body to analyse whether the identified distribution of competencies throughout the potential verifiers could be combined into a team that meets all the requirements in Annex 16, Volume IV, Appendix 6, 2.6.

Depending on the results of this review, several options are possible. If the result of the review is that the verification body already has a team of verifiers that satisfy each of the competencies listed in Annex 16, Volume IV, Appendix 6, 2.6.1 and 2.6.2, including members who have sufficient expertise to fulfil the role of the independent reviewer, the verification body can use its existing verifiers to conduct the CORSIA verification.

If the result of the review indicates that there is a gap in technical competency, the verification body needs to develop and document a training approach to resolve the deficits in accordance with its established internal processes. These are similar to the approaches described above in the guidance for Annex 16, Volume IV, Appendix 6, 2.5, such as internal or external training, as well as the applied

training options described in this section. However, as Annex 16, Volume IV, Appendix 6, 2.6 has a strong emphasis on both expertise and experience, hiring of additional staff is an alternative, which should be strongly considered.

c) Knowledge requirements and the technical expertise requirements for independent reviewers (Annex 16, Volume IV, Appendix 6, 2.5 and 2.6).

Independent reviewers are also required to meet the provisions of Annex 16, Volume IV, Appendix 6, 2.5 and 2.6, given that only comprehensive knowledge and expertise enables the independent reviewer to satisfactorily fulfil its task. This includes the critical analysis of the verification approach taken by the verification team such as reviewing the provided information and data, identifying contradictory information, ensuring completeness and integrity of documentation and potentially questioning the proposed verification statement. The approaches and options to meet the knowledge and expertise requirements outlined for the verification teams in the previous sections of this manual are applicable for the independent reviewer as well. This also includes the option that an independent review could be performed by two or more people with complementary knowledge and expertise to satisfy all provisions in Annex 16, Volume IV, Appendix 6, 2.5 and 2.6.

Annex 16, Volume IV, Appendix 6, 2.9 enables the verification body to establish a partnership to outsource the independent review to a qualified entity. Nevertheless, this option should only be chosen if the verification body itself is not in the position to identify among its own staff people not involved in the verification engagement who meet the knowledge requirements to perform the independent review, and also if this approach is duly covered by its accreditation. In this regard, it is important to establish sufficient means in the internal documentation of the verification body to give the independent reviewer appropriate authority and access to necessary data and information to carry out the review.

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.

3.3.2.3 States with a limited accreditation infrastructure

If a State has not (yet) established a national accreditation body (NAB) (or a similar institution which operates in accordance with ISO 17011) or has made a deliberate decision to not implement an ISO 14065 accreditation scope through its NAB, the following alternative options can be assessed by the State.

Option 1

A State may include in its national CORSIA regulation a provision to accept verification statements of verification bodies accredited by a specific foreign regional NAB (by naming the specific NAB). To gain guidance and an overview of the accreditation situation of other States in the geographical region, contact with the regional accreditation cooperation bodies is recommended, as follows:

a) Africa:

   1) SADCA (Southern African Development Community in Accreditation); and

   2) AFRAC (African Accreditation Cooperation);

b) America: IAAC (Inter-American Accreditation Cooperation);

c) Arabian Peninsula: ARAC (Arab Accreditation Cooperation);

d) Asia-Pacific: PAC (Pacific Accreditation Cooperation); and

e) Europe: EA (European Accreditation).

However, it is strongly advised to analyse the specific accreditation scope of a NAB before the verification statements of accredited verification bodies could be accepted as it is important to ensure that the accreditation is indeed based on the requirements of Annex 16, Volume IV and the *Environmental Technical Manual* (Doc 9501), Volume IV. This is important as States have the freedom to adapt the accreditation scope to their specific national requirements (e.g., technical provisions on data submission).

Option 2

Alternatively, a State could directly refer in its national legislation to the ICAO CORSIA Implementation Elements, as the CORSIA Central Registry (CCR) publishes a list of verification bodies accredited by each State. However, and as in Option 1, this would still require an assessment by the State as to whether the accreditation in a specific foreign State is indeed solely based on Annex 16, Volume IV and the *Environmental Technical Manual* (Doc 9501), Volume IV, or whether the foreign NAB included deviating provisions in the accreditation scope (specific national requirements). As in Option 1, the State is strongly advised to analyse the specific accreditation scope of a NAB before accepting the verification statements of accredited verification bodies.

Option 3

In addition to a national CORSIA accreditation scope, some NABs may also offer verification bodies an additional accreditation on the basis of an internationally applicable CORSIA scope (unbiased by any regional legal characteristics and solely based on Annex 16, Volume IV and the *Environmental Technical Manual* (Doc 9501), Volume IV). Such a “clean” accreditation scope can be recommended to be used for verifications in States with a limited accreditation infrastructure. As in Option 1, contact to the regional accreditation cooperation bodies is recommended to identify any NABs in the geographical region which offer such an international CORSIA accreditation scope. Moreover, most NABs would also accept to accredit foreign verification bodies. Consequently, a NAB offering an international CORSIA scope could potentially also accredit an organization based in a State which itself has only a limited accreditation infrastructure.

3.3.2.4 Witness audit during the accreditation process

The accreditation process of a verification body involves a witness audit where the NAB monitors the verification approach taken by the witnessed verification body during an actual audit. For a new scheme such as CORSIA it can prove challenging for a NAB not just to schedule witness audits during the (short) verification period (e.g., from 1 January to 31 May 2020) but to also finish the remaining administrative accreditation process within this period to enable the verification body to present a valid verification statement of an accredited verification body to its customer.

Obviously, this approach includes risks for the aeroplane operator as well. At the beginning of the scheme, aeroplane operators would need to select a not yet accredited verification body and somehow assess whether the verification body will indeed pass the accreditation process. There is always a remaining risk that the verification body would fail and therefore the aeroplane operator (within the remaining time) would not be able to source verification services from another verification body in time.

To address the issue, the verification body may demonstrate its abilities by pre-auditing data of the aeroplane operator in 2019 already, subject to the agreement of the aeroplane operator. The aeroplane operator would prepare the emissions data and Emissions Report with data from the first month of 2019 and the verification body would perform the witnessed audit on the basis of this (limited) report. This is also a good opportunity for the aeroplane operator to identify issues within the data gathering process at a very early stage which still leaves sufficient time to also resolve methodical errors.

Assuming that the witness audit (within the pre-audit) took place between June and August 2019, the remaining time is enough for the NAB to finish the administrative part of the accreditation process. Consequently, at the beginning of 2020, aeroplane operators would have clear knowledge of which verification bodies have successfully qualified for the CORSIA accreditation scope. An aeroplane operator could then either continue with its verification body (beyond the pre-audit engagement) or source a verification body which has successfully passed the accreditation process.

3.3.3 Verification fundamentals

3.3.3.1 Objective of the verification

Verification of an Emissions Report under CORSIA ensures 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). The verification statement must provide a conclusion on each verification objective as per Annex 16, Volume IV, Appendix 6, 3.2.

3.3.3.2 Scope of verification

The scope of the verification must cover the entire reporting period as stated in the Emissions Report or EUCR and is determined by the activities necessary to achieve the objective of the verification, including any double counting of cancelled emissions. 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 necessary verification activities.

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 registry accounts and/or cancelled emissions units.

3.3.3.3 Level of assurance

Under 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. In cases where the verification body is engaged to verify an EUCR, it must provide reasonable assurance that the claimed volume of eligible emissions unit cancellations is accurate and satisfies the aeroplane operator's offsetting requirement for the applicable compliance period. 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 Greenhouse Gas (GHG) assertions made by an aeroplane operator in the Emissions Report and/or EUCR.

3.3.3.4 Materiality

Annex 16, Volume IV, Appendix 6, 3.4 prescribes the following materiality levels for the Emissions Report:

a) aeroplane operators 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, above 500 000 tonnes will meet a materiality threshold of 2 per cent; and

b) aeroplane operators 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, 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.

The materiality thresholds described above are not applicable for the verification of an EUCR. The verifier is required to verify each reported cancelled unit (no sampling) included in the EUCR. This includes a full check of whether the emission units listed in the EUCR have been used by the aeroplane operator to offset any other emissions.

3.3.4 Verification process for the Emissions Report

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

In advance of seeking verification of its Emissions Report by a verification body, the aeroplane operator should conduct 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.

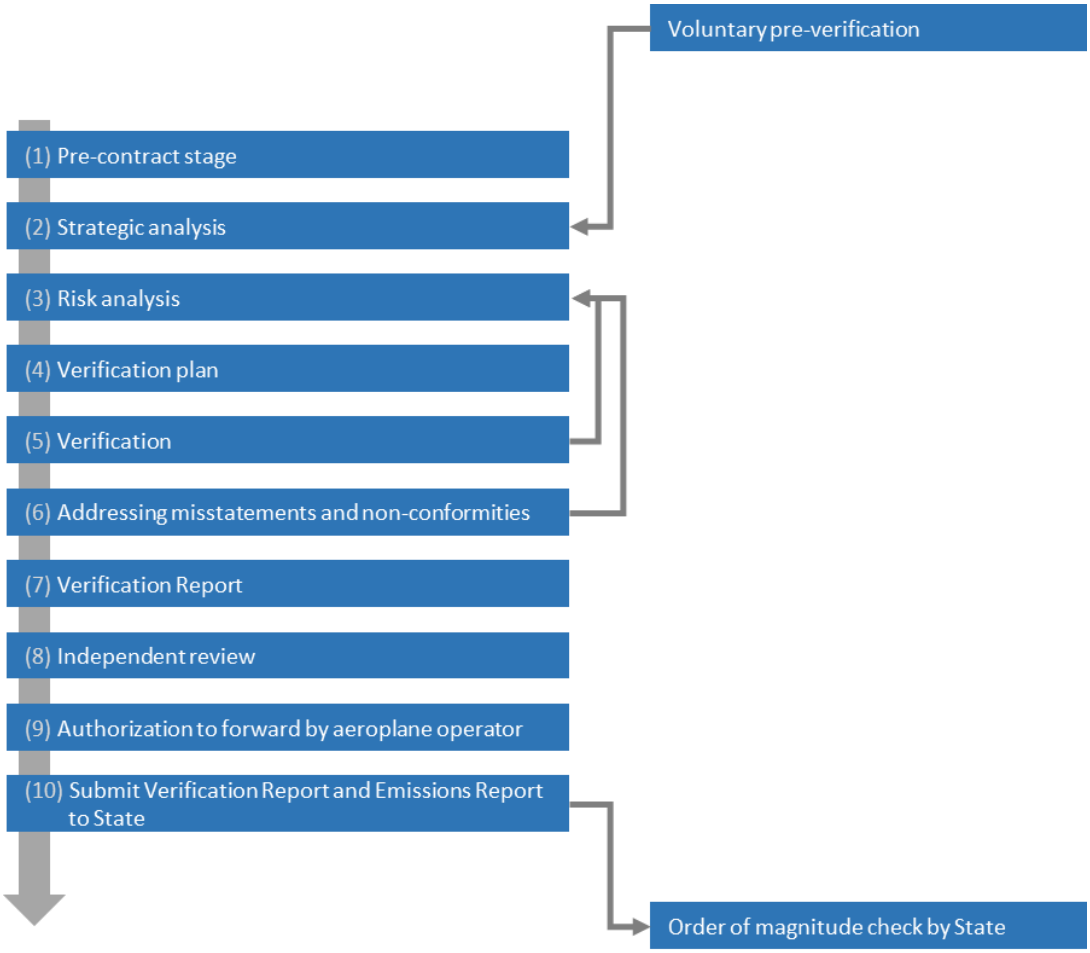


Figure 3-8. Overview of the verification process of an Emissions Report

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*[3]	*Simplified MRV*[4]
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. This analysis should 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 and activities related to the CORSIA?	x	x
		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

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

Completed by	*Topic*	*Task*	*MRV*[3]	*Simplified MRV*[4]
		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
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	

Completed by	*Topic*	*Task*	*MRV*[3]	*Simplified MRV*[4]
		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 guidance on the CORSIA-specific verification characteristics.

