

SOUTH AFRICAN CIVIL AVIATION AUTHORITY

CIVIL AVIATION ACT, 2009 (ACT NO. 13 OF 2009)

AMENDMENT SACATS 1/2019

The Director of Civil Aviation has, in terms of section 163 (1) of the Civil Aviation Act, 2009 (Act No. 13 of 2009) read with Part 11 of the Civil Aviation Regulations, 2011 amended South African-Civil Aviation Technical Standards as reflected in the Schedules hereto. The Amendments as contained in the Schedule shall come into operation on 21 June 2019.



Poppy Khoza

Director of Civil Aviation

Date: 21/6/19

GENERAL EXPLANATORY NOTE:

[] Words in bold type in square brackets indicate omissions from existing technical standards.

 Words underlined with a solid line indicate insertions in existing technical standards.

SCHEDULE

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AMENDMENT OF TECHNICAL STANDARD 24

1. Technical standard 24.01.2 is hereby amended by the substitution of section 14.1 of the following section:

"14.1 General Characteristics of Model Aircraft

- (1) Model aircraft shall meet the following general specifications:
 - (a) maximum flying weight with fuel – 25kg;
 - (b) maximum loading –15kg/m²;
 - (c) combined maximum swept volume of piston motor(s) – 600ccm;
 - (d) electric motors power source maximum no-load voltage –;
72 volts; and
 - (e) metal-bladed propellers are prohibited.
- (2) A model helicopter shall meet the following general specifications:
 - (a) maximum flying weight with fuel – 6.5kg;
 - (b) maximum swept area of the lifting rotor counting only once any superimposed areas -3m²; provided that in the case of co-axial model helicopters whose rotors are further than one rotor diameter apart, the total area of both rotors is counted; and
 - (c) rubber motor - no restrictions.
- (3) A free-flying model aircraft that is neither radio-controlled nor line-controlled shall not have a maximum mass exceeding 5kg.

(4) Noise limitations:

- (a) shall be applied to powered model aircraft categories, with 96 dB (A) at 3 metres for any category, which does not have approval for any other noise rule;
- (b) do not apply to model aircraft with electric motors; and
- (c) specific noise measuring procedures are to be developed by the relevant national body with which model aircraft operators are associated with."

AMENDMENT OF TECHNICAL STANDARD 64

2. Document SA CATS 64 is hereby amended by:

- (a) the substitution of Subpart 1 of SA-CATS 64 of the following Subpart:

"SA-CATS 64

Cabin crew licensing

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64.01.8 LANGUAGE

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64.01.14 VALIDATION OF A FOREIGN LICENCE AND RATING OR COMPETENCY CARD ISSUED BY AN APPROPRIATE AUTHORITY

64.01.5 LOGBOOKS

1. Information to be contained in logbooks

(1) The following information shall be recorded in logbooks:

- (a) full name and address of an owner;
- (b) summary of flying hours; and
- (c) particulars of a flight –
 - (i) date;
 - (ii) type and registration of an aircraft;
 - (iii) working position of an owner;
 - (iv) flight time;
 - (v) route; and
 - (vi) name of a PIC.

(2) A cabin crew member shall –

- (a) clearly indicate familiarisation flights where the individual is observing in-flight procedures;
- (b) clearly indicate flight deck observation flight; and
- (c) summarise his or her logbook.

- (d) retain the logbook for at least 60 months from the date he or she no longer holds a valid cabin crew member licence; and
 - (e) ensure that a logbook is available for inspection within 14 days from a date of request by the Authority.
- (3) Where a cabin crew member operates for more than one operator, he or she shall disclose flight and duty hours to each operator.

2. Manner in which logbooks are to be maintained

- (1) Logbooks are to be maintained by cabin crew members affiliated with an operator.
- (2) The logbook shall not be kept with the cabin crew member whilst he or she is acting as operating crew on board of an aircraft.
- (3) In the event that the logbook is lost or stolen, a cabin crew member shall be required to make an affidavit to this effect which shall be kept on file by an operator.

64.01.8 LANGUAGE

1. A demonstration of proficiency in the English language is considered to be the ability to:
- (a) communicate in the English language in a manner that is clear and easy to understand;
 - (b) compose concise, meaningful and unambiguous sentences or messages;
 - (c) use the correct terminology to match the setting;
 - (d) respond, narrate events or describe situations naturally;
 - (e) understand and follow instructions or commands pertaining to general safety and emergency procedures with relative ease; and
 - (f) ask and answer relevant questions, and engage in dialogue with relative ease.

64.01.9 DESIGNATION OF EXAMINER

1. Requirements for application as Cabin Designated Examiner

- (1) An applicant shall be in possession of the following:
 - (a) a valid Authority Cabin Crew Instructor rating;
 - (b) evidence of complying with all requirements to be designated as a Cabin Crew Instructor;
 - (c) a moderator qualification, if an examiner is required, by an ATO or an operator, to conduct moderation activities and duties;
 - (d) a minimum of 500 hours as a cabin crew instructor, as recorded on the quarterly reports for cabin crew instructors;

- (e) fees payable as prescribed in Part 187; and
- (f) prescribed application form, duly completed.

2. Requirements for designation as Cabin Designated Examiner

- (1) The Director may designate a holder of a Cabin Crew Instructor rating as a Cabin Designated Examiner when an applicant –
 - (a) has achieved a satisfactory assessment by the Authority as prescribed in the TGM;
 - (b) complies with the developmental programme prescribed in the TGM;
 - (c) complies with the oversight process as prescribed in the TGM; and.
 - (d) signs an undertaking to abide by the Authority's Code of Conduct for Cabin Designated Examiner, contained in the TGM.
- (2) An applicant may attempt an assessment referred to in subsection (1)(a), no more than 3 times within a 12-month period.
- (3) If the third attempt is unsuccessful, then an applicant shall not be permitted to apply for designation as a Cabin Designated Examiner for a further period of 12 months, calculated from the date of the last attempted assessment.
- (4) An applicant may lodge an appeal against the outcome of an assessment, in writing, within 30 days, to the Director.
- (5) Upon satisfactory completion of the assessment conducted by the Authority, an applicant shall commence with cabin crew assessment under the supervision of a Cabin Designated Examiner.
- (6) A designation shall be valid for the period of approval, not exceeding 12 months as determined by the Director.
- (7) On approval of a designation, the Director may impose endorsements, restrictions or limitations.
- (8) Where an application for designation or re-designation is declined by the Director, the Director shall provide an applicant with written reasons for the refusal.

- (9) The designation of a Cabin Designated Examiner status is a privilege and not a right. A designation and its consequent re-designation is exercised solely at the discretion of the Director.
- (10) The Authority shall publish the names of all Cabin Designated Examiners on the Authority website.
- (11) The Director may withdraw a designation if –
- (a) it becomes evident that Cabin Designated Examiner does not comply with the provisions of this technical standard; or
 - (b) the withdrawal is necessary in the interests of aviation safety; or
 - (c) any false or misleading information implicating a Cabin Designated Examiner comes to the attention of the Director, subsequent to the issuing of the designation; and
 - (d) any other factors that may be considered by the Director.
- (12) A Cabin Designated Examiner shall, upon the withdrawal of the designation by the Director, forthwith refrain from exercising any duties affiliated with the privileges of a Cabin Designated Examiner.

3. Cabin Designated Examiner (restricted)

- (1) This applies to persons designated in live firefighting before 1 May 2019 who do not hold or have not held a cabin crew licence.
- (2) If an applicant wishes to apply for a Cabin Designated Examiner (restricted), he or she shall comply with the following:
- (a) relevant aviation experience;
 - (b) firefighting qualification;
 - (c) train the trainer qualification;
 - (d) assessor qualification;
 - (e) prescribed qualification form duly completed; and
 - (f) payment of an appropriate fee prescribed in Part 187.
- (3) If a Cabin Designated Examiner (restricted) wishes to attain a full Cabin Designated Examiner designation, then an applicant shall be required to comply with the requirements prescribed in section 2.
- (4) The Director may, on written application, approve a rated applicant of a Contracting State or manufacturer to act as an Authorised Examiner -cabin, for a period not

exceeding 30 days, for the purposes of initial type rating training of a Cabin Designated Examiner, where no Cabin Designated Examiner is qualified.

- (5) The Director may, on application, approve a rated and current DFE to act as an Authorised Examiner –cabin, for a period not exceeding 30 days, for the purposes of initial type rating training of a Cabin Designated Examiner, where no Cabin Designated Examiner is qualified.

4. Developmental Programme

- (1) A Cabin Designated Examiner shall supervise an applicant when performing a developmental programme as prescribed in the TGM.
- (2) On satisfactory completion of the developmental programme, an accountable person for an ATO or AOC shall submit a recommendation letter to the Director, advising of an applicant's readiness for the initial oversight.
- (3) The developmental programme shall be completed within 12 months of successful completion of the assessment. If the developmental programme is not completed within 12 months, then an applicant shall be required to submit a new application.
- (4) A Cabin Designated Examiner responsible for the development of an applicant shall be present during an oversight conducted by an authorised officer

5. Designation reference number

- (1) A designation reference number shall be allocated to a Cabin Designated Examiner if his or her application is successful. The designation reference number shall be reflected and maintained in the Cabin Designated Examiner data base and on the designation certificate issued to a Cabin Designated Examiner.
- (2) The letter (R) shall be inserted after a designation reference number and shall be applicable to restricted Cabin Designation Examiner.

6. Submission of reports and forms

- (1) A Cabin Designated Examiner shall maintain quarterly reports on all skill tests that he or she conducted.

- (2) The reports referred in subsection (1) shall be made available to the Director within 14 days of request.

7. Stamp

- (1) A Cabin Designated Examiner shall, within 30 days of receiving his or her certificate of designation, have a stamp made that reflects the following information –

- (a) Name of examiner; and
- (b) designation reference number

- (2) The stamp shall be used on all official documentation, as prescribed in the TGM.

8. Responsibility

- (1) Cabin Designated Examiner shall ensure that a candidate for a cabin crew licence has passed the relevant theoretical knowledge examination before commencing the relevant skills test.

- (2) A Cabin Designated Examiner shall conduct and issue skills tests according to an operator's and ATO's standard operating procedures, as applicable.

- (3) A Cabin Designated Examiner shall identify and address irregular practices from an ATO or an operator and report to, the Authority on their findings.

- (4) A Cabin Designated Examiner shall conduct a full briefing prior to the commencement of any assessment and this briefing shall detail the:

- (a) expectations and objectives of the drill,
- (b) time permitted for the drill,
- (c) number of attempts permitted for the competent completion of the drill,
- (d) procedure to be followed in the event of a finding of "not yet competent",
- (e) actions that would constitute a finding of "not yet competent",
- (f) re-assessment procedure; and
- (g) appeal procedure.

- (5) A cabin designated examiner shall conduct a full individual debriefing on completion of the entire skills test.

- (6) A cabin designated examiner shall undergo a skills test every year, as prescribed in the TGM. Every third year, this skills test shall be in the presence of an authorised officer.
- (7) A Cabin Designated Examiner shall conduct oversight on a Cabin Crew Instructor, bi-annually.
- (8) A Cabin Designated Examiner shall submit an individual training schedule, detailing his or her training and assessment activities and duties, to an authorised officer on a monthly basis.
- (9) A Cabin Designated Examiner may act as a Cabin Crew Instructor provided that he or she complies with all requirements for re-designation of a Cabin Crew Instructor.
- (10) A Cabin Designated Examiner shall maintain currency in the following components on an annual basis, or as otherwise required:
- (a) safety and emergency procedures;
 - (b) aircraft type;
 - (c) aviation security awareness;
 - (d) Dangerous Goods awareness conducted every 2 years;
 - (e) first aid;
 - (f) live firefighting conducted every 3 years;
 - (g) wet ditching conducted every 3 years; and
 - (h) slide jump conducted every 3 years.
- (11) In the event that a Cabin Designated Examiner is no longer affiliated with an operator and for the maintenance of the currency of those aircraft types which are utilised for training and assessment purposes, a Cabin Designated Examiner may undertake an approved training programme, with an accredited ATO.
- (12) A Cabin Designated Examiner (restricted) shall maintain currency as appropriate for his or her expertise and specialisation.
- (13) A Cabin Designated Examiner shall have knowledge of the Training and Procedures Manual of an ATO or the operations manual of an operator, as applicable.

- (14) The maintenance of a valid medical certificate is not required for a Cabin Designated Examiner. However, a Cabin Designated Examiner that continues to operate as a cabin crew member shall be required to maintain the validity of all aspects of a cabin crew member licence.
- (15) A Cabin Designated Examiner may conduct the following assessments -
- (a) initial; recurrent; validation of a foreign licence or competency card;
 - (b) aircraft rating skills tests; and
 - (c) re-designation of cabin crew instructors;
- (16) A Cabin Designated Examiner may only conduct and issue skills tests on an aircraft types on which he or she is rated and current.
- (17) A Cabin Designated Examiner shall possess a knowledge of the following practical drill assessments as documented evidence of familiarity as provided in the TGM.
- (a) wet ditching drill;
 - (b) live firefighting drill; and
 - (c) slide jumps.
- (18) The practical drill assessments referred to in subsection (6) shall not require a current and valid aircraft type rating.
- (19) A Cabin Designated Examiner may be rated on an unlimited number of aircraft types and variants provided that he or she maintains annual currency on at least one of the aircraft types.
- (20) Where the Cabin Designated Examiner has not conducted and issued skills test on the aircraft type within a 6-month period, then he or she is required to undergo refresher training, as prescribed in Part 121.
- (21) Where currency on an aircraft type has not been maintained in excess of 36 months, a Cabin Designated Examiner shall be required to undergo initial aircraft rating training prior to conducting any training or assessing on an aircraft type.
- (22) A maximum number of 24 candidates per Cabin Designated Examiner per day shall be permitted in the theoretical examination environment.

- (23) A maximum number of 12 candidates per Cabin Designated Examiner per day shall be permitted in the practical drill assessment environment.
- (24) A maximum number of 30 candidates per Cabin Designated Examiner per day shall be permitted in the computer-based assessment environment.
- (25) A Cabin Designated Examiner may only exercise the privileges of his or her designation. Any aspect of the scope of the designation not exercised within a 36 month period shall require re-application for designation of those aspect(s), as provided for in the TGM.

9. Monitoring of the system

- (1) The Director may at any time require a Cabin Designated Examiner to subject himself or herself for a skill test, if it becomes evident that a Cabin Designated examiner is not maintaining the required standard of testing.
- (2) A re-designation and ad hoc oversight may be conducted on a Cabin Designated Examiner within a 12-month period by an authorised officer for the maintenance of standards.
- (3) An oversight may be conducted at any ATO or operator that a Cabin Designated Examiner is affiliated or contracted with.

10. Re-designation of Cabin Designated Examiner

- (1) A Cabin Designated Examiner may apply for re-designation annually and the following shall be submitted to the Director at least 60 days preceding the date of expiry:
- (a) correctly completed application form; and
 - (b) proof of payment of fee as prescribed in Part 187.
- (2) When considering an application for re-designation the Director, shall take into account the following:
- (a) the number of assessments that the Cabin Designated Examiner has conducted over the year.
 - (b) where applicable, a comprehensive report detailing reasons for a Cabin Designated Examiner who has not conducted the required number of assessments.
 - (c) proof of attendance of one Cabin Designated Examiner conference;

- (d) quarterly reports as submitted by the Cabin Designated Examiner, kept on record at the ATO; and
 - (e) completion of two assessments on the activities of a Cabin Crew Instructor.
- (3) An oversight for re-designation shall be conducted annually and if a follow up oversight shall be required, then an hourly rate fee shall apply as prescribed by Part 187.

64.01.10 DESIGNATION OF CABIN CREW INSTRUCTOR

1. Requirements for application as Cabin Crew Instructor

- (1) An applicant shall be in possession of the following:
 - (a) a valid and current South African cabin crew member licence;
 - (b) original or certified proof of having undergone an acceptable, accredited train-the-trainer course;
 - (c) original or certified proof of having undergone an acceptable, accredited assessor course;
 - (d) at least 1000 flying hours as an active cabin crew member or certified copy of summarised logbook;
 - (e) other relevant training experience or qualification that may be determined by the Director;
 - (f) appropriate fee as prescribed in Part 187; and
 - (g) prescribed application form, duly completed.
- (2) An applicant for Cabin Crew Instructor designation shall have sufficient ability in reading, speaking and understanding the English language to exercise the privileges of a cabin crew instructor.

2. Requirements for designation as Cabin Crew Instructor

- (1) The Director may designate a holder of a cabin crew member licence as a designated Cabin Crew Instructor when an applicant –
 - (a) has achieved a satisfactory assessment by the Authority as prescribed in the TGM;
 - (b) complies with the developmental programme as prescribed in the TGM;
 - (c) complies with the oversight process as prescribed in the TGM; and
 - (d) signs an undertaking to abide by the Authority's Code of Conduct for Cabin Crew Instructors, contained in the TGM.

- (2) An applicant may attempt the assessment referred to in subsection (1) no more than 3 times within a 12-month period. If the third attempt is unsuccessful then an applicant shall not be permitted to apply for designation as a Cabin Crew Instructor for a further period of 6 months, calculated from the date of the last attempted assessment.
- (3) An applicant may lodge an appeal against the outcome of an assessment, within 30 days, to the Director.
- (4) An applicant for a Cabin Crew Instructor designation may, on successful completion of the assessment conducted by the Authority, commence with co-facilitation training and facilitation training under the supervision of a Cabin Crew Instructor as provided for in the TGM.
- (5) The designation shall be valid for the period of approval, not exceeding 24 months as determined by the Director.
- (6) The Director may impose any endorsements, restrictions or limitations to the designation.
- (7) Where an application for designation or re-designation is declined by the Director, the Director shall provide an applicant with written reasons for the refusal.
- (8) The designation of a Cabin Crew Instructor status is a privilege and not a right. Designation and consequent re-designation is exercised solely at the discretion of the Director.
- (9) The Director may withdraw a designation if –
- (a) it becomes evident that the Cabin Crew Instructor does not comply with the provisions of this technical standard; or
 - (b) the withdrawal is necessary in the interests of aviation safety; or
 - (c) any false or misleading information comes to the attention of the Authority, subsequent to the issue of the designation.
- (10) The Cabin Crew Instructor shall, upon the withdrawal of the designation by the Authority, forthwith refrain from exercising any duties affiliated with the privileges of designation as instructor.

- (11) The Authority shall publish the names of all Cabin Crew Instructors on its website.

3. Developmental programme

- (1) An applicant shall be required to undergo a developmental programme as described in the TGM.
- (2) The developmental programme shall be conducted under the supervision of a Cabin Designated Examiner.
- (3) On satisfactory completion of the developmental programme, the accountable person for an ATO or AOC shall submit a recommendation letter to the Director, advising of an applicant's readiness for the initial oversight.
- (4) The developmental programme shall be completed within 12 months of successful completion of the assessment conducted by the Authority. If the developmental programme is not completed within 12 months, an applicant shall be required to submit a new application.
- (5) During the oversight conducted by the authorised officer, the Cabin Designated Examiner responsible for the development of the applicant shall be present at all times.

4. Responsibility

- (1) Cabin Crew Instructor shall ensure that a candidate receives all necessary theoretical and practical training as per the provision of Document SA CATS 64 and other relevant Parts, as applicable.
- (2) A Cabin Crew Instructor shall identify and report irregular practices by an ATO or an operator to the Authority.
- (3) A Cabin Crew Instructor shall submit an individual training schedule, detailing his or her training activities and duties, to an authorised officer on a monthly basis.
- (4) A Cabin Crew Instructor shall maintain currency in the following components on an annual basis, or as required:
- (a) safety and emergency procedures;
 - (b) aircraft type;
 - (c) aviation security awareness;
 - (d) Dangerous Goods awareness conducted every 2 years;

- (e) first aid;
 - (f) live firefighting conducted every 3 years;
 - (g) wet ditching conducted every 3 years; and
 - (h) slide jump conducted every 3 years.
- (5) In the event that a Cabin Crew Instructor is no longer affiliated with an operator and for the maintenance of the currency of those aircraft types which are utilised for training purposes, a Cabin Crew Instructor may undertake an approved training programme, with an accredited ATO.
- (6) The maintenance of a valid medical certificate is not a requirement for a Cabin Crew Instructor, however any Cabin Crew Instructor that continues to operate as a cabin crew member shall be required to maintain the validity of all aspects of the cabin crew member licence.
- (7) A Cabin Crew Instructor shall be approved to conduct the following training:
 - (a) initial, recurrent, foreign licence validation; refresher, aircraft rating, operator induction; and
 - (b) flight deck crew safety and emergency procedures.
- (8) A Cabin Crew Instructor may only conduct theoretical and practical training on the aircraft types on which he or she is rated and current.
- (9) A Cabin Crew Instructor may be rated on an unlimited number of aircraft types and variants provided that he or she maintains annual currency on at least one of these aircraft types
- (10) Where the Cabin Crew Instructor has not conducted any training on the aircraft type within a 6-month period, then he or she is required to undergo refresher training as prescribed in Part 121, prior to conducting any training on that aircraft type.
- (11) Where currency on an aircraft type has not been maintained in excess of 36 months, a Cabin Crew Instructor shall be required to undergo initial aircraft rating training prior to conducting any training on an aircraft type.
- (12) A maximum number of 24 learners per Cabin Crew Instructor per day shall be permitted in the theoretical classroom environment.
- (13) A maximum number of 12 learners per Cabin Crew Instructor per day shall be permitted in the practical drill training environment. Consideration shall be given to the type of practical training being conducted and the duration of each drill as applied for by the ATO/AOC.

- (14) A maximum number of 30 learners per Cabin Crew Instructor per day shall be permitted in the computer-based training environment, where the presence of the instructor is limited to providing support.
- (15) A Cabin Crew Instructor shall exercise his or her duties according to these regulations, the Technical Standard, the published TGM and Code of Conduct.
- (16) A Cabin Crew Instructor shall have access to and know the contents of the Training and Procedures Manual of a Part 141 ATO or the operations manual of the operator, as applicable.
- (17) A type rating for a Cabin Crew Instructor shall be conducted as per approved training programme.
- (18) A Cabin Crew Instructor shall not engage in any duties pertaining to the assessment or perceived assessment of a cabin crew.
- (19) A Cabin Crew Instructor may exercise duties as a theoretical test examiner.

5. Monitoring of the system

- (1) A Cabin Designated Examiner shall conduct at least two assessments on the activities of the Cabin Crew Instructor affiliated with an ATO or AOC for the purposes of re-designation and maintenance of standards. These oversights may be conducted at any ATO or AOC that a Cabin Crew Instructor is affiliated with.
- (2) Every second year, the re-designation oversight shall be conducted on a cabin crew instructor by an authorised officer, for the maintenance of standards.
- (3) The Director may at any time require a Cabin Crew Instructor to subject himself or herself to an assessment, if it became evident that such an instructor is not maintaining the required standard of training or should there be any question relating to the knowledge or skill level of a Cabin Crew Instructor during an Authority oversight.

6. Re-designation of Cabin Crew Instructor

- (1) A Cabin Crew Instructor may apply for re-designation annually and the following shall be submitted to the Director at least 60 days preceding the date of expiry:
 - (a) correctly completed application form; and
 - (b) proof of payment of fee as prescribed in Part 187.

- (2) When considering an application for re-designation, the Director shall take into account the following:
- (a) the number of training components that the Cabin Crew Instructor has facilitated over the year;
 - (b) a minimum number of training hours shall be evaluated, commensurate with any limitations imposed on a Cabin Crew Instructor, as per the TGM;
 - (c) proof of attendance of one Cabin Crew instructor conference annually;
 - (d) maintenance of quarterly reports which shall be made available to the Authority within 14 days of request; and
 - (e) completion of two assessments, with a satisfactory outcome, by a Cabin Designated Examiner, annually. The assessments shall be kept on record at the ATO/AOC where the assessments were conducted to determine compliance with Part 64 and other relevant Parts of the Regulations. If a follow up oversight is required then it shall be conducted by an authorised officer, and the hourly rate fee shall apply as prescribed by Part 187.
- (3) An oversight for re-designation shall be conducted every second year and a follow up oversight shall be required, then an hourly rate fee shall apply as prescribed in Part 187.

64.01.11 DESIGNATION OF FIRST AID EXAMINER

1. Requirements as a First Aid Examiner

- (1) The requirements for a First Aid Examiner shall be –
- (a) proof of current registration as –
 - (i) medical doctor registered with the Health Professions Council of South Africa; or
 - (ii) professional nurse registered with the Nursing Council of South Africa; or
 - (iii) intermediate life support paramedic emergency care practitioner (level 6) registered with the Health Professions Council of South Africa; or
 - (iv) advanced life support paramedic registered with the Health Professions Council of South Africa.
 - (b) attendance of an assessor and moderator course approved by the South African Qualification Authority;
 - (c) attendance of primary aviation health or flight medical attendant Course/Aviation Health Care Provider Course;
 - (d) attendance of recognized facilitator course or instructor course or train-the-trainer course or educational courses as part of either under or post graduate professional Bachelor's degree or equivalent course registered with an accredited authority;

- (e) attendance of basic life support instructors certificate approved by the relevant Authority; and
- (f) affiliation to an ATO.

2. Requirements for designation as a First Aid Examiner

- (1) An applicant, who desires to be designated as a First Aid Examiner, shall apply to the Director.
- (2) An application for the designation as a First Aid Examiner shall be accompanied by proof that an applicant complies with the conditions, requirements and standards prescribed in these technical standards.
- (3) The Director may, after due consideration of an application, designate an applicant as a designated First Aid Examiner for the period determined, which period may not exceed one year, calculated from the date of the designation.
- (4) An applicant who desires to renew his or her designated First Aid Examiner shall submit the following to the Director within 60 days preceding the date of expiry –
 - (a) application form; and
 - (b) the appropriate fee as prescribed in Part 187.

3. Conditions for designated First Aid Examiner

- (1) The First Aid Examiner shall ensure that the original or certified copy for each test conducted, are retained by an ATO for a minimum period of 5 years, such documentation shall be assessed during all inspection.
- (2) A First Aid Examiner shall ensure that he or she has knowledge of current CAR, TS, AICs.
- (3) A First Aid Examiner is to sign relevant segments of the applicant's certificate where and when required, indicating the date and nature of the test.
- (4) A First Aid Examiner is responsible for moderating 30% of training provided by First Aid Instructor.
- (5) A First Aid Examiner shall be required to produce documented proof of currency with relevant professional authority he or she is registered with.
- (6) A First Aid Examiner shall submit a quarterly report to the Director, on all theory and practical tests conducted.

- (7) The Director may request further supporting documents such as training schedule, lesson plans and training manuals.
- (8) In the event of a failure, the test forms shall indicate notes on the de-briefing done and the candidate shall append his or her initials next to such notes.
- (9) A First Aid Examiner shall have a stamp made that reflects the name and designation reference number of a First Aid Examiner.
- (10) A maximum of 12 learners per First Aid Instructor/DE is allowed for all practical training sessions.

4. Training aids and equipment required

- (1) The following training aids and equipment are required during training:
 - (a) a CPR adult, child and infant manikin are to be available for all courses presented at a ratio of 3 learners per manikin minimum;
 - (b) each learner shall be issued with a pair of medical examination gloves and rescue aid way valve mouth-to-mouth device or a pocket mask; and
 - (c) a medical or patient oxygen cylinder device shall be required for training.

5. Oversight of First Aid Examiner

- (1) The following types of inspections shall be conducted by an authorised officer on each First Aid Examiner within a 12 months' period:
 - (a) an inspection for annual renewal of a First Aid Examiner status, which inspection shall entail:
 - (i) an assessment of training compliance to Part 64; and
 - (ii) an assessment of compliance to conditions of designation and training equipment.
 - (b) ad hoc inspections for the maintenance of standards.
- (2) If it becomes evident that a First Aid Examiner is not maintaining the required standard of testing, the Director may at any time request such a First Aid Examiner to undergo a theoretical and practical assessment.