(1) Pre-contract stage

The contractual terms of engagement between the aeroplane operator and the verification body should specify the conditions for verification, by stating the type of report being verified (in this case the Emissions Report) and points a) to g) under Annex 16, Volume IV, Appendix 6, 2.12.

The aeroplane operator and the verification body should 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

The verification body should conduct the strategic analysis[5] 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

The verification body should conduct the analysis of risks[6] 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;

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

Note.— For the purposes of Annex 16, Volume IV and this manual, "other GHG schemes" refers to GHG emission reduction programmes other than CORSIA in which the aeroplane operator can reduce its quantified emissions through the use of CORSIA eligible fuels.

(4) Verification plan

The verification body should 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).

When 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, the verification body should 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 3.3.8.2 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 3.3.8.3 of this manual.

(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 for Emissions Report

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 indications 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.		

No.	*Question/Issue*	*Additional information*	*Status: OK/Yes/No/ Not Applicable*	*Notes and results of checks*
43	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?		
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	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.		
49	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.		
50	Does the aeroplane operator report more than 3 500 flights on an aerodrome pair?	If so, get back to aeroplane operator to check plausibility.		
51	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
52	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.		
53	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.		
54	Other defects/comments?			
	Data gaps			
55	Did data gaps occur during the reporting year?	If yes, detailed assessment of the State required.		
56	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?		
57	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.		
58	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.		
59	Is the estimated fuel consumption plausible?	The ICAO CORSIA CERT can be used to perform random checks.		
60	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.		
61	Other defects/comments?			
	Verification body			
62	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*
63	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.		
64	Are there any negative assessments from the verification body?	If so, check whether the issues identified affect the amount of reported emissions.		
65	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.		
66	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.		
67	Has the verification body issued a satisfactory verification opinion with comments?	The verification comments must be examined in depth.		
68	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.		
69	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.		
70	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.		
71	Other defects/comments?			
	Change of data by State			
72	Change of data necessary?			

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

3.3.5 Conducting the verification activities for the Emissions Report

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 (handwritten) or automatically	High

Examples	*Categorization*	*Technical explanation*	*Usability rating*
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
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	–

Examples	*Categorization*	*Technical explanation*	*Usability rating*
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 authorizing an operator to carry out specified commercial air transport operations (Annex 6 to the Convention on International Civil Aviation) — 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 has 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 amounts 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 aeroplanes 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 air operator certificate (or equivalent) and that a copy of this air operator certificate (or equivalent) 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 aeroplanes 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.

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 method

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

Fuel Uplift method

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 method

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 of this manual.

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).

Note.— For the purposes of this manual, a "batch" is a volume of CORSIA eligible fuel that has been assigned a unique designator by the producer of the certified neat CORSIA eligible fuel. The volume of any batch of CORSIA eligible fuels may not exceed 100 million litres. A batch cannot represent CORSIA eligible fuel produced over a period in excess of one calendar month. A batch is characterized by one set of test results (i.e., demonstrated through the certificate of quality generated at the point of production of the neat CORSIA eligible fuel).

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 Verification process for the Emissions Unit Cancellation Report (EUCR)

The verification process for the EUCR under CORSIA can be broken down into 13 steps involving three key participants: the aeroplane operator, the verification body and the State.

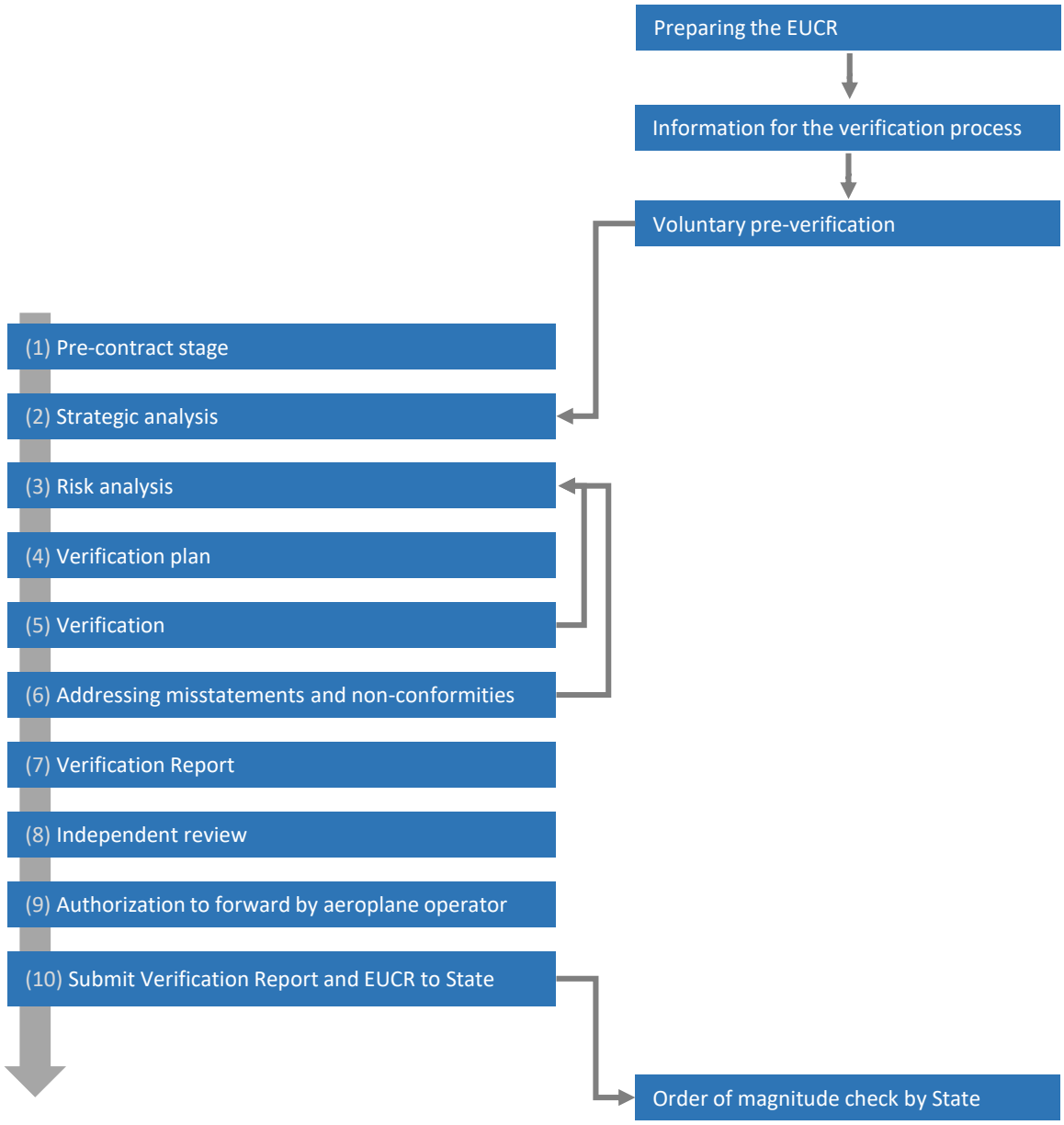


Figure 3-9. Overview of the verification process of an Emissions Unit Cancellation Report

3.3.6.1 Preparing the EUCR

Prior to the start of the verification itself, the aeroplane operator will engage in preparing and filling out an EUCR.

The EUCR will contain the fields as in Annex 16, Volume IV, Appendix 5, Table A5-7. An individual State may require its aeroplane operators to provide further information. The guidance contained here does not consider any such additional requirements and relates to a standardized EUCR template that will be made available on the ICAO CORSIA website.

The guidance herein provides for each required field (i) data entry format; and (ii) sources of data to be used when filling out the report.

Fields 1 to 4

Completion of Fields 1 to 4 requires aeroplane operator information, as shown in Table 3-11.

Table 3-11. Information required for the EUCR (Fields 1 to 4)

Field #	*Data field*	*Details*	*Data format*	*Data source*
1	Aeroplane operator information	1.a Name of aeroplane operator	Alphanumeric	Aeroplane operator – full legal entity name as used in all official correspondence with reporting State
		1.b Detailed contact information of aeroplane operator	Alphanumeric	Aeroplane operator
		1.c Name of a point of contact		Aeroplane operator
		1.d Unique identifier by which an aeroplane operator is attributed to a State, in accordance with Annex 16, Volume IV, Part II, Chapter 1, 1.2.4	Alphanumeric	Aeroplane operator
		1.e State	Text entry	Aeroplane operator
2	Compliance period years reported	2. Year(s) in the reported compliance period for which offsetting requirements are reconciled in this report	Numeric	Aeroplane operator
3	Aeroplane operator's total final offsetting requirements	3. Aeroplane operator's total final offsetting requirements (in tonnes), as informed by the State	Numeric, full values in tonnes only, no decimal points	State to which aeroplane operator is attributed
4	Total quantity of emissions units cancelled	4. Total quantity of emissions units cancelled to reconcile the total final offsetting requirements in Field 3	Numeric, full values in tonnes only, no decimal points	Aeroplane operator

Field 5

Field 5 requires filling out Fields 5.a through 5.m for each "batch" of cancelled emissions units, where a batch is defined as a contiguous quantity of serialized emissions units. For example, a set of cancelled emissions units with serial numbers starting at "XYZ001" and ending at "XYZ005" (five units in total) would be one batch. If the aeroplane operator is also reporting a set of cancelled emissions units starting at "XYZ007" and ending at "XYZ050", these units would constitute a second batch, and would therefore require filling out Fields 5.a through 5.m for this batch as a second entry, and so on.