64.01.12 DESIGNATION OF FIRST AID INSTRUCTOR

1. Requirements as a First Aid Instructor

- (1) The requirements for designation shall be –
 - (a) proof of current registration as –

- (i) medical doctor registered with the Health Professions Council of South Africa; or
- (ii) auxiliary nurse registered with the South African Nursing Council; or
- (iii) advanced life support paramedic with Level 7 or 8, registered with the Health Professions Council of South Africa;
- (iv) intermediate life support emergency care practitioner with Level 6;
- (v) basic life support emergency care practitioner with BAA–Level 4-5, registered with the Health Professions Council of South Africa; or
- (vi) proof of continued professional development with the institutions referred to in subparagraphs (i) to (v);
- (b) Instructor / Train-the-Trainer / Facilitator - accredited by the relevant authority;
- (c) primary aviation health / Flight Medical Attendant Course / Aviation Health Care Provider Course;
- (d) Basic Life Support Instructor Certificate approved by the professional authority;
- (e) assessor Course that is South African Qualification Authority approved;
- (f) documented proof of experience in the aviation environment; and
- (g) affiliation with an ATO.

2. Requirements for designation of First Aid Instructor

- (1) A person, who desires to be designated as a First Aid Instructor, shall apply to the Director.
- (2) The Director may, after due consideration of the application, designate an applicant as a First Aid Instructor. For the period determined, which period may not exceed one year, calculated from the date of the designation.
- (3) The Director may withdraw a designation if it becomes evident that the designated instructor does not comply with the provisions of these Technical Standard.
- (4) A designated First Aid Instructor shall upon the withdrawal of the designation by the Director, forthwith surrender all documents issued by the Director.

3. Conditions for First Aid Designated Instructor

- (1) A First Aid Instructor shall have knowledge of the current CAR, Technical Standards and AICs.
- (2) A First Aid Instructor shall sign appropriate segments of the applicant's certificate where and when required indicating the date and nature of the test.

- (3) A First Aid Instructor shall be moderated by a First Aid Examiner.
- (4) A First Aid Instructor shall submit quarterly reports to the Director, on all practical and theoretical test conducted by a First Aid Instructor.
- (5) A First Aid Instructor shall be required to produce documented proof of currency with relevant professional authority.
- (6) The Director may request further supporting documents such as training schedules, lesson plans and training manuals.
- (7) A First Aid Instructor shall have a stamp made that reflects the name and designation number of a First Aid Instructor.

4. Oversight of First Aid Instructor

- (1) The following types of inspections shall be conducted by an authorised officer on each First Aid Instructor within a 12 month period:
 - (a) an inspection for an annual renewal of a First Aid Instructor status, which inspection shall entail –
 - (i) assessment of training compliance to Part 64;
 - (ii) assessment of compliance to conditions of designation and training equipment.
 - (b) ad hoc inspection for the maintenance of standards.
- (2) If it became evident that a First Aid Instructor is not maintaining the required standard of testing, the Director may at any time request a First Aid Instructor to undergo a theoretical and practical assessment.

64.01.14 VALIDATION OF A FOREIGN LICENCE AND RATING OR COMPETENCY CARD ISSUED BY AN APPROPRIATE AUTHORITY

- (1) The Authority shall verify the ICAO Effective Implementation rating for cabin crew issued by an appropriate authority of the Contracting State to determine if the standard of such a foreign rating is deemed to be equivalent to or higher than the South African rating.
- (2) The Authority shall evaluate the approved cabin crew manual and training aspects or a foreign cabin crew prior to conducting the validation skills test for submission to the Authority.
- (3) The following curriculum subjects shall be reviewed:

- (a) Aviation – general
 - (i) regulatory overview;
 - (ii) aviation terminology;
 - (iii) theory of flight;
 - (iv) physiology of flight; and
 - (v) flight deck observation flight.
- (b) Responsibilities
 - (i) operator;
 - (ii) cabin crew member; and
 - (iii) civil aviation inspector.
- (c) Safety procedures
 - (i) crew coordination;
 - (ii) communication;
 - (iii) surface contamination;
 - (iv) briefings;
 - (v) pre-flight and safety checks;
 - (vi) passenger handling;
 - (vii) passenger and flight crew seats/restraints;
 - (viii) cabin baggage;
 - (ix) electronic devices;
 - (x) service to passengers on the ground;
 - (xi) fuelling with passengers on board;
 - (xii) pre-take-off and pre-landing;
 - (xiii) propeller abnormalities;
 - (xiv) apron/ramp safety;
 - (xv) turbulence;
 - (xvi) crew member incapacitation;
 - (xvii) flight deck protocol;
 - (xviii) fuel dumping;
 - (xix) post flight duties; and
 - (xx) oxygen administration;
- (d) Emergency procedures
 - (i) firefighting;
 - (ii) smoke/fumes in the cabin;
 - (iii) rapid decompression and decompression problems;
 - (iv) evacuations.
- (e) Emergency equipment
 - (i) equipment overview.
- (f) Aircraft specific subjects
 - (i) physical description;
 - (ii) galleys;
 - (iii) communication systems;
 - (iv) lighting system;
 - (v) water and waste systems;
 - (vi) heating and ventilation systems;
 - (vii) oxygen systems;
 - (viii) exits; and
 - (ix) unique features.
- (g) Security awareness
 - (i) security of the flight deck;

- (ii) unruly passengers;
 - (iii) bomb threats;
 - (iv) hijacking; and
 - (v) chemical / biological / radiological weapons.
 - (h) Cabin health and First Aid
 - (i) management of on-board medical events;
 - (ii) food safety;
 - (iii) cabin disinsection;
 - (iv) altitude physiology; and
 - (v) fatigue.
 - (i) Dangerous Goods Awareness category 11
 - (i) general philosophy;
 - (ii) limitations;
 - (iii) labelling and marking;
 - (iv) recognition of undeclared Dangerous Goods;
 - (v) provisions for passengers and crew;
 - (vi) emergency procedures.
- (4) For initial and renewal validation application, the Authority shall verify a foreign cabin crew qualification of an applicant and shall require proof of completion and ensure that the date of expiry is clearly indicated for the following:
- (a) safety and emergency procedures training which includes security awareness for cabin crew;
 - (b) aircraft type;
 - (c) aviation medicine including first aid training for cabin crew members;
 - (d) dangerous goods awareness category 11;
 - (e) live firefighting;
 - (f) wet ditching indicating "RAFT or NO RAFT; and
 - (g) medical certificate.
- (5) All documentation for the validation shall be submitted in English and certified as being reliable and authentic by a competent authority.
- (6) An applicant for the issue of a validation shall demonstrate to a South African Cabin Designated Examiner, the ability to competently perform the requirements of the skills test as prescribed for validations, comprising the following practical drills:
- (a) communication system;
 - (b) passenger briefing drills;
 - (c) equipment drills;
 - (d) incapacitated pilot drill;
 - (e) aircraft exit operation drills;
 - (e) simulated firefighting drill;
 - (f) evacuation drill; and
 - (g) egress drill.
- (7) A communication system drill may be incorporated as part of the evacuation drill;

Note

A validation practical skills test is estimated to take 2 hours per cabin crew member.
This does not take into account re-assessments of drills not conducted competently.

- (8) The validation of the foreign cabin crew qualification shall be valid for a period of 12 months or until the first expected expiry date for the various components as indicated on the documentation or, whichever date comes first.
- (9) In the case of the holder of a foreign cabin crew qualification operating within the borders of the Republic of South Africa, the validation may be renewed only once. Thereafter the holder shall be required to undergo the process for the initial South African cabin crew member licence.
- (10) In the case of the holder of a foreign cabin crew qualification operating outside the borders of the Republic of South Africa, the validation may be renewed, as required.

AMENDMENT OF TECHNICAL STANDARD 66

3. Technical standard 66.02.3(1)(1.4) is hereby amended by the substitution of subsections (2) and (3) for the following subsections:

“(2) A candidate may not re-test the applicable exam subject to :

- (a) in the case of a first or second failure, within a period of 7 days;
- (b) in the case of a third or subsequent failure, within a period of 60 days;
or
- (c) in any case where a score of less than 50% was achieved, within a period of 60 days.

- (3) If result is between 70% and 74%, both inclusive, candidate may apply in writing for a re-mark within 30 days from the date of receiving the examination results, on payment of the prescribed fee. If the remark is successful, the fee shall be refunded”.

AMENDMENT OF TECHNICAL STANDARD 67

4. Technical Standard 67.00.2 is hereby amended by –

- (a) the substitution of section 2 of the following section:

“2 **Class 1 medical certificate**

[1.1.] 2.1 Physical and mental standards

[Applicants] An applicant shall have no established medical history or clinical diagnosis of –

[1.1.1.] 2.1.1 Psychiatric

- (1) Any of the following conditions that are of **[a]** severity which render~~[s]~~ **[the]** an applicant incapable of safely exercising the privileges of the licence, or makes it likely that within two years of the assessment **[the]** an applicant shall be unable to safely exercise the privileges of the licence, shall be disqualifying unless acceptable and effective treatment has controlled any additional risk of functional disorder or sudden or subtle incapacitation:
- (a) a psychotic disorder, unless the psychosis was of toxic origin and there has been complete recovery;
 - (b) alcohol or other psychoactive substance abuse or dependence;
 - (c) character or behaviour disorder, severe enough to have resulted in an overt act;
 - (d) any other psychiatric disorder;
 - (e) organic mental disorder;
 - (f) a mental or behavioural disorder due to use of psychoactive substance; this includes dependence syndrome induced by alcohol or other psychoactive substances;
 - (g) schizophrenia or schizotypal or delusional disorder;
 - (h) a mood (affective) disorder;
 - (i) a neurotic, stress related or somatoform disorder;
 - (j) a behavioural syndrome associated with physiological disturbance or physical factors;
 - (k) a disorder of adult personality or behaviour, particularly if manifested by repeated overt acts;
 - (l) mental retardation;
 - (m) a disorder of psychological development;
 - (n) a behavioural or emotional disorder with onset in childhood or adolescence, or
 - (o) a mental disorder not specified.
- (b) the substitution of section 3 of the following section:

“3 Class II medical certificate

[2.1] 3.1 Physical and mental standards

[Applicants] An applicant shall have no established medical history or clinical diagnosis of –

[2.1.1] 3.1.1 Psychiatric

(1) Any of the following conditions that are of **[a]** severity which render~~s~~ **[the]** an applicant incapable of safely exercising the privileges of the licence, or makes it likely that within two years of the assessment **[the]** an applicant shall be unable to safely exercise the privileges of the licence, shall be disqualifying unless acceptable and effective treatment has controlled any additional risk of functional disorder or sudden or subtle incapacitation:

- (a) a psychotic disorder, unless the psychosis was of toxic origin and there has been complete recovery;
- (b) alcohol or other psychoactive substance abuse or dependence;
- (c) character or behaviour disorder, severe enough to have resulted in an overt act;
- (d) any other psychiatric disorder;
- (e) an organic mental disorder;
- (f) a mental or behavioural disorder due to use of psychoactive substance; this includes dependence syndrome induced by alcohol or other psychoactive substances;
- (g) schizophrenia or schizotypal or delusional disorder;
- (h) a mood (affective) disorder;
- (i) a neurotic, stress related or somatoform disorder;
- (j) a behavioural syndrome associated with physiological disturbance or physical factors;
- (k) a disorder of adult personality or behaviour, particularly if manifested by repeated overt acts;
- (l) mental retardation;
- (m) a disorder of psychological development;
- (n) a behavioural or emotional disorder with onset in childhood or adolescence, or
- (o) a mental disorder not otherwise specified.

(c) the substitution in section 4 of the following section:

"4 Class III medical certificate

[3.1] 4.1 Physical and mental standards

[Applicants] An applicant shall have no established medical history or clinical diagnosis of –

[3.1.1] 4.1.1 Psychiatric

(1) Any of the following conditions that are of **[a]** severity which render~~s~~ **[the]** applicant incapable of safely exercising the privileges of the licence, or makes it likely that within two years of the assessment **[the]** an applicant **[will]** shall be unable to safely exercise the privileges of the licence, **[will]** shall be

disqualifying unless acceptable and effective treatment has controlled any additional risk of functional disorder or sudden or subtle incapacitation

- (a) a psychotic disorder, unless the psychosis was of toxic origin and there has been complete recovery;
 - (b) alcohol or other psychoactive substance abuse or dependence;
 - (c) character or behaviour disorder, severe enough to have resulted in an overt act;
 - (d) any other psychiatric disorder;
 - (e) an organic mental disorder;
 - (f) a mental or behavioural disorder due to use of psychoactive substance; this includes dependence syndrome induced by alcohol or other psychoactive substances;
 - (g) schizophrenia or schizotypal or delusional disorder;
 - (h) a mood (affective) disorder;
 - (i) a neurotic, stress related or somatoform disorder;
 - (j) a behavioural syndrome associated with physiological disturbance or physical factors;
 - (k) a disorder of adult personality or behaviour, particularly if manifested by repeated overt acts;
 - (l) mental retardation;
 - (m) a disorder of psychological development;
 - (n) a behavioural or emotional disorder with onset in childhood or adolescence, or
 - (o) a mental disorder not otherwise specified.
- (d) the substitution in section 5 of the following section:

“5. Class IV medical certificate

5.1 Physical and mental standards

An applicant shall have no established medical history or clinical diagnosis of –

5.1.1 Psychiatric

- (1) Any of the following conditions that are of severity which render an applicant incapable of safely exercising the privileges of the licence, or makes it likely that within two years of the assessment an applicant shall be unable to safely exercise the privileges of the licence, shall be disqualifying unless acceptable and effective treatment has controlled any additional risk of functional disorder or sudden or subtle incapacitation
- (a) a psychotic disorder, unless the psychosis was of toxic origin and there has been complete recovery;

- (b) alcohol or other psychoactive substance abuse or dependence;
- (c) character or behaviour disorder, severe enough to have resulted in an overt act;
- (d) any other psychiatric disorder;
- (e) an organic mental disorder;
- (f) a mental or behavioural disorder due to use of psychoactive substance; this includes dependence syndrome induced by alcohol or other psychoactive substances;
- (g) schizophrenia or schizotypal or delusional disorder;
- (h) a mood (affective) disorder;
- (i) a neurotic, stress related or somatoform disorder;
- (j) a behavioural syndrome associated with physiological disturbance or physical factors;
- (k) a disorder of adult personality or behaviour, particularly if manifested by repeated overt acts;
- (l) mental retardation;
- (m) a disorder of psychological development;
- (n) a behavioural or emotional disorder with onset in childhood or adolescence, or
- (o) a mental disorder not otherwise specified.