The majority of the information required under Field 5 will come from the emissions unit programme registry (or registries) within which the cancelled emissions units exist. Further guidance is provided in section 3.3.6.2 of this manual regarding preparing information for the verification process. See Table 3-12 for further information.

Table 3-12. Information required for the EUCR (Field 5)

Field #	*Data field*	*Details*	*Data format*	*Data source/Supporting notes*
5	Consolidated identifying information for cancelled emissions units	For each batch of cancelled emissions units (batch defined as a contiguous quantity of serialized emissions units), identify the following:		
		5.a Quantity of emissions units cancelled	Numeric, full value only in tonnes, no decimal points	Emissions unit programme registry Quantity from and including the starting value in 5.b to ending value in 5.c
		5.b Start of serial numbers	Alphanumeric characters as defined by the CORSIA Eligible Emissions Unit Programme and its registry No cap on number of characters	Emissions unit programme registry cancellation data
		5.c End of serial numbers	Alphanumeric characters as defined by the CORSIA Eligible Emissions Unit Programme and its registry No cap on number of characters	Emissions unit programme registry cancellation data
		5.d Date of cancellation	Date entry format: YYYY-MM-DD (ISO 8601)	Date of cancellation as recorded within emissions unit programme registry

Field #	*Data field*	*Details*	*Data format*	*Data source/Supporting notes*
	Consolidated identifying information for cancelled emissions units *(continued)*	5.e Eligible Emissions Unit Programme	Text entry	ICAO document *CORSIA Eligible Emissions Units* that is available on the ICAO CORSIA website
		5.f Unit type	Text entry Enter only the acronym for the unit In cases where a unit has also been certified under an additional non-carbon programme (i.e., a co-benefit programme), only the unit type as used under the CORSIA Eligible Emissions Unit Programme should be entered, with no further acronyms or characters	Emissions unit programme registry cancellation data *Note.— Unit type refers to the name and/or associated acronym used to describe a unit issued under a given CORSIA Eligible Emissions Unit Programme, i.e. "Certified Emission Reduction", or "CER" is the "unit type" issued under the UNFCCC Clean Development Mechanism (CDM)*
		5.g Host country	Text entry	Emissions unit programme registry cancellation data This is the host country in which the programme activity occurred or is taking place
		5.h Methodology	Alphanumeric In case of more than one methodology, enter title and associated reference (where applicable) of each methodology	Emissions unit programme registry cancellation data A "methodology" may also be described as a "protocol" or "framework". The aeroplane operator should fill out the applicable term as used by the emissions unit programme
		5.i Demonstration of unit date eligibility	Alphanumeric	Parameters of unit date eligibility as contained in the ICAO document entitled *CORSIA Eligible Emissions Units* available on the ICAO CORSIA website

Field #	*Data field*	*Details*	*Data format*	*Data source/Supporting notes*
	Consolidated identifying information for cancelled emissions units *(continued)*	5.j Programme-designated registry name	Text entry	ICAO document *CORSIA Eligible Emissions Units* available on the ICAO CORSIA website CORSIA Eligible Emissions Unit Programme registry
		5.k Unique identifier for registry account to which the batch was cancelled	Alphanumeric	Emissions unit programme registry cancellation data This should be the account in which the cancelled units are recorded
		5.l Aeroplane operator in whose name the unit was cancelled	Alphanumeric	Emissions unit programme registry cancellation data It should be in the name of the reporting aeroplane operator and match the entry publicly visible on the emissions unit programme registry public website
		5.m The unique identifier for the registry account from which the cancellation was initiated	Alphanumeric	Emissions unit programme registry cancellation data

3.3.6.2 Preparing information for the verification process of the EUCR

This section includes guidance for an aeroplane operator to successfully secure and prepare the information required for the verification process. The verification process itself is based on objectives (a) to (c), as contained in Annex 16, Volume IV, Appendix 6, 3.2.2. This section sets out guidance, for each of these three objectives, on what information should be collected and for what purpose.

Objective (a): The aeroplane operator has accurately reported cancellations of its CORSIA Eligible Emissions Units in accordance with Annex 16, Volume IV.

In order to accurately complete the required fields in an EUCR, the aeroplane operator should take all appropriate steps including through contractual arrangement(s), as necessary to ensure the following:

a) The required quantity of CORSIA Eligible Emissions Units are cancelled in the name of the aeroplane operator on a given programme registry, within the timeframe required;

b) The aeroplane operator has access to all the required information to complete the EUCR in a timely manner, in particular in cases where a third party has been engaged to cancel units on its behalf;

c) The aeroplane operator has confirmed that the programme registries which it is utilizing can make public the required fields from Annex 16, Volume IV, Appendix 5, Table A5-7 for its cancelled units, and that it has acquired the rights necessary to instruct (directly or indirectly) the publication of cancelled emissions units on a programme registry website, in the timeframe required; and

d) The aeroplane operator can, if requested, provide a verification body with access to the programme registry account in cases where a quantity of emissions units have been cancelled, for the purposes of completing the verification of an EUCR.

In order to ensure accuracy and avoid data entry errors between information as contained in an emissions unit programme registry and an EUCR, where available the aeroplane operator may wish to download cancellation reports from the given programme registry and cross-check data entered in an EUCR against the registry report.

In order to ensure that the aeroplane operator's reported emissions units are cancelled in accordance with the requirements in Annex 16, Volume IV and can be clearly explained to the verification body, the operator should take the following actions:

a) Identify within all the relevant programme registries to be used, the available options for cancellation of an emissions unit, along with associated terminology and definitions. Such information will be available from the emissions unit programme and/or programme registry;

b) Make use of the cancellation step offered by the programme registry consistent with the note under Annex 16, Volume IV, Part II, Chapter 4, 4.2.2 b) ("Cancel" means the permanent removal and single use of a CORSIA Eligible Emissions Unit within a CORSIA Eligible Emissions Unit Programme designated registry such that the same emissions unit may not be used more than once. This is sometimes also referred to as "retirement", "cancelled", "cancelling" or "cancellation"); and

c) Keep track of the steps used for each programme registry, with associated terminology and make available to the verification body during the verification process.

Note 1.— A programme registry cancellation report, where available, may not include all the required fields of information under an EUCR and therefore the operator may need access to information held within a registry account.

Note 2.— A programme registry cancellation report cannot be used in lieu of a consolidated Emissions Unit Cancellation Report.

Objective (b): The stated number of cancelled CORSIA Eligible Emissions Units is sufficient for meeting the aeroplane operator's total final offsetting requirements associated with the relevant compliance period, after accounting for any claimed emissions 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.

The first part of this objective addresses a material requirement specific to each aeroplane operator of cancelling a required quantity of emissions units, as indicated to it by a State. The information used by a verification body to corroborate and verify whether this objective has been met is as contained in Fields 3, 4 and 5 of the EUCR. The total quantity of cancelled CORSIA Eligible Emissions Units in Field 4 should therefore be equal to the sum of all the batches of cancelled units in Field 5.

The second part of this objective seeks to ensure and protect against a scenario in which the legal rights of use to a cancelled emissions unit contained in an EUCR, beneficial or otherwise, reside with a third party other than the reporting aeroplane operator. The aeroplane operator may use the following sources of data to demonstrate "sole rights of use":

a) Contractual evidence of acquisition/transfer of title and ownership to the emissions unit;

b) Contractual evidence of instructions to a third party to cancel emissions units on an aeroplane operator's behalf;

c) Terms and conditions pertaining to sole rights of use/cancellation, if applicable, between the aeroplane operator and a CORSIA Eligible Emissions Unit Programme registry, where reported units have been cancelled; and

d) Emissions unit programme registry public website, containing corroborating cancellation information, including Field 5.I, "Aeroplane operator in whose name the unit was cancelled".

Objective (c): The CORSIA Eligible Emissions Units cancelled by the aeroplane operator to meet its offsetting requirements under Annex 16, Volume IV have not been used by the aeroplane operator to offset any other emissions.

This objective seeks to ensure and protect against a scenario in which the same emissions unit has been used (intentionally or not) by the aeroplane operator towards another requirement, which may be regulatory or voluntary in nature.

a) Regulatory schemes:

The aeroplane operator should identify whether it is participating in (or expects to be shortly participating in) another mandatory scheme which requires the cancellation of emissions units, eligible under both CORSIA and any such other requirements. In the case where the operator is required to physically "surrender" or "transfer" the eligible emissions unit to a regulatory body, the risk of double use is mitigated, as an emissions unit cannot be both transferred and reported as cancelled for the purposes of CORSIA in a programme registry. In the case where an operator is participating in a regulatory scheme other than CORSIA, where (i) the same emissions units are eligible (as under CORSIA) and (ii) such other scheme does not require physical transfer of a unit, the risk of reporting the same cancelled unit exists. Therefore, the operator should in such instance prepare the following information to be reviewed by a verification body:

1) All relevant rules and participation information of any other such regulatory scheme(s), including emissions units eligibility information, compliance and reporting requirements and timelines;

2) All internal control and risk management procedures utilized to mitigate such risks, including any applicable audit documentation; and

3) Cancellation information of emissions units under such programme, including audit reports where applicable, for the current relevant reporting cycle. This information should be in an electronic format and made available for the verification body to conduct a comparison between unique identifiers (serial numbers).

b) Non-regulatory/voluntary schemes:

In cases where an aeroplane operator has been, or is currently participating in, or is operating a non-regulatory (voluntary) scheme, where emissions units used are also eligible for use under CORSIA, then a risk exists of intentional or unintentional dual use. An example of such a scheme is when an aeroplane operator is offsetting its own emissions, operating a consumer opt-in/opt-out programme. Therefore, the operator should in such instance prepare the following information to be reviewed by a verification body:

1) All internal information regarding such schemes, including past specific emissions units, as well as retirement/cancellation information of emissions units made in a period starting from three calendar years prior to the start of the reported CORSIA compliance cycle. This information should be in an electronic format and made available for the verification body to conduct a comparison between unique identifiers (serial numbers);

2) All internal control and risk management procedures utilized to mitigate such risks, including any applicable audit documentation; and

3) Public reporting materials, such as Corporate Social Responsibility (CSR) reports and marketing materials, or submissions made under voluntary reporting initiatives/certification schemes such as, for example, the Carbon Disclosure Project (CDP).