- (c) the substitution of Schedule 1 Protocol with the following Schedule:

"SCHEDULE 1: PROTOCOL ON NEUROLOGICAL AND NEUROSURGICAL CONDITIONS

1. Epilepsy

1.2 Applicability

- (1) Epilepsy for Schedule 1 Protocol is applicable to the following Class of medical certificates:

- (a) Class I,
- (b) Class II,
- (c) Class III and
- (d) Class IV

1.3 Aeromedical considerations

An applicant who is diagnosed with epilepsy shall be declared medically unfit.

1.4 Important concepts

- (a) Diagnosis of a single epileptic attack means that an applicant is permanently medically unfit to fly;
- (b) An applicant who has had a convulsion after the age of 5 years shall not be considered for pilot training;
- (c) Any inexplicable Loss of Consciousness (LOC) shall be regarded as epilepsy until diagnosed otherwise; and
- (d) An applicant with a history of a single, uncomplicated febrile convulsion between the age of 1 and 5 years shall be eligible for pilot training. If, however, the convulsion was complicated, an applicant shall no longer be eligible for pilot training under the following conditions:
 - (i) a convulsion before the age of 1 year and this holds the risk for mental retardation and epilepsy later in life;
 - (ii) multiple febrile convulsions;
 - (iii) duration of convulsions longer than 5 minutes; or
 - (iv) lateralising signs during febrile convulsions.

2. Epilepsy for Cabin Crew

2.1 Applicability

Epilepsy for cabin crew

2.2 medical requirements

- (1) A cabin crew member who is diagnosed with epilepsy is medically unfit to fly.
- (2) Cabin crew member may be considered for recertification by the Medical Assessor after a year period has lapsed following initiation of medication.
- (3) On application for recertification an applicant shall be required to submit the following reports which are not older than 3 months:
 - (a) a Neurologist report stating that he or she is adequately functional on acceptable medication without significant side effects;
 - (b) a Brain CT scan film/MRI scan; and
 - (c) a 16 Lead EEG.
- (4) If an applicant suffers a seizure while on medication, he or she is deemed to be medically unfit to fly and shall submit the reports referred to in subsection (3).
- (5) If there is a change in medication, an applicant shall be grounded for 6 months and shall be required to provide a Neurologist report stating that an applicant is stable on the new medication.

2.3 Restrictions

- (1) A cabin crew member with epilepsy is restricted to operate under the following conditions:
- (a) short haul flights which are not more than 3 hours; and
 - (b) operate under supervision or in pairs.

3. Benign Rolandic Epilepsy of childhood

3.1 Applicability

- (1) Benign Rolandic Epilepsy of childhood is applicable to the following medical certificate:
- (a) Class I.
 - (b) Class II.
 - (c) Class III, and
 - (d) Class IV.

3.2 Operational considerations

An applicant who has been diagnosed with Benign Rolandic Epilepsy shall not be eligible to apply for Class I, II, III and IV medical certification.

3.3 Operational restrictions

- (1) Operational restrictions shall be applicable to the following classes of medical certificates:
- (a) Class I-multi-crew, as or with a co-pilot;
 - (b) Class II – with safety pilot;
 - (c) Class III- with constant supervision;
 - (d) Class IV -no restriction; and
 - (e) Cabin Crew- no restriction

3.4 Medical requirements

- (1) An applicant with Benign Rolandic Epilepsy with Centro-temporal Spikes may be considered for medical certification after a minimum observation period of 5 years or more, as the condition is self-limiting.
- (2) An applicant shall be seizure free and not be using medication for the period referred to in subsection (1).
- (3) When applying for recertification the following shall be required: and which shall be accompanied by the following reports which are not older than 3 months:

- (a) a comprehensive neurologist report;
- (b) 16 lead EEG with provocation; and
- (c) Brain CT/MRI scan Film.

(4) All initial or recertification applications of epilepsy shall be presented to the Medical Assessor for consideration.

4. Febrile childhood seizures

4.1 Applicability

- (1) The occurrence of a single seizure is disqualifying for all classes of medical certification unless it is a proven febrile seizures of childhood.
- (2) One seizure under between the age of 1 to 5 years, clearly associated with an episode of febrile illness is acceptable.
- (3) The following complications shall render an applicant medically unfit to fly:
 - (a) any other form of seizure that occurred under the age of 1 year;
 - (b) multiple seizures;
 - (c) a seizure that lasted more than 5 minutes; and
 - (d) lateralizing signs associated with a seizure.
- (4) A Neurologist report which is not older than 3 months is mandatory for all cases associated with Febrile childhood seizures.

4.2 Aeromedical implications

Medical certification may be granted following a single uncomplicated febrile seizure when all studies are normal and there are no risk factors for recurrence.

4.3 Medical requirements

- (1) An applicant with a history of febrile childhood seizures may be considered for certification provided it was a single uncomplicated seizure and there are no risk factors for recurrence.
- (2) An applicant with a history of febrile childhood seizures shall submit the following medical reports which are not older than 3 months:
 - (a) a comprehensive neurologist report;
 - (b) a 16 lead EEG; and
 - (c) a Brain CT/MRI scan film.

5. Single seizure

5.1 Applicability

(1) Single seizure diagnosis shall be applicable to the following medical certificates:

- (a) Class I;
- (b) Class II;
- (c) Class III; and
- (d) Class IV.

(2) Cabin crew with a single seizure may be considered by a medical assessor on application.

5.2 Operational implications

The occurrence of a single seizure is disqualifying for all classes of medical certification with the exception of cabin crew.

5.3 Risk factors for developing a second seizure or epilepsy

- (1) Age younger than 16 years at first seizure presentation.
- (2) Remote symptomatic seizures following a stroke or lesion location.
- (3) Seizures occurring between midnight and 08:59am.
- (4) Previous provoked seizures and previous febrile seizures.
- (5) Family history of epilepsy.
- (6) Status epilepticus or multiple seizures within 24 hours as the remote symptomatic seizures.
- (7) History of neurological deficit at birth such as cerebral palsy or mental retardation.
- (8) EEG that shows epileptiform discharges.
- (9) Brain tumour on CT scan.

5.4 Requirements for consideration of an applicant with the history of single seizure

- (1) An applicant shall be presented to the Medical Assessor for considerations.
- (2) When an applicant suffers from his or her first seizure, a thorough search for cause and risk factor stratification shall be conducted and the following information and medical records which are not older than 3 months shall be required:
 - (a) history of seizures in immediate family;
 - (b) history of febrile seizures;
 - (c) prior acute symptomatic seizure;
 - (d) history of remote neurological insult;
 - (e) Neurologist report;
 - (f) cerebral imaging study (CT scan film); and
 - (g) 16 EEG Channel with provocation.

- (3) An applicant's recurrence risk of a seizure is approximately 30% over five years.
- (4) An applicant with no risk of recurrence of a seizure and without medication in 5 years shall submit the following reports which are not older than 3 months for medical recertification:
 - (a) a comprehensive neurologist;
 - (b) 16 channel EEG for 15 minutes, with provocation; and
 - (c) an MRI/CT Scan.
- (5) If a cause for a seizure is not found, a pilot or ATC shall be temporarily taken off from his or her safety operations duties for a duration of no less than 5 years.
- (6) An applicant referred to in subsection (5) may only be considered for recertification after 5 years' period of being seizure-free and medication-free observation period has been achieved.
- (7) If a cause for a seizure is not found, a recreational pilot shall be temporarily taken off from his or her safety operations duties for duration of no less than 2 years and the medical certificate applied for shall not be granted until a two-year seizure-free and medication-free observation period has been achieved.
- (8) If a cause of the seizure is found, a medical assessor shall determine the grounding period and the duration thereof based on the underlying cause and treatment of the seizure.
- (9) An applicant who complies with the requirements of section 5.4 may be declared medically fit to fly and such an applicant shall be restricted to fly "As or with co-pilot" for 2 years.
- (10) An applicant shall be required to submit the information and medical reports referred in subsection (4) after 5 years.

5.5 Follow up requirements

- (1) An applicant referred to in section 5.4 shall submit the following reports for a follow-up :
 - (a) a 6 monthly comprehensive Neurologist report for the first 2 years;
 - (b) 16 lead EEG and CT brain film reports which is not older than 3 months;
 - (c) report which is not older than 3 months on any new symptoms or change in medical status immediately; and
 - (d) annual Neurologist report after the 3rd year which is not older than 3 months.

6. Migraines

6.1 Applicability

- (1) Migraine protocol shall be applicable to the following classes of medical certificates:
 - (a) Class I;
 - (b) Class II;
 - (c) Class III; and
 - (d) Class IV.
- (2) A Cabin crew member who is diagnosed with migraine may be considered medically fit by a medical assessor.

6.2 Medical requirements

- (1) An applicant who is diagnosed with migraine shall be declared medically unfit to fly and shall provide the following reports which are not older than 3 months upon diagnosis:
 - (a) comprehensive Neurologist report confirming the diagnosis and stating the frequency of attacks, type of aura, duration of prodromal period;
 - (b) Brain CT scan; and
 - (c) 16 Lead EEG
- (2) An applicant may be considered for recertification by a medical assessor after a minimum of 6-months observation period.
- (3) On application for recertification an applicant shall provide a comprehensive Neurologist report stating the following:
 - (a) he or she is stable on acceptable medication with documented effectiveness for prevention or treatment of migraine attack;
 - (b) he or she does not suffer from visual auras;
 - (c) he or she does not suffer from severe incapacitating headaches;
 - (d) the frequency of headaches is low (1-2) migraine episodes a year with gradual onset; and
 - (e) he or she does not need unacceptable medication to abort, treat or prevent the migraine.

7 Cluster Headache

7.1 Applicability

- (1) Cluster headache is applicable to the following medical certificates:
 - (a) Class I,
 - (b) Class II,

- (c) Class III and
- (d) Class IV.

- (2) Cabin crew member who is diagnosed with Cluster Headache may be considered medically fit.

7.2 Medical requirements

- (1) An applicant who is diagnosed with cluster headache shall be declared medically unfit to fly and shall provide the following reports which are not older than 3 months upon diagnosis:
 - (a) a comprehensive Neurologist report stating the frequency of attacks, severity of attacks and medication used for the headache;
 - (b) a Brain CT scan; and
 - (c) a 16 Lead EEG.
- (2) An applicant may be considered for recertification after a 1-year observation period has lapsed.
- (3) An applicant shall be on acceptable medication for the treatment of the cluster headache attacks.

8. Head injuries or Traumatic Brain Injuries (TBI)

Types of Head injuries

8.1 Mild Head Injury- Traumatic Brain Injury (TBI)

8.1.1 Applicability

- (1) Mild Head Injury- Traumatic Brain Injury (TBI) shall be applicable to the following medical certificates:
 - (a) Class I;
 - (b) Class II;
 - (c) Class III; and
 - (d) Class IV.

8.1.2 Conditions for grounding of an applicant

- (1) An applicant who is presented with mild head injury or Mild Traumatic Brain Injury (TBI) shall be grounded for 7 days following the head injury.

- (2) Any fleeting loss of consciousness or altered consciousness shall cause an applicant to be deemed medically unfit and an applicant shall be grounded for 6 weeks.

8.1.3 Application for recertification

- (1) A mild traumatic brain injury with no alteration of consciousness and normal examination by a Neurologist may be considered for medical recertification.
- (2) An applicant shall be required to submit a brain CT scan and a Neurologist reports which are not older than 3 months and such reports shall be certified by a Medical Assessor.

9 Moderate head injury or Traumatic Brain Injury(TBI)

9.1 Applicability

- (1) The above diagnosis shall be applicable to the following medical certificates:
- (a) Class I;
 - (b) Class II;
 - (c) Class III; and
 - (d) Class IV.
- (2) Cabin crew with Moderate Head Injury may be considered medically fit upon application and submission of the required medical reports.

9.2 Medical requirements

- (1) Upon diagnosis, an applicant shall be grounded and shall submit the following reports which are not older than 3 months for consideration:
- (a) a comprehensive Neurologist report;
 - (b) a Brain CT scan film; and
 - (c) a 16 Lead EEG with provocation.
- (2) An applicant diagnosed with Moderate Traumatic Head Injury may be considered for recertification by the Medical Assessor provided the observation period of at least 2 years following injury has lapsed.
- (3) On application for recertification, an applicant shall provide the following reports which are not older than 3 months:
- (a) a comprehensive Neurologist report stating that an applicant has been stable and there were no seizures reported;
 - (b) a Brain CT scan film; and
 - (c) a 16 lead EEG with provocation.

10 Severe head injury or Traumatic Brain Injury (TBI)

10.1 Applicability

- (1) Severe head injury or Traumatic Brain injury (TBI) shall be applicable to the following medical certificate:
 - (a) Class I;
 - (b) Class II;
 - (c) Class III; and
 - (d) Class IV.
- (2) Cabin crew member with severe head injury may be considered upon application and submission of the required medical reports.

10.2 Medical requirements

- (1) Upon diagnosis, an applicant shall be declared medically unfit and the applicant shall be required to submit the following reports which are not older than 3 months:
 - (a) an MRI Scan / CT brain Scan;
 - (b) a 16 Lead EEG with standard provocation;
 - (c) Neuropsychometric evaluation by a Clinical Psychologist; and
 - (d) Neurologist report.
- (2) An applicant diagnosed with severe traumatic brain injury shall be deemed to be temporary medically unfit for a period of at least 5 years.
- (3) An applicant may be considered for recertification by the Medical Assessor after 5 years' observation period.
- (4) Subsequent to 5 years' observation period, an applicant shall provide the following medical reports which are not older than 3 months for recertification and consideration:
 - (a) a Neurologist report;
 - (b) a 16 Lead EEG with provocation;
 - (c) a Brain MRI scan film; and
 - (d) neuropsychometric evaluation from a Clinical Psychologist.
- (5) An applicant's cognitive function and risk of seizure shall be considered before an applicant is declared medically fit.

11. Post-traumatic syndrome (concussion)

11.1 Applicability

- (1) Post-traumatic syndrome (concussion) shall be applicable to Class I, II, III and IV of medical certificates.

11.2 Medical requirements for Post-traumatic syndrome (concussion)

- (1) An applicant with post-traumatic syndrome (concussion) shall be considered by the Medical Assessor upon application and submission of the required medical reports which are not older than 3 months.
- (2) An applicant with concussion and without any neurological sequelae may be considered for recertification after 1 month and shall provide the following reports:
 - (a) a Neurologist report;
 - (b) a Brain CT scan film; and
 - (c) a 16 Lead EEG report.

12 Syncope

12.1 Applicability

- (1) Syncope shall be applicable to the following classes of medical certificates:
 - (a) Class I;
 - (b) Class II;
 - (c) Class III; and
 - (d) Class IV.
- (2) Cabin crew member with the history of Syncope may be considered upon application and submission of the required medical reports.

12.2 Medical requirements

- (1) An applicant shall be required to submit the following comprehensive reports which are not older than 3 months:
 - (a) Neurologist report with clinical history and the circumstances surrounding syncope and the cause of the syncope shall be fully investigated; and
 - (b) Cardiologist report with an ECG; and blood results including, Full Blood Count (FBC), Urea and Electrolytes (U&E) and Pregnancy Studies.

12.3 An applicant with syncope

- (a) an applicant shall be declared temporarily medical unfit upon diagnosis;
- (b) an applicant may be considered by the Medical Assessor for recertification after a period of at least 3 months has lapsed if there were 2 or less attacks and after least 6 months if there were multiple attacks; and
- (c) an applicant who has a history of syncope shall be fully assessed, as there are many organic (cardiovascular, neurological) diseases that may cause syncope.

13. Transient memory loss or global amnesia

13.1 Applicability

- (1) Transient memory loss or global amnesia shall be applicable to the following medical certificates.
 - (a) Class I;
 - (b) Class II;
 - (c) Class III; and
 - (d) Class IV.
- (2) Cabin crew with Transient Memory Loss or global amnesia shall be considered upon application and submission of the required medical reports.

13.2 An applicant with Transient Memory loss

- (1) An applicant presenting with Transient Memory Loss or global amnesia:
 - (a) shall be declared medical unfit for a minimum period of 1 year and the cause of the amnesia shall be investigated; and
 - (b) may be declared medical fit to fly after (one) 1 year if all medical reports referred to in subsection (2) are normal:
- (2) An applicant referred to in subsection (1) shall submit medical reports not older than 3 months which shall include an EEG and an MRI Scan of the brain.

14. Brain tumour

14.1 Applicability

- (1) Brain tumour shall be applicable to the following classes of medical certificates:
 - (a) Class I;
 - (b) Class II;
 - (c) Class III; and

(d) Class IV.

- (2) A cabin crew member with brain tumour may be considered medically fit on a case by case basis upon the submission of the required medical reports.

15. Types of tentorial tumour

- (1) All types of tentorial tumour shall be applicable to the following classes of medical certificates:

- (a) Class I;
- (b) Class II;
- (c) Class III; and
- (d) Class IV.

15.1 Benign Supra-tentorial tumour (Meningioma)

- (1) An applicant presented with benign supra-tentorial tumour shall be declared temporary medically unfit upon diagnosis, for a period of 2 years.
- (2) Following successful surgery, an applicant may be considered for recertification by the Medical Assessor after at least 2 years of observation.
- (3) On application for recertification an applicant shall submit the following reports which shall not be older than 3 months:
- (a) Brain MRI scan film;
 - (b) Neurologist report; and
 - (c) Oncologist report.
- (4) After successful recertification, an applicant shall submit the following:
- (a) annual neurologist report; and
 - (b) annual oncologist report
- (5) Following radiation therapy, the Medical Assessor shall review and consider recertification after 10 years observation period has lapsed and provided it was Focal Radiotherapy.

15.2 Benign Infra-tentorial tumour (Acoustic neuroma, pituitary adenoma and benign extra-axial tumours)

- (1) An applicant presented with benign infra-tentorial tumour shall be declared temporary medically unfit.

- (2) An applicant may be considered for recertification by the Medical Assessor after 1 year following successful removal of a tumour and an applicant shall submit the following reports which shall not be older than 3 months:
- (a) Brain MRI scan film;
 - (b) Neurologist report; and
 - (c) Oncologist report.
- (3) After successful recertification, an applicant shall submit the following reports:
- (a) annual neurologist report; and
 - (b) annual oncologist report.

15.3 Pseudo-tumour Cerebri

(1) General

- (a) pseudotumor cerebri occurs when the pressure inside the skull (intracranial pressure) increases for no obvious reason;
- (b) symptoms mimic those of a brain tumor, but no tumor is present;
- (c) it can occur in children and adults, but it's most common in women of childbearing age who are obese;
- (d) pseudotumor cerebri signs and symptoms may include:
 - (i) moderate to severe headaches that may originate behind your eyes and worsen with eye movement;
 - (ii) ringing in the ears that pulses in time with your heartbeat (pulsatile tinnitus);
 - (iii) nausea, vomiting or dizziness;
 - (iv) blurred or dimmed vision;
 - (v) brief episodes of blindness, lasting only a few seconds and affecting one or both eyes (visual obscurations);
 - (vi) difficulty seeing to the side;
 - (vii) double vision (diplopia); and
 - (vii) Seeing light flashes (photopsia)

(2) Medical requirements

- (a) An applicant shall be declared medically unfit and shall submit the following reports which are not older than 3 months:
 - (i) Neurologist report confirming the diagnosis;
 - (ii) Brain CT scan film; and
 - (iii) Ophthalmologist report with observation on visual fields.
- (b) An applicant may be considered for recertification after 6 months provided that an applicant has not had any headaches, is off medication or on acceptable medication and the visual fields are normal.

(c) On application for recertification, an applicant shall provide the following reports which are not older than 3 months:

- (i) Neurologist report; and
- (ii) Ophthalmologist report

15.4 Malignant Tumour

An applicant diagnosed with malignant intra-cranial tumour shall be declared medically unfit to fly for all classes of medical certificate.

15.5 Multiple sclerosis

15.6 Operational considerations

An applicant diagnosed with multiple sclerosis shall be declared temporarily medically unfit.

15.7 Medical requirements

- (1) An applicant may be considered for recertification by the Medical Assessor after 6 months of observation period.
- (2) On application for recertification an applicant shall submit the following information and reports which shall not be older than 3 months:
 - (a) Neurologist report;
 - (b) Blood and Cerebro-Spinal fluid Oligoclonal bands;
 - (c) IGG index;
 - (d) Brain and Spinal cord MRI scan film;
 - (e) Ophthalmologist report; and
 - (f) Neuropsychologist report.
- (3) After successful recertification, an applicant shall submit a neurologist and ophthalmologist report every 6 months. An applicant shall be declared medically unfit on follow up if any of the following develops:
 - (a) Neurological deficit after exacerbation;
 - (b) visual loss;
 - (c) sensory disturbances on hands;
 - (d) mood instability;
 - (e) vertigo; or
 - (f) any convulsions.

16. Infections

16.1 Applicability

Infections shall be applicable to the following classes of medical certificates:

- (a) Class I;
- (b) Class II;
- (c) Class III; and
- (d) Class IV.

16.2 Meningitis and Encephalitis

- (1) An applicant diagnosed with meningitis or encephalitis shall be declared temporarily medically unfit.
- (2) An applicant may be considered for recertification by the Medical Assessor after a 6-month observation period.
- (3) Recertification shall depend on the degree of deficit or recovery and the risk of developing hydrocephalus.
- (4) On application for recertification, an applicant shall submit a neurologist report which is not older than 3 months.

16.3 Brain Abscess

- (1) Each case shall be assessed on its merit considering the location of the abscess (infra-tentorial or supra-tentorial) and the nature of neurological deficit.
- (2) There shall be no high incidence of seizures.
- (3) The decision to recertify shall be referred to the Medical Assessor after a 6 months observation period.
- (4) On application for recertification the applicant shall submit the following reports which shall not be older than 3 months:
 - (a) Neurologist report; and
 - (b) Brain MRI scan film.

16.4 Neurosyphilis

- (1) Neurological deficits usually persist even after successful treatment
- (2) An applicant shall be assessed for neurological deficit or degree of recovery.

- (3) Recertification shall depend on the functional capacity following treatment and shall be referred to the Medical Assessor.
- (4) Recertification may be considered after an observation period of 6 months.
- (5) On application for recertification an applicant shall submit the following reports which shall not be older than 3 months:
 - (a) neurologist report; and
 - (b) functional assessment report from an occupational therapist which may also be considered to specific occupation.

17. Dementia

17.1 Applicability

- (1) Dementia shall be applicable to the following classes of medical certificates.
 - (a) Class I;
 - (b) Class II;
 - (c) Class III; and
 - (d) Class IV.

17.2 General

- (1) An applicant with dementia shall be declared medically unfit to fly.
- (2) Where the cause of the dementia is known and the condition has been resolved, an applicant may be considered for recertification".
- (d) the substitution in Schedule 25 Protocol of section 1 with the following section:
 - "1. This technical standard is applicable to the following categories:

Class I

- (a) Air transport pilot; and
- (b) Commercial pilot.

Class II

Private pilot with the following:

- (a) Night flying;

- (b) IF Rating; and
- (c) Flying a Glass cockpit aircraft which shall be considered on a case by case basis”.”

1A This technical standard shall not be applicable to:

- (a) a Class I medical certificate holder declared medically fit on or before 30 September 2015 who applies for renewal with a colour vision that is not progressive;
 - (b) cabin crew; and
 - (c) a Class IV applicant in respect of the colour vision deficiency requirements”.”
- (e) the insertion in Schedule 25 section 2 after subsection (4) of the following subsection:
- “(5) A Class III applicant who fails an Ishihara shall be required to undergo a Lantern or an Anolomoscope Scope”.”
- (f) the insertion after Schedule 34 Protocol of the following Schedules:

“SCHEDULE 35: PROTOCOL ON RENAL CELL CARCINOMA

1. Applicability

- (1) This Protocol is applicable to the following classes of medical certificates:
- (a) Class I;
 - (b) Class II;
 - (c) Class III; and
 - (d) Class IV.

2. Requirements for consideration of a medical certificate

- (1) An applicant who is asymptomatic and has no other conditions may be declared medically fit subject to the following conditions:
- (a) the primary lesion (tumour) shall be monitored with 6 monthly CT scans for 2 years; and
 - (b) an applicant with a lesion not demonstrating growth after 2 years (threshold 4cm), shall be monitored with annual CT scans.

- (2) An applicant who is symptomatic or with lesions(tumour) > 4cm:
- (a) shall be declared medically unfit for a period of 2 years and a recommended treatment is nephrectomy;
 - (b) when presenting himself or herself for recertification after 2 years, an applicant shall be required to submit a Urologist's report which is not older than 3 months with the following:
 - (i) disease-specific history such as symptom-free period, surgery complications, further anticipated treatment;
 - (ii) function of the remaining kidney;
 - (iii) CT reports, mainly on Brain and Abdomen; and
 - (iv) confirmation that an applicant is off all medication.
- (3) An applicant with early recertification with multi-crew limitation may be declared medically fit if a specialist's advice indicates an acceptable low risk.

3. Follow-Up Reports

- (1) An applicant shall be required to submit the following Urologist reports:
- (a) one report every 3 months in the first year;
 - (b) two reports in the second year; and
 - (c) one report annually after the second year for an indefinite period".

"SCHEDULE 36: PROTOCOL ON BENIGN PROSTATIC HYPERPLASIA

1. Applicability

- (1) This Protocol is applicable to the following classes of medical certificates:
- (a) Class I;
 - (b) Class II;
 - (c) Class III; and
 - (d) Class IV.

2. Requirements for consideration of a medical certificate

- (1) An applicant presented with Benign Prostatic Hyperplasia who is asymptomatic may be declared medically fit provided that he or she has submitted the required medical reports.
- (2) An applicant presented with Benign Prostatic Hyperplasia and who is asymptomatic shall be required to submit a 6-monthly Urologist's report including Prostate Specific Antigen (PSA) blood test.

- (3) An applicant presented with Benign Prostatic Hyperplasia who is symptomatic shall be declared medically unfit up to a period of 3-months post-commencement of medical treatment.
- (4) An applicant presented with Benign Prostatic Hyperplasia who is symptomatic shall be medically unfit from time of diagnosis, up to a period of 6 weeks' post-surgery.
- (5) An applicant may be considered for medical certification only if no treatment or surgery complications and symptoms are completely resolved.

3 Follow-Up Reports

An applicant shall submit a 6 monthly Urologist's report which shall include Prostate Specific Antigen (PSA) values and disease-specific history such as any deterioration of symptoms, any complications and planned future treatment".