3.3.6.3 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. Similar to the Emissions Report, it is recommended to appoint an internal auditor. The main objective of the audit is to ensure that all relevant data is available for the verification body and is also presented in a way which allows for an effective but also efficient audit. In addition to the list included in Table 3-13, the aeroplane operator is encouraged to develop its own internal cross-checks. These could, for instance, include approaches to compare the key steps in the process for internal commissioning of purchasing emissions units, with the units being held in a registry to ensure eligibility, or a general analysis to determine whether there are other internal processes (e.g., within subsidiaries), which use offsetting as well to meet legal or voluntary requirements.

Table 3-13. Voluntary pre-verification checklist

Completed by	*Topic*	*Task*	*Satisfactorily completed: Yes/No/ Not completed/ Not applicable*
Aeroplane operator CORSIA management team	**Selecting internal auditor**	Has a qualified internal auditor or audit team been chosen?	
		Is it ensured that the internal auditor has the required knowledge and skills and is independent from the activity being audited?	

Completed by	*Topic*	*Task*	*Satisfactorily completed: Yes/No/ Not completed/ Not applicable*
Internal auditor	**Understand aeroplane operator emissions unit cancellation process**	Review aeroplane operator's plan to conduct cancellations and other relevant internal procedures for conducting cancellations and collating information (data flow charts, preliminary draft reports, historical reports, communications with State, etc.)	
Internal auditor in conjunction with aeroplane operator's CORSIA management team	**Identify scope of voluntary pre-verification audit plan**	What is the applicable reporting cycle for cancellations?	
		Identify the applicable emissions unit registries where reported units have been cancelled, including whether the account is owned by the operator or by a third party	
		Check whether the aeroplane operator is participating in any other regulatory schemes where the same emissions units are applicable and where the schemes do not require transfer/surrender of emissions units	
		Check whether the operator has participated in/conducted voluntary offset schemes, up to three years prior to the start of the current compliance period	
Internal auditor	**Evaluate staff competence**	Check whether the responsible staff is competent and has been trained sufficiently	
Internal auditor	**Analysis to identify errors or gaps in the report**	Are all the required fields in Annex 16, Volume IV, Appendix 5, Table A5-7 complete and equal to the cancellation information as contained within all applicable third-party registries?	
		Does the total quantity of cancelled CORSIA Eligible Emissions Units in Field 5.a of Annex 16, Volume IV, Appendix 5, Table A5-7 match the operator's required quantity for the given cycle?	

Completed by	*Topic*	*Task*	*Satisfactorily completed: Yes/No/ Not completed/ Not applicable*
		Are all reported emissions unit cancellations visible on a publicly accessible website of the applicable emissions unit programme registry?	
		Does the aeroplane operator have documented evidence of sole right of use of the reported emissions units?	
Internal auditor	**Assess scope and any applicable exemptions**	Does the aeroplane operator participate under another regulatory scheme, with the same eligibility/reporting requirements? Does the aeroplane operator operate/engage in a non-regulatory/voluntary offsetting scheme?	
Internal auditor	**Data sources used**	List all applicable data sources used to compile report and applicable supporting information required to complete the verification	

3.3.6.4 Verification steps

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 guidance on the CORSIA-specific verification characteristics.

(1) Pre-contract stage

It is recommended that the contractual terms of engagement between the aeroplane operator and the verification body specify the conditions for verification by stating the type of report being verified (in this case the EUCR) and points a) to g) under Annex 16, Volume IV, Appendix 6, 2.12.

According to Annex 16, Volume IV, Appendix 1, aeroplane operators are required to send a verified EUCR to the State by 30 April 2025 for the first time after the initial compliance period (2021-2023). The verification of this first EUCR is likely to take place between 1 December 2024 and 30 April 2025. During part of this period, the verification of the Emissions Report for the year 2024 will take place. An aeroplane operator will therefore have to decide to either contract one verification body to perform the verification of the Emissions Report and EUCR, or choose separate verification bodies to verify the reports. When deciding on the approach, it is important to recall Annex 16, Volume IV, Appendix 6, 2.2.1, whereby the leader of the verification team can only undertake six annual verifications for one aeroplane operator (including any other GHG verifications outside CORSIA).

For example:

- An aeroplane operator has sourced five verifications of the Emissions Report already (2019-2023);
- In order to reduce costs for on-site visit, the aeroplane operator aims to purchase the verification of the EUCR and the verification of the Emissions Report from the same verification body;
- The verification body used so far has just one single lead verifier employed (verifying EUCR and Emissions Report).

Option A: The aeroplane operator contracts the existing verification body for the emissions reporting year 2024 (Emissions Report) and EUCR (2021-2023) (sixth annual verification). For the following year, the aeroplane operator must either request that the existing verification body identify a new team lead, or contract a new verification body.

Option B: The aeroplane operator contracts a new verification body for the emissions reporting year 2024 (Emissions Report) and for the first verification of the EUCR (2021-2023).

Whichever approach the aeroplane operator decides on, it is recommended that the aeroplane operator and the verification body agree on the contractual matters at the latest by October of the year preceding the one for which the verification will be carried out. It is recommended that aeroplane operators engage/contract a verification body as soon as possible after their first cancellations of emissions units. This is particularly advisable for aeroplane operators that cancel emissions units prior to knowing their final offsetting obligation. The required timeline for submission of a verified EUCR is in Annex 16, Volume IV, Appendix 1 for each period. Aeroplane operators will only know their exact final offsetting obligation on 30 November following the end of each period, or later if there is a delay in publication of the sector growth factor. While verifications cannot be completed until this information is known, an aeroplane operator may wish to undertake preparatory activities for the verification, such as preparing material required for the verification of the EUCR.

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. The specific competencies required for a verification team, including knowledge requirements, technical expertise, and data and information auditing expertise are provided in the following documents:

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 are to ensure that, as a minimum, the verification team includes 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 determine whether the EUCR 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 appropriately, the verification body requires access to all relevant documents including access to potential registries accounts of the aeroplane operator. 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[7] by January of the year when the verification of the EUCR takes place. In addition to the programme-neutral content of the strategic analysis, the parts specific to the EUCR should at least include the following items:

a) administrative and organizational aspects (e.g., size of the aeroplane operator, organizational structure, key commercial data such as growing or shrinking business, web page information, annual report);

b) general quantity of the emissions units to purchase and offset (small, medium, or large);

c) previous versions of EUCR and Verification Report; and

d) relevant communication between aeroplane operator and State.

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[8] by January of the year when the verification of the EUCR takes place (directly after the strategic analysis). In addition to the programme-neutral content of the risk analysis, it should at least include the following items:

a) number of batches of cancelled emissions units;

b) cancellation status, as advised by the aeroplane operator, and whether the aeroplane operator is self-reporting any timeline challenges to acquire and cancel the required quantity of eligible units in time for the verification;

c) number of different emissions unit programme registries involved and proportion of direct versus indirect control of registry accounts, where operator cancellations have taken place;

d) operator participation in other regulatory/non-regulatory programmes;

7. Definitions of strategic analysis are contained in the IAF Mandatory Document for the Application of ISO 14065:2013, Issue 2 (IAF MD 6:2014).
8. 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).

e) assessment of whether the CORSIA offsetting process is part of a certified management system;

f) availability of internal audit reports;

g) type and level of detail of described internal procedures applicable to ensure that the number of cancelled CORSIA Eligible Emissions Units is sufficient for meeting the aeroplane operator's final offsetting requirements;

h) type and level of detail of described internal procedures applicable to ensure the eligibility of emissions units cancelled to meet the offsetting obligation under CORSIA;

i) multiple locations for data gathering and processing;

j) centralized vs. decentralized responsibilities for CORSIA; and

k) 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 January of the year when the verification of the EUCR takes place (directly after the risk analysis). The following elements should be covered:

a) verification programme (including name of aeroplane operator, verification objective, verification scope, verification language, arrangements and responsibilities within the verification team, site visit arrangements, potential technical details to access registries, activities performed on- and off-site, document list); and

b) test plan for control activities (scope and methods of testing, including IT controls, quality assurance in outsourced processes, procedures to ensure eligibility of units and sufficient number of emissions units).

In cases where additional risks are identified or new information that changes the original assessment of a risk is discovered during the actual verification, 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 EUCR (in most cases the headquarters of the aeroplane operator). Site visits are recommended for verification bodies verifying an EUCR of an aeroplane operator, especially if the EUCR is being verified for the first time. To a large extent, the risk analysis, but also the evidence obtained during the verification itself, determine the scope and the number of site visits necessary for a verification body to conclude on the EUCR. 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.

Nevertheless, especially after the initial verification, 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 and relevant registries. As with physical site visits, it is very important to not base verification activities on technology which does not allow instant communication (e.g. e-mail). 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 at headquarters. If the verification body decides to replace a site visit(s) with other means, it 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 to which the aeroplane operator is attributed 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 compliance cycle and the submission of a verified EUCR, it is recommended that, in the case where the aeroplane operator has cancelled units over the course of the compliance cycle, the verification body consider performing a preliminary verification earlier in the compliance cycle. 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 a few unit cancellations should be available for review by the verification body. Depending on the individual risk assessment and the confidence level 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 uses standard auditing techniques (such as interviews, analytical data testing approaches, and document reviews) when implementing the verification plan. See section 3.3.7 of this manual for recommended verification activities and other guidance for verifying the EUCR.

(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 EUCR, the verification body has to follow the instructions as described in section 3.3.8.3 of this manual.

(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 EUCR 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. As in other GHG schemes, the independent reviewer will not be part of the verification team.

(9) Authorization to submit the Emissions Unit Cancellation Report

The verification body will submit the Verification Report and the EUCR to the State. To avoid the unintended submission of the Verification Report and the EUCR by the verification body, the verification body will submit 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 Unit Cancellation Report

In addition to the verification body submitting the Verification Report together with the EUCR to the State, the aeroplane operator will also provide the State with a copy of the Verification Report and the EUCR. The State will review the documents and may contact the aeroplane operator and the verification body to receive further explanations if required.

3.3.6.5 Order of magnitude check by State

The State will perform an order of magnitude check of the EUCR of the aeroplane operator as described in Annex 16, Volume IV, Part II, Chapter 4, 4.4.1.5. The order of magnitude check should follow a set of standardized requirements as outlined in Table 3-14.

Table 3-14. State order of magnitude checklist for EUCR

No.	*Data field*	*Questions*	*Satisfactorily completed: Yes/No/ Not Applicable*	*Notes and results of checks*
0	Accreditation	Is the accreditation of the verification body valid?		
1	Aeroplane operator information: – name – contact information – name of a point of contact – unique identifier – State	Is there an unambiguous identification of aeroplane operator? Contact aeroplane operator in case of uncertainties.		
2	Compliance period years reported	Are the correct year(s) indicated (e.g. new entrant)? If not, contact the aeroplane operator.		

No.	*Data field*	*Questions*	*Satisfactorily completed: Yes/No/ Not Applicable*	*Notes and results of checks*
3	Aeroplane operator's total offsetting requirements	Is the figure correct? Cross-check with final offsetting requirement communicated by the State according to Annex 16, Volume IV, Appendix 1, 2.3.		
4	Total quantity of emissions units cancelled	Is the total quantity of emissions units cancelled different from the total offsetting requirement? Is the sum of cancelled units (reported in batches) in Field 5 of the EUCR equal this entry? Does the figure on the EUCR correspond to the figures publically available on the programme registry? Is the cancellation final and irreversible? What is the result of an individual cross-check with applicable CORSIA Eligible Emissions Unit Programme registries? *Note.— The respective cancellation status of each participating registry must be publically available and known to ensure permanent cancellation.*		
5	Consolidated identifying information for cancelled emissions units. For each batch of cancelled emissions units (batch defined as a contiguous quantity of serialized emissions units), identify the following:			

No.	*Data field*	*Questions*	*Satisfactorily completed: Yes/No/ Not Applicable*	*Notes and results of checks*
5.a	Quantity of emissions units cancelled	Calculate the quantity of emissions units by calculating the number of units between start and end serial number of a batch and cross-check. Is the value correct?		
5.b	Start of serial numbers	Do the serial numbers exist for the unit type in question? Have the serial numbers never been used before for compliance? E.g., cross-check with public data provided by the registry.		
5.c	End of serial numbers	E.g., cross-check with data potentially provided by the CCR for earlier compliance periods. E.g., cross-check with data from other national aeroplane operators which have cancelled emissions units in the past or in the current compliance period.		
5.d	Date of cancellation	Check date with public information provided by applicable CORSIA Eligible Emissions Unit Programme registry. Was the cancellation carried out within the given CORSIA cycle deadline?		
5.e	Eligible Emissions Unit Programme	Check the list of CORSIA Eligible Emissions Units Programmes. *Note.— The list of CORSIA Eligible Emissions Units is included in the ICAO document entitled* CORSIA Eligible Emissions Units *available on the ICAO CORSIA website.*		

No.	Data field	Questions	Satisfactorily completed: Yes/No/ Not Applicable	Notes and results of checks
5.f	Unit type	Check the list of CORSIA Eligible Emissions Units to find associated unit type. *Note.— The list of CORSIA Eligible Emissions Units is included in the ICAO document entitled* CORSIA Eligible Emissions Units *available on the ICAO CORSIA website.*		
5.g	Host country	Is data provided and, if so, is it reasonable?		
5.h	Methodology	Is the methodology an approved methodology of the emissions unit programme?		
5.i	Demonstration of unit date eligibility	Check unit date eligibility as contained in the ICAO document *CORSIA Eligible Emissions Units* available on the ICAO CORSIA website.		
5.j	Programme-designated registry name	Does the registry belong to the participating registries? Check whether the registry belongs to the CORSIA Eligible Emissions Unit Programme registry.		
5.k	Unique identifier for registry account to which the batch was cancelled	Is the registry account a cancellation account? Can the respective cancellation account be used for more than one purpose? If so, refer to the findings of the verifier under verification Objective (c).		
5.l	Aeroplane operator in whose name the unit was cancelled	Cross-check with name of the aeroplane operator stated in the EUCR and on the public website of a given programme registry where cancellations are visible.		

No.	*Data field*	*Questions*	*Satisfactorily completed: Yes/No/ Not Applicable*	*Notes and results of checks*
5.m	The unique identifier for the registry account from which the cancellation was initiated	Is there data provided? Does the registry account exist and does its status allow for cancellations?		

3.3.7 Conducting the verification activities for the Emissions Unit Cancellation Report

While section 3.3.6 of this manual provides a generic approach, this section aims at providing technical background and practical advice. At the beginning of this section a generic verification approach is presented (3.3.7.1), later more detailed steps are included for the verification body to carry out in order to verify the content of an EUCR (3.3.7.2). At the end of the section, a usability rating for specific data and data sources is introduced to support the verification process.

3.3.7.1 Stepwise generic approach to achieve the verification objectives

The following stepwise generic approach is recommended to achieve the verification objectives.

(1) Full understanding

First, it is important that the verifier gains a full and complete understanding of all relevant processes which lead to data contained in the EUCR template according to Annex 16, Volume IV, Appendix 5, Table A5-7. Relevant processes for consideration by the verification body include, but are not limited to, the following:

a) process for identifying the required number of emissions units to comply with an offsetting obligation;

b) processes to ensure eligibility of emissions units;

c) internal documented procedures to communicate with CORSIA Eligible Emissions Unit Programme registries to publish the cancellation of CORSIA Eligible Emissions Units on the public website;

d) procedures for ensuring that the aeroplane operator has sole ownership of emission units; and

e) procedures for ensuring that cancelled units are used only once by the aeroplane operator.

This step includes the study of written internal procedures, review of internal audit results (including voluntary pre-verification) and interviews with responsible staff at the aeroplane operator. As this step serves to achieve a full understanding, an aeroplane operator annual report and website search, including marketing material analysis, is required to identify potential other voluntary or mandatory offsetting obligations. As a result, the verifier should document a process chart which indicates the internal roles and responsibilities at the aeroplane operator.

(2) Gaps and weaknesses

The verifier now tests the verification objectives according to Annex 16, Volume IV, Appendix 6, 3.2 against the process chart from (1) in order to identify gaps and weaknesses. It is recommended that the verifier develop key questions for each of the verification objectives to test whether the organizational structure is sufficiently robust and to identify where each relevant data item can be found. Examples are provided in Table 3-15.

Table 3-15. Key questions on verification objectives of EUCR

Verification objectives according to Annex 16, Volume IV, Appendix 6, 3.2.2	*Sample key questions only to be populated by the verification body to determine where gaps and weaknesses may exist*
a) the aeroplane operator has accurately reported cancellations of its CORSIA Eligible Emissions Units in accordance with this Volume	– Do the written internal procedures with regard to the EUCR sufficiently reflect Annex 16, Volume IV? – How is relevant information being forwarded? – By what method has the operator secured access to the required information and is this a time-limited period? – For the relevant programme registry(ies), is there more than one possible type of action/step used to achieve cancellation? And is the chosen action consistent with the requirements of Annex 16, Volume IV?
b) the stated number of cancelled CORSIA Eligible Emissions Units is sufficient for meeting the aeroplane operator's total final offsetting requirements associated with the relevant compliance period, after accounting for any claimed emissions 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	– Who determines the total number of required CORSIA Eligible Emissions Units and on the basis of which process? – How are changes in the required number of CORSIA Eligible Emissions Units being tracked (e.g., as a result of the order of magnitude check of the Emissions Report by the State)? – When and by whom is the CORSIA Eligible Emissions Units list consulted to ensure eligibility? – Who has access to which registry? …
c) the eligible emissions units cancelled by the aeroplane operator to meet its offsetting requirements under this Volume have not been used by the aeroplane operator to offset any other emissions	– What management control and risk control methods is the operator using to clearly distinguish between emissions units procured and cancelled under CORSIA versus for any other regulatory and/or voluntary programme?

Verification objectives according to Annex 16, Volume IV, Appendix 6, 3.2.2	*Sample key questions only to be populated by the verification body to determine where gaps and weaknesses may exist*
	– By what process has the operator determined whether risk of "eligibility-overlap" exists between CORSIA and any other regulatory/non-regulatory programmes? – What control activities exist? – How does the operator communicate in public material its participation in CORSIA compared to any other such programme involving the cancellation of emissions units? …

(3) EUCR content

In a third step, the verifier would make itself familiar with actual content of the presented EUCR. This includes obvious checks as the correct name, address and compliance cycle.

(4) Cross-checks

On the basis of (1), (2) and (3) above, the verifier is in the position to link specific information from the EUCR with specific internal information by taking into account relevant procedural weaknesses in order to identify appropriate evidence for all data provided in the EUCR, as Figure 3-10 illustrates below. This includes the analysis and assessment of cancellation information of CORSIA Eligible Emissions Units Programme registries (public data) as well as cross-checks regarding financial and accounting documents (internal data).

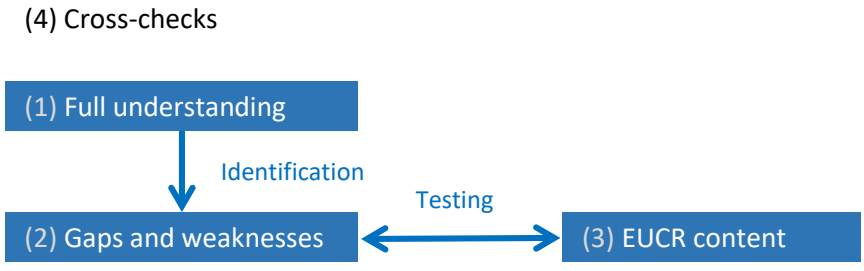


Figure 3-10. Overview of the generic verification process of the EUCR

3.3.7.2 Verification steps for the verification body to verify the EUCR against the identified objectives

Objective (a): The aeroplane operator has accurately reported cancellations of its CORSIA Eligible Emissions Units in accordance with Annex 16, Volume IV.