"SCHEDULE 37: PROTOCOL ON CHRONIC KIDNEY DISEASE

1. Applicability

- (1) This Protocol shall be applicable to the following classes of medical certificates:
 - (a) Class I;
 - (b) Class II;
 - (c) Class III; and
 - (d) Class IV

2. Requirements for consideration of a medical certificate

- (1) An applicant presenting with Chronic Kidney disease shall have ongoing surveillance with a Physician, to prevent deterioration and development of complications.
- (2) An applicant with a diagnosis of Chronic Kidney disease, with Creatinine < 200 Micromole/L, shall be declared medically unfit if symptomatic, until he or she is treated and is stable.
- (3) An applicant presented with Chronic Kidney disease, with Creatinine < 200 Micromole/L, may be considered for recertification if a Physician's report provides the following:
 - (a) an applicant has been treated fully or has recovered with no current illness likely to cause instability;
 - (b) renal function is stable with normal electrolytes; and

- (c) underlying chronic medical conditions are well controlled on current medication.
- (4) An applicant shall submit a 6 monthly Physician's report which shall not be older than 3 months and shall include results for:
 - (a) Urea, Creatinine and Electrolytes;
 - (b) Haemoglobin; and
 - (c) Urinalysis.
- (5) An applicant presented with Chronic Kidney disease, with Creatinine 200-500 Micromole/L, shall be declared medically unfit if symptomatic, until he or she is treated and is stable.
- (6) An applicant with a diagnosis of Chronic Kidney Disease, with Creatinine 200-500 Micromole/L medical fitness shall be considered on a case-by-case basis after recovery.
- (7) An applicant for recertification, shall submit a Physician's report which is not older than 3 months, with the following information:
 - (a) normal Electrolytes ;
 - (b) Haemoglobin is at least 10g/dL;
 - (c) confirmation that underlying chronic medical conditions are well controlled; and
 - (d) confirmation that an applicant condition is asymptomatic and stable on current treatment.
- (8) An applicant shall submit two monthly Physician's report which is not older than 3 months and shall include results for:
 - (a) Urea, Creatinine and Electrolytes;
 - (b) Haemoglobin; and
 - (c) Urinalysis.
- (9) An applicant presented with Chronic Kidney disease, with Creatinine > 500 Micromole/L, shall be declared medically unfit.
- (10) An applicant presented with Chronic Kidney disease, with Creatinine > 500 Micromole/L, may be referred to Medical Assessor to be considered for recertification.
- (11) An applicant who requires dialysis shall be declared medically unfit".

"SCHEDULE 38 HIV/AIDS PROTOCOL FOR CABIN CREW AND RECREATIONAL PILOT

1 Applicability

This Protocol shall be applicable to the Cabin Crew and Recreational Pilot.

2. General and Medical requirements

- (1) All cases shall be assessed on case by case basis taking into consideration a favourable clinical and serological response.
- (2) Subsequent to an initial diagnosis of HIV seropositivity, an applicant shall be declared as temporarily medically unfit.
- (3) An applicant shall submit the following reports which are not older than 3 months for recertification:
 - (a) HIV specialist or a physician review with following:
 - (i) history of infection;
 - (ii) current and previous symptoms;
 - (iii) full neurological examination to assess sequelae including primitive reflexes;
 - (iv) stability of condition;
 - (v) history of opportunistic infections or associated illnesses;
 - (vi) history of CD4+ T cell counts;
 - (vii) history of viral load measurements;
 - (viii) medication history including "over-the-counter" medications and alternative medication; and
 - (ix) report concerning side effects of medications.
 - (b) laboratory testing reports to include –
 - (i) Hepatitis B and C, syphilis and tuberculosis screening;
 - (ii) full blood count (minimum Hb of 12g/dL), urea, creatinine and electrolytes, Liver function tests (LFTs);
 - (iii) fasting glucose and lipogram may be required on clinical indication; and
 - (iv) Cytomegalovirus and Toxoplasma may be required when clinically indicated.
 - (c) Clinical Psychologist report with baseline cognitive assessment;
 - (d) tests shall include timed psychomotor tasks and memory tasks requiring attention, learning, active monitoring and retrieval of information; and
 - (e) other Specialist reports may be required on clinical indication.

3. Medication

- (1) An applicant shall use acceptable medication referred to on SA-CATS 67.00.9
- (2) If an applicant is using medication which is not on the acceptable list, he or she may apply for a waiver.
- (3) An application for a waiver referred to subsection (1) shall be accompanied by a treating physician's report stating the duration of treatment, side effect and profile specific to an applicant.

4. Regular follow-ups requirements

- (1) Regular follow ups shall include:
 - (a) CD4 count and viral load measurements which shall be required initially at 3 months, 6 months and then annually;
 - (b) FBC (with minimum Hb of 12g/dL), Urea, Creatinine and Electrolytes, LFTs at 3 months and 6 monthly thereafter submission of 3 months reports; and
 - (c) fasting glucose and fasting lipogram may be required when clinically indicated.
- (2) A medical assessor may request that medical examinations or tests be performed at shorter intervals or require additional examinations or tests be performed when clinically indicated.

4. Medically unfit applicant

- (1) An applicant presented with the following complications or side effects, shall be declared medically unfit:
 - (a) presence of acute or serious opportunistic infection;
 - (b) the use of any substance or medication that is not compatible with flying;
 - (c) safety threatening side effects of any medication;
 - (d) evidence of resistance to antiretroviral treatment;
 - (e) co-existing disqualifying medical conditions or disease; and
 - (f) any other medical condition which may be deemed unsafe for practice of aviation duties".

"SCHEDULE 39: PROTOCOL ON HODGKIN'S LYMPHOMA

1. Applicability

- (1) This protocol shall be applicable to the following classes of medical certificates:
 - (a) Class I;

- (b) Class II;
- (c) Class III; and
- (d) Class and IV.

- (2) Class I application may be considered after 6-months post treatment for operational multicrew environment and an applicant may apply for the removal of restriction after 2 years.
- (3) Class II application may be considered after 6-months post treatment for an unrestricted medical certificate.
- (4) Class III and Class IV applicants may be considered by a medical assessor upon submission of the required medical reports.

2. Requirements for medical certification

- (1) An applicant shall complete a minimum of 6 weeks of radiotherapy for consideration. If radiotherapy treatment has been conducted to the chest and cardiac tissue included, cardiac evaluation shall be considered as satisfactory.
- (2) An applicant shall be required to complete a minimum of 2 months of chemotherapy (excluding anthracyclines) before being considered for a medical certificate.
- (3) An applicant shall be considered for a medical certificate upon completing a minimum of 6 months of anthracycline chemotherapy and presenting a cardiac evaluation report relating to the side effects of the medication.
- (4) An applicant shall submit satisfactory haematological parameters >12g/dl (male) or >11.5g/dl (female) and Platelets.
- (5) An applicant shall demonstrate continuing clinical remission without symptoms of potential flight safety importance.
- (6) An applicant shall not have a history of central nervous system involvement.
- (7) An applicant shall not have continuing side-effects from treatment.
- (8) An applicant; shall submit the following medical reports which shall not be older than 3 months:
 - (a) a current status report and all pertinent medical reports such as a Haematologist/Oncologist's Report;
 - (b) Blood Results for FBC & ESR, U&E and LFT;
 - (c) the medical report to include past and present treatment(s);
 - (d) Chest X Ray;

- (e) ECG
- (f) Lung Function Test; and
- (g) Any other report that may be requested.

3. Regular follow –ups requirements

- (1) An applicant shall submit a 6 monthly Haematologist /Oncologist report, to include a Full Blood Count, White Cell Count (WCC), differential and a biochemical profile that include liver Function Test for the first 5 years.
- (2) After 5 years, an applicant shall be required to submit a Haematologist /Oncologist report annually.

4. Bone Marrow Transplantation

- (1) An applicant may apply for medical recertification after a bone marrow transplantation.

5. Autologous Stem Cell Transplantation

- (1) An applicant for medical recertification after 1 year of autologous stem cell transplantation shall be restricted to Class I OML(valid only as or with a qualified co-pilot) .
- (2) An applicant for medical recertification after 2 years of autologous stem cell transplantation may apply for an unrestricted medical certificate.
- (3) An applicant for medical recertification after 1 year of autologous stem cell transplantation for Class II shall be eligible to apply for unrestricted medical certificate.

6. Allogeneic transplantation

- (1) An applicant applying for medical recertification after 2 years of allogeneic transplantation shall be eligible to apply for a restricted to Class I OML(valid only as or with qualified co-pilot) and thereafter 3 years to unrestricted Class I.
- (2) An applicant applying for medical recertification after 1 year of an allogeneic transplantation for a Class 2 medical certificate shall be eligible to apply for a restricted to Operational Safety Pilot medical certificate and thereafter 2 years to unrestricted medical certificate .

- (3) Lack of adverse prognostic features and the underlying diagnosis shall be important and, in the case of allogeneic transplantation, the lack of continuing graft-versus-host disease or immunosuppression.

7. General

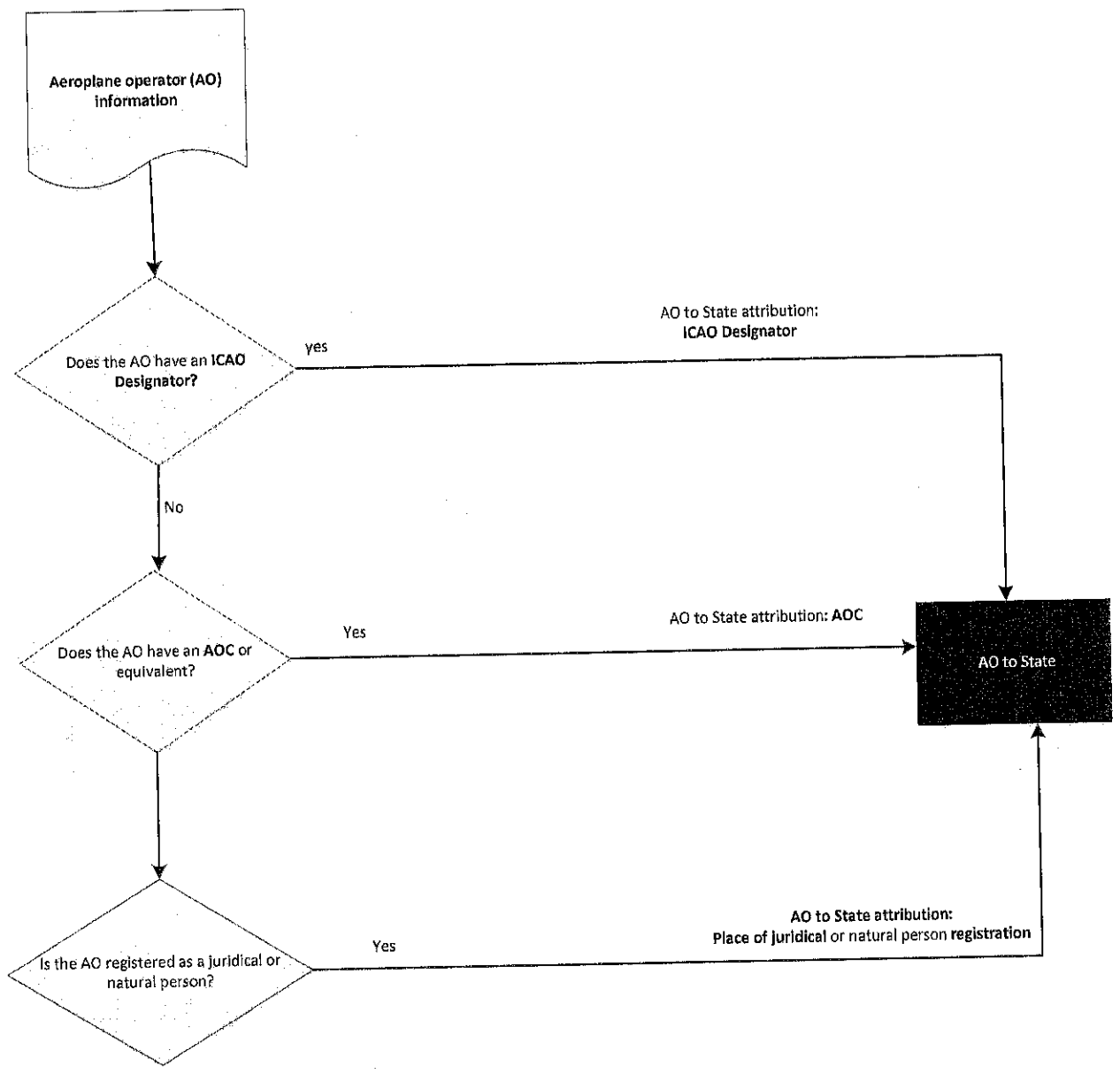
- (1) An applicant with an active Hodgkin's disease or an applicant undergoing therapy for Hodgkin's disease shall be declared medically unfit due to the risk of sudden incapacitation.
- (2) An applicant with Stage I and II-A with no evidence of the disease for 2 years after completion of treatment may be declared medically fit.
- (3) An applicant with Stage II-B to IV-B shall be free of the disease after completion of therapy for at least 5 years before consideration of being declared medically fit, and shall be re-evaluated every 6 months for 10 years.
- (4) Numerous long-term complications of treatment for Hodgkin's disease include the development of acute leukaemia and second malignancies of other types, radiation related heart disease, pulmonary fibrosis, and hypothyroidism.
- (5) Subsequent to frequent re-evaluation after 10 years, an applicant shall be subjected to annual appraisals".