In order to address Objective (a), the verifier should carry out the following verification activities:

Note.— Whether a step is applicable to a batch of cancelled units or any other aggregation will be indicated.

a) Cancellations are made in the name of the aeroplane operator:

1) For each batch, review and confirm that the entity name contained in Field 5.l of Table A5-7 in Appendix 5 of Annex 16, Volume IV is the same as the name of the aeroplane operator as contained in Field 1.a; and

2) On an emissions unit programme registry public website, for each corresponding batch contained in an EUCR, cross-check and confirm whether a reported batch of serial numbers (between Fields 5.b and 5.c) are cancelled in the name of the aeroplane operator.

b) All reported cancelled units are CORSIA Eligible Emissions Units:

1) For each batch, review and confirm entries in Fields 5.e “Eligible Emissions Unit Programme” and 5.i “Demonstration of unit date eligibility” are within the parameters of unit date eligibility information contained in the ICAO documents *CORSIA Eligible Emissions Units* and *CORSIA Emissions Unit Eligibility Criteria*, both available on the ICAO CORSIA website; and

2) Review and cross-check, for each batch, entries made in Fields 5.e and 5.i of the EUCR and the corresponding batch of cancelled units on the relevant emissions unit programme registry public website.

c) Reported emissions units have been cancelled in a CORSIA Eligible Emissions Unit Programme registry:

1) For each batch of the same emissions unit programme, review and confirm that the “Programme-designated registry name” in Field 5.j matches that found on the website and/or programme documentation of the CORSIA Eligible Emissions Unit Programme identified in Field 5.

d) Cancellation status of the units is as per the requirements of Annex 16, Volume IV:

1) Review programme documentation for each respective emissions unit programme registry used by an operator, to identify which option offered by a registry is consistent with the note under Annex 16, Volume IV, Part II, Chapter 4, 4.2.2 b). Specifically, the cancellation option available (and used) should mean that a unit has been permanently and irreversibly cancelled once, for a single purpose, as identified in the programme registry through features such as: “status”; “date of cancellation”; “account type” (i.e. account specifically for the given purpose of cancellation); and name of the aeroplane operator in whose name the unit has been cancelled (Field 5.l). In some instances, such a status is referred to as “retirement”. The term “cancellation” in some instances may refer to the removal of the unit from the registry for a purpose other than single use, such as to re-issue under another registry and/or programme or towards a specific purpose other than for CORSIA. In such instances, “cancellation” would not result in the unit being permanently removed from potential future use and should not be used; and

2) Once the relevant cancellation status per programme registry has been identified, the verifier should review and confirm that reported cancelled units have been cancelled in accordance with the relevant option.

Objective (b): The stated number of cancelled CORSIA Eligible Emissions Units is sufficient for meeting the aeroplane operator's total final offsetting requirements associated with the relevant compliance period, after accounting for any claimed emissions 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.

In order to address Objective (b), the verifier should carry out the following verification activities:

a) Sufficient quantity of CORSIA Eligible Emissions Units have been cancelled:

1) Review and confirm that the total quantity of CORSIA Eligible Emissions Units cancelled across all batches contained in Field 5 equals the total quantity of cancelled emissions units in Field 4, (both in tonnes); and

2) Review and confirm that the aeroplane operator's total final offsetting requirement, as provided to the operator by the State to which it is attributed, and reported in Field 3 of the EUCR, equals the total quantity of emissions units cancelled in Field 4 (both in tonnes).

b) Demonstration of sole right of use to cancelled emissions units:

1) For cancelled units reported in an EUCR, review contractual evidence (to be provided by the aeroplane operator) and confirm the operator's sole right to cancel the unit to meet its requirements under CORSIA, without encumbrance or restriction of any kind in either the instrument itself or any of its underlying attributes.

Note.— The format of contractual evidence may vary from case to case, depending on the method of acquisition of rights to an emissions unit. Examples may include but are not limited to: an emission reduction purchase agreement between two or more counterparts (including a variety of derivative contract structures); trade confirmation/settlement documentation for a transaction conducted via an exchange; and indirect ownership through acquisition and investment activities and through transfer of ownership under a non-commercial exchange (i.e., donation). The format of acquisition itself is not the priority, rather the verifier should review provided documentation to confirm (regardless of format/method) that the aeroplane operator holds the relevant rights as described in (a).

Objective (c): The CORSIA Eligible Emissions Units cancelled by the aeroplane operator to meet its offsetting requirements under Annex 16, Volume IV have not been used by the aeroplane operator to offset any other emissions.

In order to address Objective (c) the verifier should carry out the following verification activities:

a) Risk determination:

1) During the risk analysis step, the verifier should develop an initial determination of whether a risk of "dual use" exists under both another regulatory programme and under a non-regulatory/voluntary programme;

2) During the verification, the verifier should revisit the risk determination and identify whether any changes have occurred since the original determination, and update the determination accordingly;

Note 1.— Regulatory programme risk variables include: (i) participation in another regulatory programme requiring use of emissions units; (ii) overlap of eligibility criteria (for emissions units) between CORSIA and other programme(s); (iii) overlap of cancellation and reporting requirements (i.e., both do not require surrender/transfer of a unit to the account of a regulator); and (iv) presence of internal management controls, policies and procedures to manage use of emissions units.

Note 2.— Non-regulatory/voluntary programme risk variables include: (i) participation in/operation of a voluntary initiative to make use of emissions units; (ii) overlap between criteria of type of emissions units used toward a voluntary programme and those eligible for use under CORSIA; and (iii) presence of internal management controls, policies and procedures to manage use of emissions units.

3) If no risk exists under both categories, then no further verification activities are required. The verifier should provide a justification statement for a no-risk determination; and

4) If a risk exists under either/both categories, then the verifier should conduct the activities below.

b) Regulatory programme review:

1) Review documentation provided by the aeroplane operator, including:

i) participation requirements/rules under the other regulatory programme(s), including but not limited to eligibility criteria, reporting requirements, reported information and any audit information; and

ii) cancellation information of emissions units used and reported under other such regulatory programmes (including unique identifier information such as unit serial numbers); internal management controls and procedures to manage use of emissions units;

2) Identify if units from the same project/activity have been cancelled both under CORSIA and another regulatory programme; and

3) If so, cross-check for duplications of unique identifier information (serial numbers) for such project/activity between those contained in the EUCR and those reported by the aeroplane operator under any other regulatory programmes.

c) Non-regulatory/voluntary programme review:

1) Review documentation provided by the aeroplane operator detailing participation in such non-regulatory/voluntary programme(s) conducted up to three years prior to the start of the given CORSIA cycle; including but not limited to the following:

i) types of units used (self-determined and/or third party determined voluntary criteria for unit types);

ii) voluntary reporting initiatives under which actions taken are reported;

iii) externally reported information regarding voluntary actions taken;

iv) audit information (if applicable);

v) cancellation information of emissions units used and reported under other such voluntary programmes (including unique identifier information such as unit serial numbers); and

vi) internal management controls and procedures to manage the use of emissions units.

2) Identify if units from the same project/activity have been cancelled both under CORSIA and under another regulatory programme; and

3) If so, cross-check for duplications of unique identifier information (serial numbers) for such project/activity between those contained in the EUCR and those reported by the aeroplane operator under any other such voluntary programmes.

Table 3-16. Usability rating for specific data and data sources

Examples	*Categorization*	*Technical explanation*	*Usability rating*
Emissions unit programme registry public data	Primary external data	– Cancellation data for all cancelled emissions units, including all fields from Annex 16, Volume IV, Appendix 5, Table A5-7 (except Fields 5.j, 5.k and 5.m) – Primary data source – Can be used to corroborate internal data and all reported data to be contained in an EUCR	High
Operator internal data management system	Secondary internal data	– Internal records relating to cancelled emissions units (if applicable)	Medium-Low
Contractual evidence of acquisition, (i.e., Emission Reduction Purchase Agreement)	Primary internal and external data	– Can be used as evidence of sole right of use for the buyer (aeroplane operator), as transferred to the aeroplane operator at a distinguishable point of time such as receipt of delivery or settlement of payment or another such agreed event – Includes counterpart information	High
Terms of use agreement with an eligible emissions unit registry	Secondary external data	– May be used to establish aeroplane operator contractual commitments entered into with given registry to use held units towards a single claim	Medium-Low

Examples	*Categorization*	*Technical explanation*	*Usability rating*
Rules and requirements of regulatory offsetting programmes under which the operator reports	Secondary external data	– Can be used to establish any potential overlap between eligibility of units cancelled under CORSIA and under any such other programme – May also be used to determine reporting requirements for such programme	Medium-High
Regulatory offsetting programme cancellation reports (i.e., documentation and registry reports)	Primary internal data	– Can be used to conduct cross-checks of unique identifier information for possible dual-use of emissions units	Medium-High
Aeroplane operator sustainability report	Primary internal data	– May include relevant internal data on voluntary offsetting activity and associated emissions unit used	Medium-High
External environmental report i.e., Carbon Disclosure Project (CDP) reporting	Primary external data	– May include relevant internal data on voluntary offsetting undertaken	Medium

3.3.8 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.

The same considerations, with the exception of adherence to the Emissions Monitoring Plan, are relevant for forming conclusions on whether in all material respects the aeroplane operator has accurately reported cancellations of its CORSIA Eligible Emissions Units in accordance with Annex 16, Volume IV, and that cancelled units are owned and have been used only once by the aeroplane operator.

3.3.8.1 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 and/or EUCR 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, or with Annex 16, Volume IV. 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;

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.; and

d) The number of emissions units cancelled does not meet the required number of offsets for the compliance period.

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.

3.3.8.2 Assessing materiality for the Emissions Report

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 3-11 illustrates the materiality threshold concept in this context.

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.

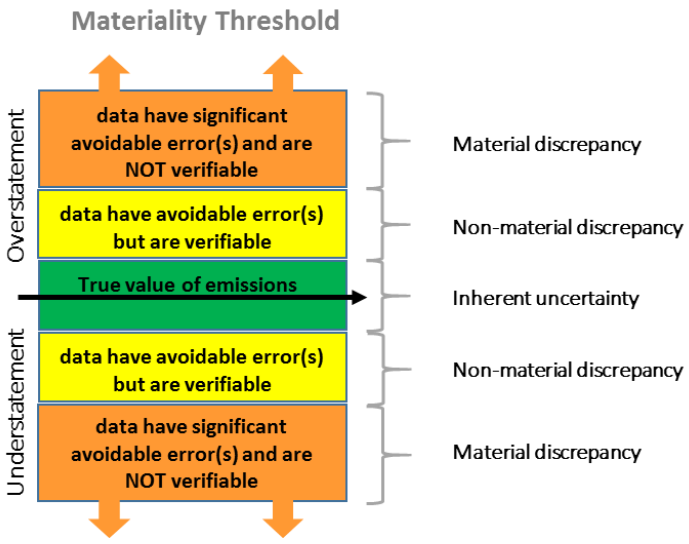


Figure 3-11. Illustration of the materiality threshold concept in the context of verification

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 3-17. 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 value 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 regard 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.

3.3.8.3 Completing the Verification Report and statement

If the Emissions Report or the EUCR includes non-material misstatement and/or non-material non-conformities, the Emissions Report or the EUCR 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 or the EUCR 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 or the EUCR will be 'verified as not satisfactory'. In such cases it is recommended that the verification body advise 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).