AMENDMENT OF TECHNICAL STANDARD 91

6. Document SA CATS 91 is hereby amended by the insertion of Subpart 10 of the following Subpart:

"91.10.2 Attribution of an aeroplane operator to the Republic

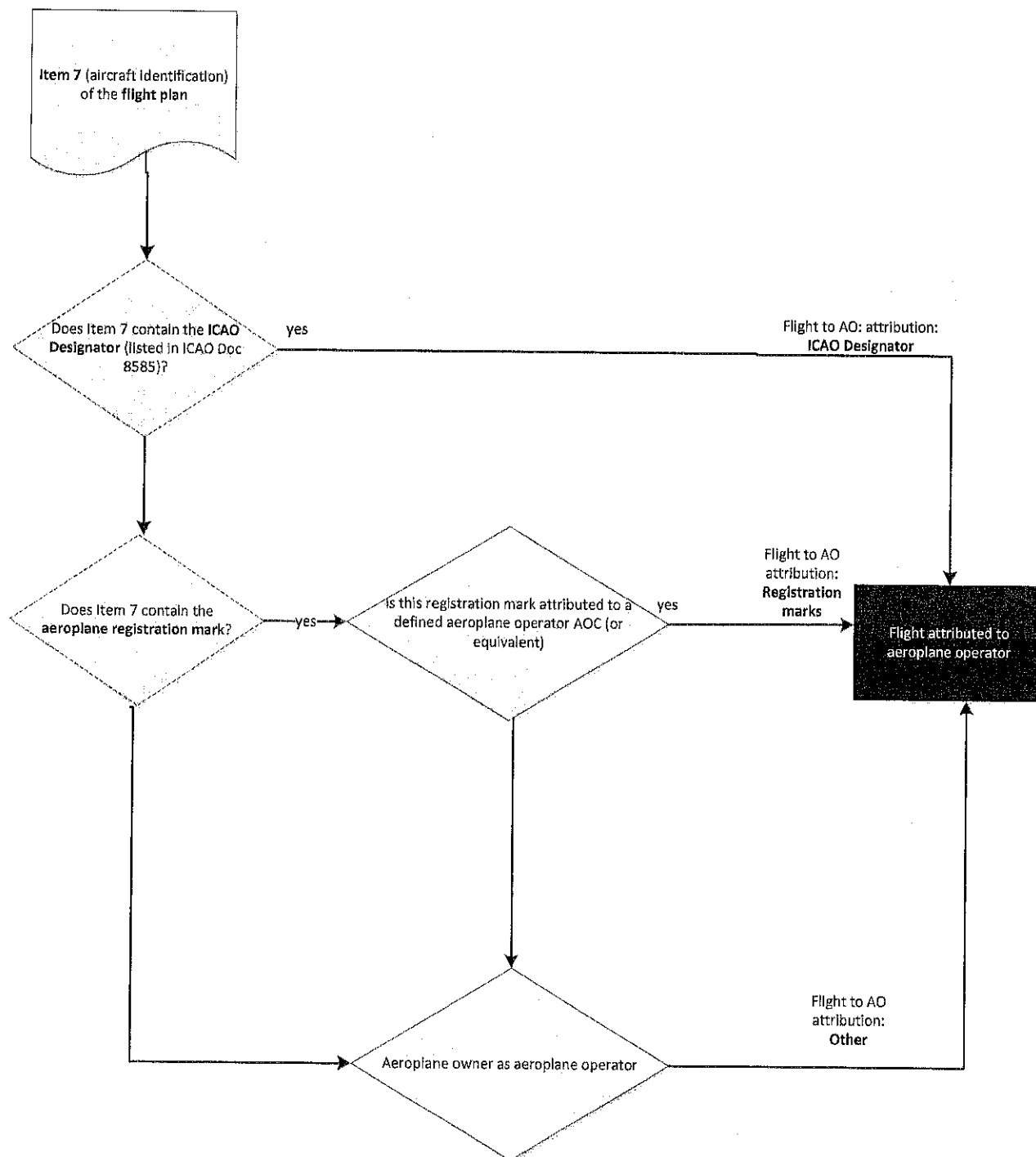
The process of attributing an aeroplane operator to a State is illustrated as follows:



Process for attribution of an aeroplane operator to a State

91.10.3 Attribution of international flight to an aeroplane operator

The process of attributing an international flight to an aeroplane operator is illustrated as follows:



Process for attribution of a flight to an aeroplane operator

91.10.4 Record keeping, compliance periods and equivalent procedures

- (1) The Director and aeroplane operator shall comply with the following CORSIA compliance periods and the requirements for the 2019-2020 period:

<u>Timeline</u>	<u>Requirement</u>
<u>1 January 2019 to 31 December 2019</u>	The aeroplane operator shall monitor, CO ₂ emissions for 2019 from international flights, as defined in regulation CAR 91 Subpart 10.
<u>28 February 2019</u>	The aeroplane operator shall submit Emissions Monitoring Plan to the Director (only once, unless there is a need to review) in accordance with regulation CAR 91 Subpart 10.
<u>30 April 2019</u>	The Director shall approve Emissions Monitoring Plans (only once, unless there is a review) in accordance with regulation CAR 91 Subpart 10.
<u>30 April 2019</u>	The Director shall submit a list of aeroplane operators that are attributed to it to ICAO, as well as a list of verification bodies accredited in the Republic in accordance with regulation CAR 91 Subpart 10.
<u>31 May 2019</u>	Recommendation: <i>The Director may obtain and use the ICAO document entitled "CORSIA Aeroplane Operator to State Attributions" summarising a list of aeroplane operators and the State to which they have been attributed in accordance with regulation CAR 91 Subpart 10. The document is available on the ICAO CORSIA website.</i>
<u>1 January 2020 to 31 December 2020</u>	The aeroplane operator shall monitor, CO ₂ emissions for 2020 from international flights, in accordance with regulation 91.10.
<u>1 January 2020 to 31 May 2020</u>	The aeroplane operator shall compile 2019 CO ₂ emissions data to be verified by a verification body, in accordance with regulation CAR 91 Subpart 10. Recommendation: <i>The Aeroplane operator may submit their Emissions Report for verification as soon as possible after completing their Emissions Report.</i>
<u>31 May 2020</u>	The aeroplane operator and the verification body shall both submit the verified Emissions Report and associated Verification Report for 2019 to the Director in accordance with regulation CAR 91 Subpart 10.
<u>1 June 2020 to 31 August 2020</u>	The Director shall conduct an order of magnitude check of the verified Emissions Report for 2019, including any filling in of data gaps in case of non-reporting by aeroplane operators in accordance with regulation CAR 91 Subpart 10.
<u>30 June 2020</u>	The Director shall notify ICAO of the Republic's decision to voluntarily participate, or to discontinue the voluntary participation in the applicability of regulation CAR 91

	<u>Subpart 10 from 1 January 2021 in accordance with regulation CAR 91 Subpart 10.</u> <u>The Director shall also notify ICAO which option it has selected for calculating the aeroplane operator's CO₂ emissions during the 2021-2023 period in accordance with regulation CAR 91 Subpart 10.</u>
<u>1 August 2020</u>	<u>The Director shall obtain and use the ICAO document entitled "CORSIA States for Chapter 3 State Pairs" applicable for the 2021 compliance year in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 August 2020</u>	<u>The Director shall submit required information regarding CO₂ emissions for 2019 to ICAO in accordance with regulation CAR 91 Subpart 10</u>
<u>30 November 2020</u>	<u>The Director shall submit updates to the list of aeroplane operators that are attributed to it to ICAO, as well as updates to the list of verification bodies accredited in the Republic in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 December 2020</u>	<u>Recommendation:</u> <i><u>The Director may obtain and use the ICAO document entitled "CORSIA Aeroplane Operator to State Attributions" summarising a list of aeroplane operators and the State to which they have been attributed in accordance with regulation CAR 91 Subpart 10. The document is available on the ICAO CORSIA website.</u></i>

Note. — The time for verification of the aeroplane operator's Emissions Report is longer during the 2019-2020 period than subsequent Periods.

- (2) The Director and aeroplane operator shall comply with the following CORSIA compliance periods and the requirements for the 2021-2023 period, where applicable:

<u>Timeline</u>	<u>Requirement</u>
<u>1 January 2021 to 31 December 2021</u>	<u>The aeroplane operator shall monitor, CO₂ emissions for 2021 from international flights, in accordance with regulation CAR 91 Subpart 10.</u>
<u>1 January 2021 to 31 May 2021</u>	<u>The aeroplane operator shall compile 2020 CO₂ emissions data to be verified by a verification body, in accordance with regulation CAR 91 Subpart 10.</u> <u>Recommendation:</u> <i><u>The Aeroplane operator may submit their Emissions Report for verification as soon as possible after completing their Emissions Report.</u></i>
<u>31 May 2021</u>	<u>The aeroplane operator and the verification body shall both submit the verified Emissions Report and associated Verification Report for 2020 to the Director in accordance with regulation CAR 91 Subpart 10.</u>

<u>1 June 2021 to 31 August 2021</u>	The Director shall conduct an order of magnitude check of the verified Emissions Report for 2020, including any filling in of data gaps in case of non-reporting by aeroplane operators in accordance with regulation CAR 91 Subpart 10.
<u>30 June 2021</u>	The Director shall notify ICAO of any change in its decision to voluntarily participate, or to discontinue the voluntary participation in the applicability of regulation CAR 91 Subpart 10 from 1 January 2022 in accordance with regulation CAR 91 Subpart 10.
<u>1 August 2021</u>	The Director shall obtain and use the ICAO document entitled "CORSIA States for Chapter 3 State Pairs" applicable for the 2022 compliance year in accordance with regulation CAR 91 Subpart 10.
<u>31 August 2021</u>	The Director shall submit required information regarding CO ₂ emissions for 2020 to ICAO in accordance with regulation CAR 91 Subpart 10
<u>30 September 2021</u>	The Director shall calculate and inform aeroplane operators attributed to it of their average total CO ₂ emissions during 2019 and 2020, in accordance with regulation CAR 91 Subpart 10
<u>30 November 2021</u>	The Director shall submit updates to the list of aeroplane operators that are attributed to it to ICAO, as well as updates to the list of verification bodies accredited in the State in accordance with regulation CAR 91 Subpart 10.
<u>31 December 2021</u>	Recommendation: <i>The Director may obtain and use the ICAO document entitled "CORSIA Aeroplane Operator to State Attributions" summarising a list of aeroplane operators and the State to which they have been attributed in accordance with regulation CAR 91 Subpart 10. The document is available on the ICAO CORSIA website.</i>
<u>1 January 2022 to 31 December 2022</u>	The aeroplane operator shall monitor CO ₂ emissions for 2022 from international flights, in accordance with regulation CAR 91 Subpart 10
<u>1 January 2022 to 30 April 2022</u>	The aeroplane operator shall compile 2021 emissions data to be verified by a verification body, in accordance with regulation CAR 91 Subpart 10 Recommendation: <i>The aeroplane operator may submit their Emissions Report for verification as soon as possible after completing their Emissions Report.</i>
<u>30 April 2022</u>	The aeroplane operator and the verification body shall both submit the Verified Emissions Report and associated Verification Report for 2021 to the Director in accordance with regulation CAR 91 Subpart 10.
<u>1 May 2022 to 31 July 2022</u>	The Director shall conduct an order of magnitude check of the verified Emissions Report for 2021, including any filling in of data gaps in case of non-reporting by

	<u>aeroplane operators in accordance with regulation CAR 91 Subpart 10.</u>
<u>30 June 2022</u>	<u>The Director shall notify ICAO of any change in its decision to voluntarily participate, or to discontinue the voluntary participation in the applicability of regulation CAR 91 Subpart 10 from 1 January 2023 in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 July 2022</u>	<u>The Director shall submit required information regarding CO₂ emissions for 2021 to ICAO in accordance with regulation CAR 91 Subpart 10.</u>
<u>1 August 2022</u>	<u>The Director shall obtain and use the ICAO document entitled "CORSIA States for Chapter 3 State Pairs" applicable for the 2023 compliance year in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 October 2022</u>	<u>The Director shall obtain and use the Sector's Growth Factor (SGF) for 2021 from the document "CORSIA Central Registry (CCR): Information and Data for the Implementation of CORSIA" that can be found on the ICAO CORSIA website in accordance with regulation CAR 91 Subpart 10.</u>
<u>30 November 2022</u>	<u>The Director shall submit updates to the list of aeroplane operators that are attributed to it to ICAO, as well as updates to the list of verification bodies accredited in the Republic in accordance with regulation CAR 91 Subpart 10.</u> <u>The Director shall calculate and inform aeroplane operators of offsetting requirements for 2021, and based on a chosen formula in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 December 2022</u>	<u>Recommendation:</u> <u>The Director may obtain and use the ICAO document entitled "CORSIA Aeroplane Operator to State Attributions" summarising a list of aeroplane operators and the State to which they have been attributed in accordance with regulation CAR 91 Subpart 10. The document is available on the ICAO CORSIA website.</u>
<u>1 January 2023 to 31 December 2023</u>	<u>The aeroplane operator shall monitor, CO₂ emissions for 2023 from international flights, as defined in regulation CAR 91 Subpart 10.</u>
<u>1 January 2023 to 30 April 2023</u>	<u>The aeroplane operator shall compile 2022 emissions data to be verified by a verification body, in accordance with regulation CAR 91 Subpart 10.</u> <u>Recommendation:</u> <u>The aeroplane operator may submit their Emissions Report for verification as soon as possible after completing their Emissions Report.</u>
<u>30 April 2023</u>	<u>The aeroplane operator and the verification body shall both submit the Verified Emissions Report and associated Verification Report for 2022 to the Director in accordance with regulation CAR 91 Subpart 10.</u>

<u>1 May 2023 to 31 July 2023</u>	<u>The Director shall conduct an order of magnitude check of the verified Emissions Report for 2022, including any filling in of data gaps in case of non-reporting by aeroplane operators in accordance with regulation CAR 91 Subpart 10.</u>
<u>30 June 2023</u>	<u>The Director shall notify ICAO of any change in its decision to voluntarily participate, or to discontinue the voluntary participation in the applicability of regulation CAR 91 Subpart 10 from 1 January 2024 in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 July 2023</u>	<u>The Director shall submit required information regarding CO₂ emissions for 2022 to ICAO in accordance with regulation CAR 91 Subpart 10.</u>
<u>1 August 2023</u>	<u>The Director shall obtain and use the ICAO document entitled "CORSIA States for Chapter 3 State Pairs" applicable for the 2024 compliance year in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 October 2023</u>	<u>The Director shall obtain and use the Sector's Growth Factor (SGF) for 2022 from the ICAO document entitled "CORSIA Central Registry (CCR): Information and Data for the Implementation of CORSIA" that is available on the ICAO CORSIA website in accordance with regulation CAR 91 Subpart 10.</u>
<u>30 November 2023</u>	<u>The Director shall submit updates to the list of aeroplane operators that are attributed to it to ICAO, as well as updates to the list of verification bodies accredited in the State in accordance with regulation CAR 91 Subpart 10.</u> <u>The Director shall calculate and inform aeroplane operators of offsetting requirements for 2022, and based on a chosen formula in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 December 2023</u>	<u>Recommendation: The Director may obtain and use the ICAO document entitled "CORSIA Aeroplane Operator to State Attributions" summarising a list of aeroplane operators and the State to which they have been attributed in accordance with regulation CAR 91 Subpart 10. The document is available on the ICAO CORSIA website.</u>

Note 1. — The time for verification of the aeroplane operator's Emissions Report is shorter during the 2021-2023 period than the 2019-2020 period.