3.3.9 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, in cases 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

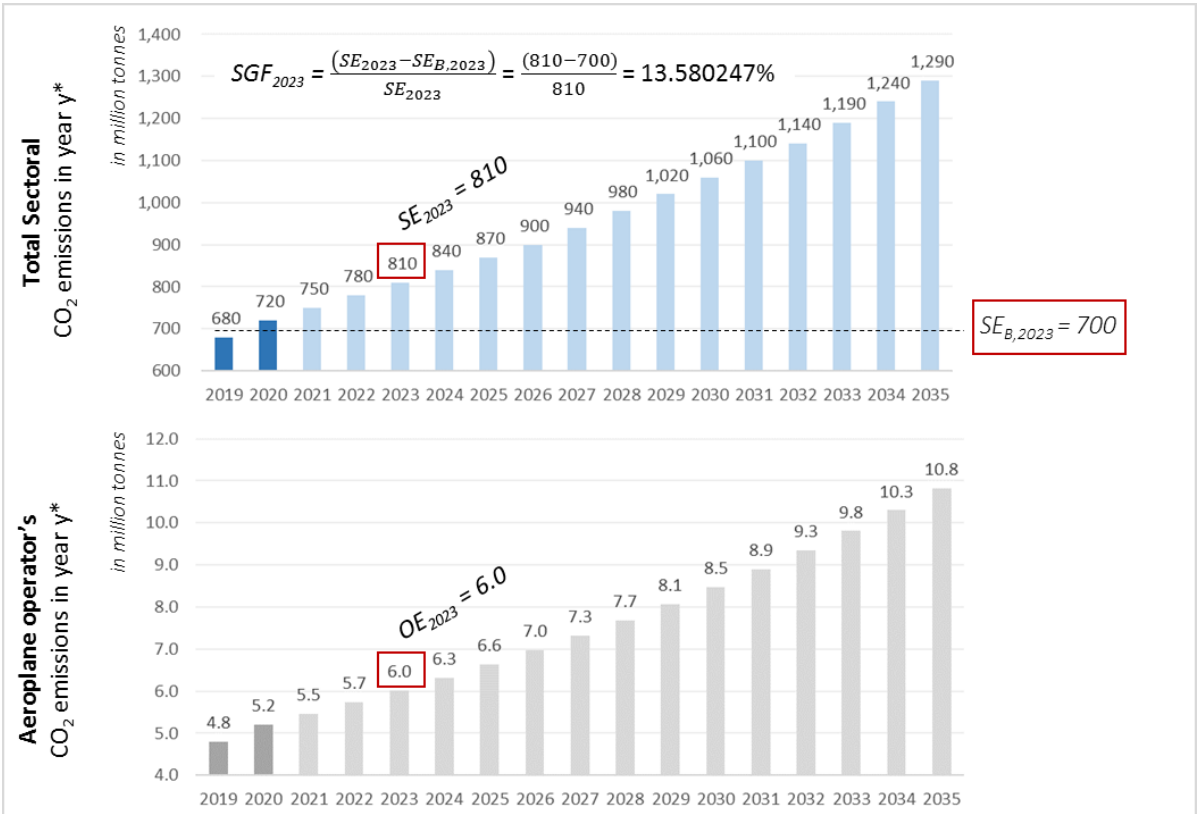
GUIDELINES ON CALCULATION OF OFFSETTING REQUIREMENTS

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:

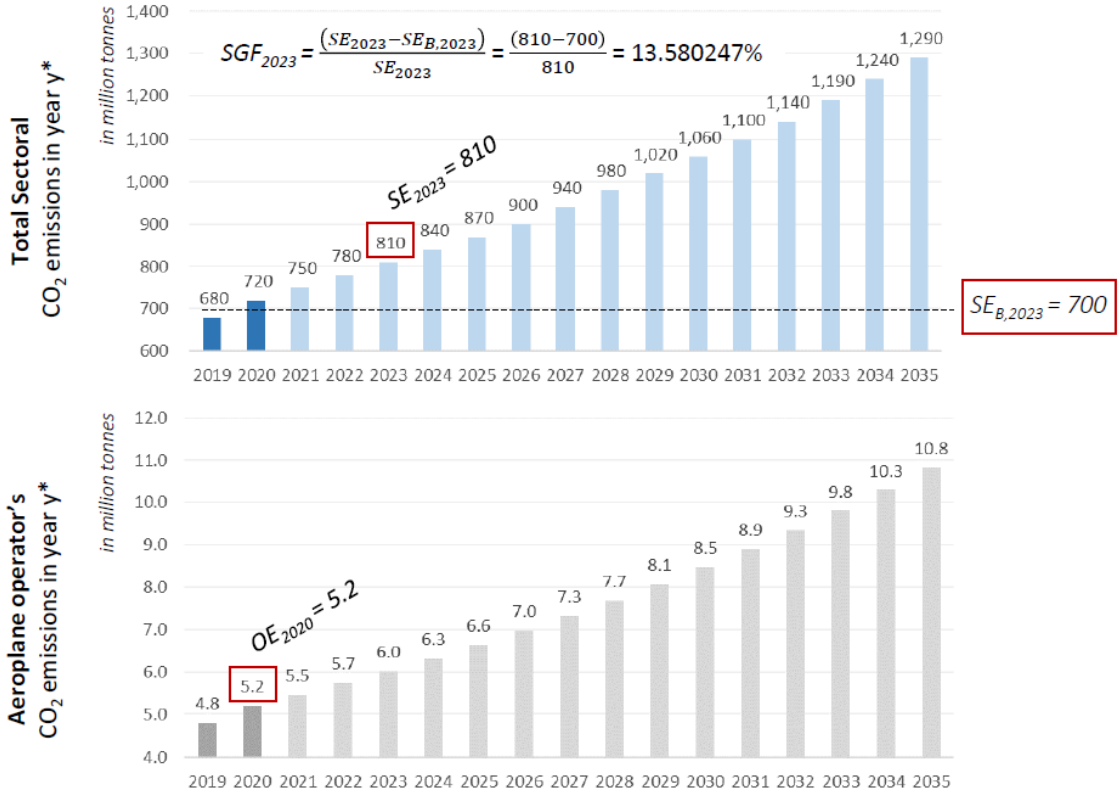
OR_y = Aeroplane operator's offsetting requirements in the given year y;

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.



** 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 State to which the aeroplane operator is attributed has chosen to use the aeroplane operator's 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;

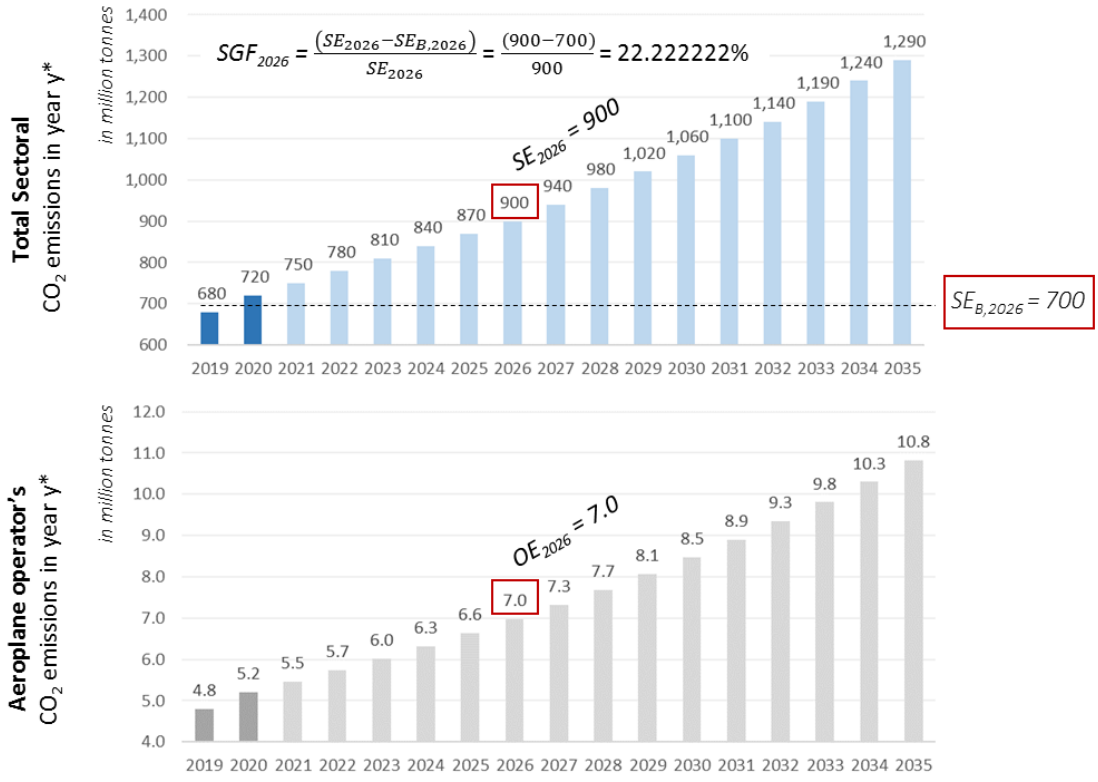
OE_y = Aeroplane operator's CO_2 emissions covered by Annex 16, Volume IV, Part II, Chapter 3, 3.1 in 2020; and

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).



** 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., 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

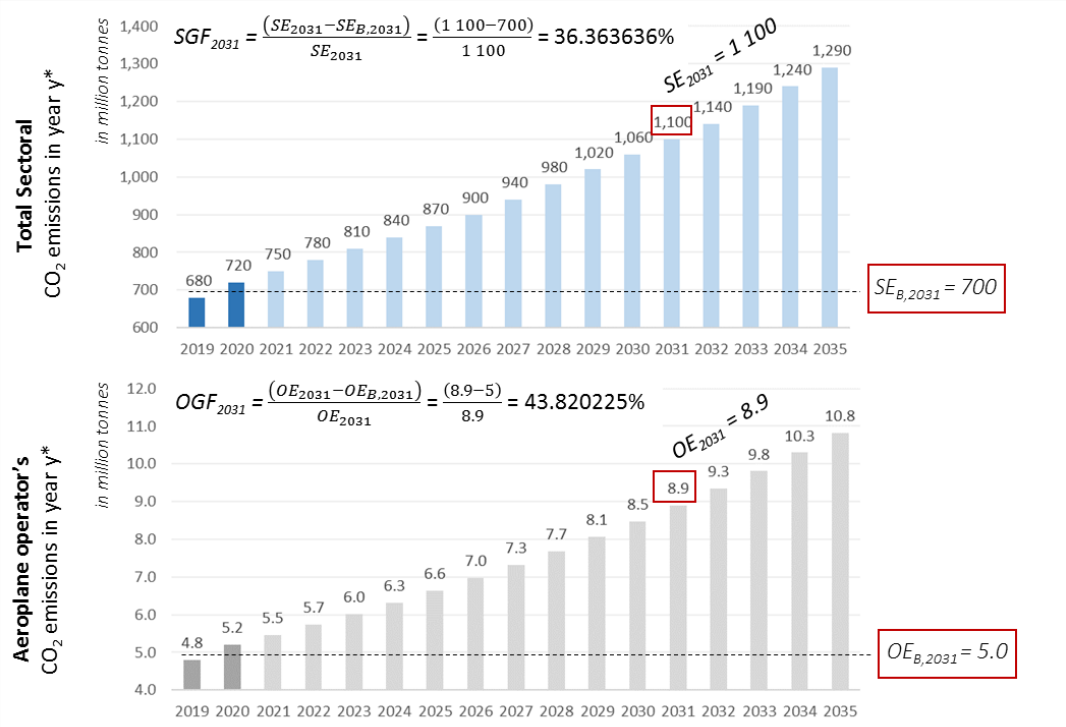
SGF_y = Sector's Growth Factor.

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* will be made available on the ICAO CORSIA website as soon as practicable after 30 June 2020 and 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

In cases 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 Annex 16, Volume IV.

3) Deadlines

i) All deadlines of Annex 16, Volume IV and the *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 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 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.	

No.	Task (examples)	Detailed specification of tasks (examples)	Scope?
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 Annex 16, Volume IV and the *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

(*) *For the purposes of this template, the fuel total could include the sum of equivalent fuels.*

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		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		
46		
47		
48		
49		
50		

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			

(*) *For the purposes of this template, the fuel total could include the sum of equivalent fuels.*

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		
18		
19		
20		
21		
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24		
25		
26		
27		
28		
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30		
31		
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37		
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42		
43		
44		
45		
46		
47		
48		
49		
50		

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

(*) For the purposes of this template, the fuel total could include the sum of equivalent fuels.

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							
15							
16							
17							
18							
19							
20							
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"****.*

5.1 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 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):

(*) *For the purposes of this template, the fuel total could include the sum of equivalent fuels.*

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.

(*) *For the purposes of this template, the fuel total could include the sum of equivalent fuels.*

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.

(*) For the purposes of this template, the fuel total could include the sum of equivalent fuels.

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?

5.2 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):

(*) For the purposes of this template, the fuel total could include the sum of equivalent fuels.

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.
(*) For the purposes of this template, the fuel total could include the sum of equivalent fuels.

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.

(*) For the purposes of this template, the fuel total could include the sum of equivalent fuels.

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" occur when an aeroplane operator is missing data which is relevant for the determination of its fuel use for one or more international flights in accordance with Annex 16, Volume IV, Part II, Chapter 2, 2.2.1.1.*

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 available", "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).

e) Portion of batch purchased (if needed)

e1) 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).

e2) Mass of batch purchased

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

f) 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).

g) Sustainability documentation

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

h) Life Cycle Emissions Values of the CORSIA eligible fuel

h1) Default or Actual Life Cycle Emissions value (LS_f)

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

h2) Default or Actual Core Life Cycle Assessment (LCA) value

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

h3) Default Induced Land Use Change (ILUC) value

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

i) 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).

i1) Name of the intermediate purchaser 1.

Please enter the name of the intermediate purchaser 1.

i2) Address of the intermediate purchaser 1.

Please enter the address of the intermediate purchaser 1.

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

j) Intermediate purchaser 2 (if needed)

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

j1) Name of the intermediate purchaser 2.

Please enter the name of the intermediate purchaser 2.

j2) Address of the intermediate purchaser 2.

Please enter the address of the intermediate purchaser 2.

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

k) CORSIA eligible fuel shipper

k1) 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.

k2) 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:	

l) Fuel blender

l1) Name of the fuel blender

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

l2) 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:	

m) 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:	

n) Neat CORSIA eligible fuel received

n1) 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.

n2) Mass of neat CORSIA eligible fuel received

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

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

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

p) 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).

q) 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.

1.4 TEMPLATE OF VERIFICATION REPORT (PREPARED BY THE VERIFICATION BODY)

This section provides a template version of a Verification Report for use by verification bodies for CORSIA purposes.

CORSIA

Verification Report

CONTENTS

Template Information

Template provided by:	
Version (publication date):	

SCOPE OF VERIFICATION REPORT

Please specify which type of report is being verified (aeroplane operator's Emissions Report with or without CORSIA eligible fuels and/or an aeroplane operator's Emissions Unit Cancellation Report).
Note I: *When conducting the verification of an Emissions Unit Cancellation Report exclusively, only the points a), b), c), d), f), g), h), m), p), q), r) and s) shall be applicable.*
Note II: *The verification body has to provide a conclusion on each of the verification objectives, as applicable, in the concluding verification statement.*

IDENTIFICATION

a) Name of the verification body

Please enter the name of the verification body. This name should be the legal entity.

a1) Address of the verification body

Please enter the department and address of the verification body.

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

a2) Information on verification team members

Please enter the contact information of the verification team leader. Please provide address details if different from a1).

Position within the company:	
First name:	
Surname, academic title:	
Role and expertise of the team member within the verification team:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

Please enter the contact information of additional verification team members.

Position within the company:	
First name:	
Surname, academic title:	
Role and expertise of the team member within the verification team:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

Please enter the contact information of additional verification team members.

Position within the company:	
First name:	
Surname, academic title:	
Role and expertise of the team member within the verification team:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

Please enter the contact information of additional verification team members.

Position within the company:	
First name:	
Surname, academic title:	
Role and expertise of the team member within the verification team:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

a3) Information on independent reviewer

Please enter the contact information of the independent reviewer.

Position within the company:	
First name:	
Surname, academic title:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

TIME ALLOCATION AND SCOPE OF THE VERIFICATION

b) Total time of verification

Please enter the dates on which the verification was carried out and the total time required for the verification in working days, including revisions.

c) Scope of the verification

Please indicate the scope of the verification. This must include the time period covered by the verification and the verification boundaries (organization, physical). Include whether one or more site visits were conducted and what elements, if any, were conducted remotely.

c1) CORSIA eligible fuels

If the verification includes a claim of CORSIA eligible fuels, please indicate the source of the CORSIA eligible fuel information and if direct access to the fuel producer was required and provided.

GENERAL INFORMATION

d) Impartiality and avoidance of conflict of interest assessment

Please describe the main results of impartiality and avoidance of conflict of interest assessment.

e) Verification criteria

Please specify the criteria against which the Emissions Report was verified (e.g. version of EMP; Annex 16, Volume IV; CORSIA Implementation Elements; specific national legislation; Environmental Technical Manual *(Doc 9501), Volume IV, etc.).*

f) Information and data used of the aeroplane operator

Please specify which data and documents provided by the aeroplane operator were used by the verification body to carry out verification activities (e.g. list of flight activities exported from the Operational Management System as of dd/mm/yy, flight logs and ACARS messages of the following flights, instructions for flight crews for use of density information of fuel as contained in document xyz, etc,).

PROCESS AND ANALYSIS

g) Strategic analysis and assessment of risk

Please specify the main results of the strategic analysis and assessment of risk.

h) Verification activities

Please describe the verification activities undertaken and their corresponding results. Please include detailed information on whether the audit took place on- or off-site. This includes the precise place and in case of a remote audit, detailed procedural information on how the verification was technically conducted.

i) Data sampling

Please describe the procedures of data sampling and testing conducted, including records or evidence sampled, sample size, and sampling method(s) used.

j) Results of data sampling

Please specify the results of all data sampling and testing, and name the cross-checks applied.

k) Compliance with the Emissions Monitoring Plan

Please indicate whether the monitoring was performed according to the Emissions Monitoring Plan. If not, please specify and assess deviations (materiality).

l) Non-compliances of the Emissions Monitoring Plan

Please specify any non-compliances of the Emissions Monitoring Plan with Annex 16, Volume IV. In case any potential non-compliances of the Emissions Monitoring Plan with Annex 16, Volume IV are found, please specify them and consult the State to which the aeroplane operator is attributed as to whether it is necessary for the aeroplane operator to revise the Emissions Monitoring Plan and resubmit it to the State for approval.

m) Non-conformities and misstatements identified

Please list identified non-conformities and misstatements. Please describe how these have been resolved.

CONCLUSIONS

n) Data quality and materiality

Please specify the conclusions on data quality.

Please specify the materiality threshold for this aeroplane operator.

n1)

Is this materiality threshold being met in the Emissions Report?

n2)

o) Conclusion in relation to the aeroplane operator's Emissions Report

Please specify the conclusions on the verification of the aeroplane operator's Emissions Report by providing an individual conclusion for each of the verification objectives as listed in Annex 16, Volume IV, Appendix 6, 3.2.1 (as applicable).

p) Conclusion in relation to the Emissions Unit Cancellation Report

Please specify the conclusions on the verification of the Emissions Unit Cancellation Report by providing an individual conclusion for each of the verification objectives as listed in Annex 16, Volume IV, Appendix 6, 3.2.2.

q) Justification by the verification body

Please justify the verification opinion(s).

CONCLUDING VERIFICATION STATEMENT

r) Results of the independent review

Please specify the results of the independent review.

r1) Information on independent reviewer

Please enter the contact information of the independent reviewer. Please provide address details if different from a1).

Position within the company:	
First name:	
Surname, academic title:	
Email address:	
Telephone number:	
Address line 1:	
Address line 2:	
City:	
State/Province/Region:	
Postcode/ZIP:	
Country:	

s) Concluding verification statement

s1) Concluding verification statement for the Emissions Report

Please select the verification statement.

s1a) Satisfactory with comments

Please specify the non-material misstatements and non-conformities.

s1b) Not satisfactory

Please specify why the verification statement is not satisfactory including the relevant details for each of the following situations: there are material misstatements and/or material non-conformities, the scope of the verification is too limited, or the verification body is not able to obtain sufficient confidence in the data.

s2) Concluding verification statement for the Emissions Units Cancellation Report

Please select the verification statement.

s2a) Satisfactory with comments

Please specify the non-material misstatements and non-conformities.

s2b) Not satisfactory

Please specify why the verification statement is not satisfactory including the relevant details for each of the following situations: there are material misstatements and/or material non-conformities, the scope of the verification is too limited, or the verification body is not able to obtain sufficient confidence in the data.

— END —

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