Note 2. – During the 2021-2023 period, States may determine the basis of the aeroplane operator offsetting requirements in accordance with regulation CAR 91 Subpart 10.

(3) The Director and aeroplane operator shall comply with the following CORSIA compliance periods and the requirements for the 2024-2026 period, where applicable:

<u>Timeline</u>	<u>Requirement</u>
<u>1 January 2024 to 31 December 2024</u>	<u>The aeroplane operator shall monitor, CO₂ emissions for 2024 from international flights, in accordance with CAR 91 Subpart 10.</u>
<u>1 January 2024 to 30 April 2024</u>	<p><u>The aeroplane operator shall compile 2023 emissions data to be verified by a verification body, in accordance with regulation CAR 91 Subpart 10.</u></p> <p><i><u>Recommendation: The aeroplane operator may submit their Emissions Report for verification as soon as possible after completing their Emissions Report.</u></i></p>
<u>30 April 2024</u>	<u>The aeroplane operator and the verification body shall both submit the Verified Emissions Report and associated Verification Report for 2023 to the Director in accordance with regulation CAR 91 Subpart 10.</u>
<u>1 May 2024 to 31 July 2024</u>	<u>The Director shall conduct an order of magnitude check of the verified Emissions Report for 2023, including any filling in of data gaps in case of non-reporting by aeroplane operators in accordance with regulation CAR 91 Subpart 10.</u>
<u>30 June 2024</u>	<u>The Director shall notify ICAO of any change in its decision to voluntarily participate, or to discontinue the voluntary participation in the applicability of regulation CAR 91 Subpart 10. from 1 January 2025 in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 July 2024</u>	<u>The Director shall submit required information regarding CO₂ emissions for 2023 to ICAO in accordance with regulation CAR 91 Subpart 10.</u>
<u>1 August 2024</u>	<u>The Director shall obtain and use the ICAO document entitled "CORSIA States for Chapter 3 State Pairs" applicable for the 2025 compliance year in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 October 2024</u>	<u>The Director shall obtain and use the Sector's Growth Factor (SGF) for 2023 from the ICAO document entitled; "CORSIA Central Registry (CCR): Information and Data for the Implementation of CORSIA" in accordance with regulation CAR 91 Subpart 10.</u>
<u>30 November 2024</u>	<p><u>The Director shall calculate and inform aeroplane operators of offsetting requirements for 2023, and based on a chosen formula in accordance with regulation CAR 91 Subpart 10.</u></p> <p><u>The Director shall calculate and inform aeroplane operators of their final offsetting requirements for the 2021 to 2023 Period in accordance with regulation CAR 91 Subpart 10.</u></p> <p><u>The Director shall submit updates to the list of aeroplane operators that are attributed to it to ICAO, as well as updates to the list of verification bodies</u></p>

	accredited in the Republic in accordance with regulation CAR 91 Subpart 10.
<u>31 December 2024</u>	Recommendation: <i>The Director may obtain and use the ICAO document entitled "CORSIA Aeroplane Operator to State Attributions" summarising a list of aeroplane operators and the State to which they have been attributed in accordance with regulation CAR 91 Subpart 10. The document is available on the ICAO CORSIA website.</i>
<u>1 January 2025 to 31 December 2025</u>	The aeroplane operator shall monitor, CO ₂ emissions for 2025 from international flights, in accordance with regulation CAR 91 Subpart 10.
<u>31 January 2025 or 60 days after the State informs aeroplane operators of their final offsetting requirements for the 2021-2023 period</u>	The aeroplane operator shall cancel emissions units for compliance during the 2021 to 2023 period in accordance with regulation CAR 91 Subpart 10.
<u>7 February 2025</u>	The aeroplane operator shall request that their cancellation of Eligible Emissions Units for the 2021-2023 period is communicated on the respective Eligible Emission Units Program registry (or registries) public website(s) in accordance with regulation CAR 91 Subpart 10.
<u>1 December 2024 to 30 April 2025</u>	The aeroplane operator shall compile their Emissions Unit Cancellation Report covering the 2021-2023 period to be verified by a verification body, in accordance with regulation CAR 91 Subpart 10.
<u>1 January 2025 to 30 April 2025</u>	The aeroplane operator shall compile 2024 emissions data to be verified by a verification body, in accordance with regulation CAR 91 Subpart 10. Recommendation: <i>The aeroplane operator may submit their Emissions Report for verification as soon as possible after completing their Emissions Report.</i>
<u>30 April 2025</u>	The aeroplane operator and the verification body shall both submit the Verified Emissions Report and associated Verification Report for 2024 to the Director in accordance with regulation CAR 91 Subpart 10. The aeroplane operator and the verification body shall submit the verified Emissions Unit Cancellation Report and associated Verification Report for the 2021-2023 period to the Director in accordance with regulation CAR 91 Subpart 10.
<u>1 May 2025 to 31 July 2025</u>	The Director shall conduct an order of magnitude check of the verified Emissions Report for 2024, including any filling in of data gaps in case of non-reporting by aeroplane operators in accordance with regulation CAR 91 Subpart 10.

	<u>If applicable, the Director shall undertake an order of magnitude check of the verified Emissions Unit Cancellation Report for the 2021-2023 period in accordance with regulation CAR 91 Subpart 10.</u>
<u>30 June 2025</u>	<u>The Director shall notify ICAO of any change in its decision to voluntarily participate, or to discontinue the voluntary participation in the applicability of regulation CAR 91 Subpart 10 from 1 January 2026 in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 July 2025</u>	<p><u>The Director shall submit required information regarding CO₂ emissions for 2024 to ICAO in accordance with regulation CAR 91 Subpart 10.</u></p> <p><u>If applicable, the Director shall report to ICAO the required information regarding emissions unit cancellation for the 2021-2023 period in accordance with regulation CAR 91 Subpart 10.</u></p>
<u>1 August 2025</u>	<u>The Director shall obtain and use the ICAO document entitled "CORSIA States for Chapter 3 State Pairs" applicable for the 2026 compliance year in accordance with regulation CAR 91 Subpart 10.</u>
<u>31 October 2025</u>	<u>The Director shall obtain and use the Sector's Growth Factor (SGF) for 2024 from the ICAO document entitled: "CORSIA Central Registry (CCR): Information and Data for the Implementation of CORSIA" in accordance with regulation CAR 91 Subpart 10.</u>
<u>30 November 2025</u>	<p><u>The Director shall calculate and inform aeroplane operators of their offsetting requirements for 2024, in accordance with regulation CAR 91 Subpart 10</u></p> <p><u>The Director shall submit updates to the list of aeroplane operators that are attributed to it to ICAO, as well as updates to the list of verification bodies accredited in the Republic in accordance with regulation CAR 91 Subpart 10.</u></p>
<u>31 December 2025</u>	<u>Recommendation:</u> <u>The Director may obtain and use the ICAO document entitled "CORSIA Aeroplane Operator to State Attributions" summarising a list of aeroplane operators and the State to which they have been attributed in accordance with regulation CAR 91 Subpart 10. The document is available on the ICAO CORSIA website.</u>
<u>1 January 2026 to 31 December 2026</u>	<u>The aeroplane operator shall monitor, in accordance with regulation CAR 91 Subpart 10 CO₂ emissions for 2026 from international flights, in accordance with regulation CAR 91 Subpart 10.</u>
<u>1 January 2026 to 30 April 2026</u>	<u>The aeroplane operator shall compile 2025 emissions data to be verified by a verification body, in accordance with regulation CAR 91 Subpart 10.</u>

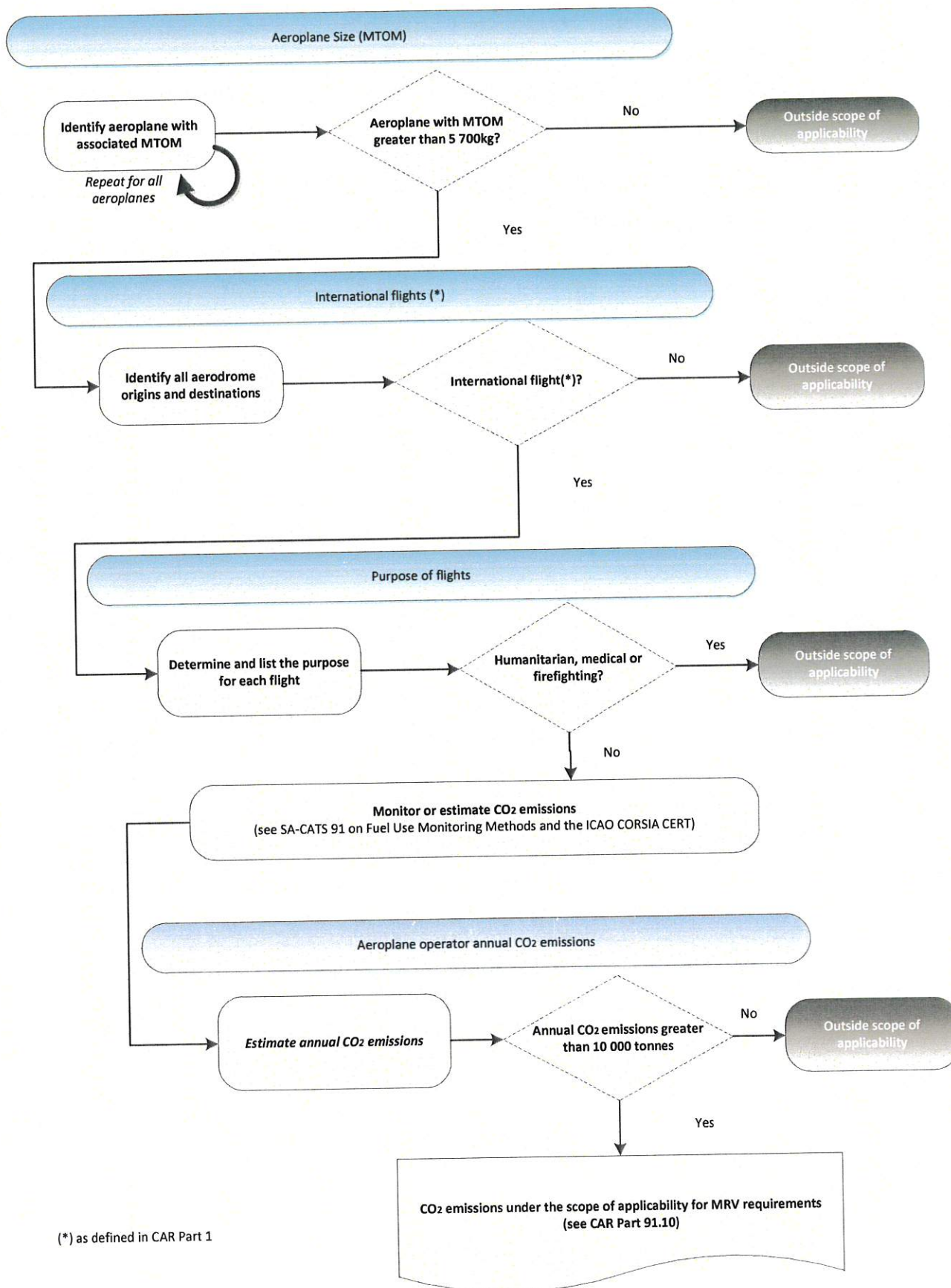
	<u>Recommendation:</u> <i>The aeroplane operator may submit their Emissions Report for verification as soon as possible after completing their Emissions Report.</i>
<u>30 April 2026</u>	The aeroplane operator and the verification body shall both submit the verified Emissions Report and associated Verification Report for 2025 to the Director in accordance with regulation CAR 91 Subpart 10.
<u>1 May 2026 to 31 July 2026</u>	The Director shall conduct an order of magnitude check of the verified Emissions Report for 2025, including any filling in of data gaps in case of non-reporting by aeroplane operators in accordance with regulation CAR 91 Subpart 10.
<u>30 June 2026</u>	The Director shall notify ICAO of any change in its decision to voluntarily participate, or to discontinue the voluntary participation in the applicability of regulation CAR 91 Subpart 10 from 1 January 2027 in accordance with regulation CAR 91 Subpart 10.
<u>31 July 2026</u>	The Director shall submit required information regarding CO ₂ emissions for 2025 to ICAO in accordance with regulation CAR 91 Subpart 10.
<u>1 August 2026</u>	The Director shall obtain and use the ICAO document entitled "CORSIA States for Chapter 3 State Pairs" applicable for the 2027 compliance year in accordance with regulation CAR 91 Subpart 10.
<u>31 October 2026</u>	The Director shall obtain and use the Sector's Growth Factor (SGF) for 2025 from the ICAO document entitled; "CORSIA Central Registry (CCR): Information and Data for the Implementation of CORSIA" in accordance with regulation CAR 91 Subpart 10.
<u>30 November 2026</u>	The Director shall calculate and inform aeroplane operators of their offsetting requirements for 2025, in accordance with regulation CAR 91 Subpart 10. The Director shall submit updates to the list of aeroplane operators that are attributed to it to ICAO, as well as updates to the list of verification bodies accredited in the State in accordance with regulation CAR 91 Subpart 10.
<u>31 December 2026</u>	<u>Recommendation:</u> <i>The Director may obtain and use the ICAO document entitled "CORSIA Aeroplane Operator to State Attributions" summarising a list of aeroplane operators and the State to which they have been attributed in accordance with regulation CAR 91 Subpart 10. The document is available on the ICAO CORSIA website.</i>

- (4) An aeroplane operator shall use the equivalent procedures prescribed in Part 91 Subpart 10 unless an equivalent procedure is approved by the Authority.

- (5) An aeroplane operator may apply to the Authority for the use of equivalent procedures for the following reasons:
- (a) to make use of previously acquired or existing data; and
 - (b) to minimize the costs of demonstrating compliance with the requirements of CAR 91 Subpart 10

9.1.10 .5 Monitoring requirements of aeroplane operator annual CO₂ emissions

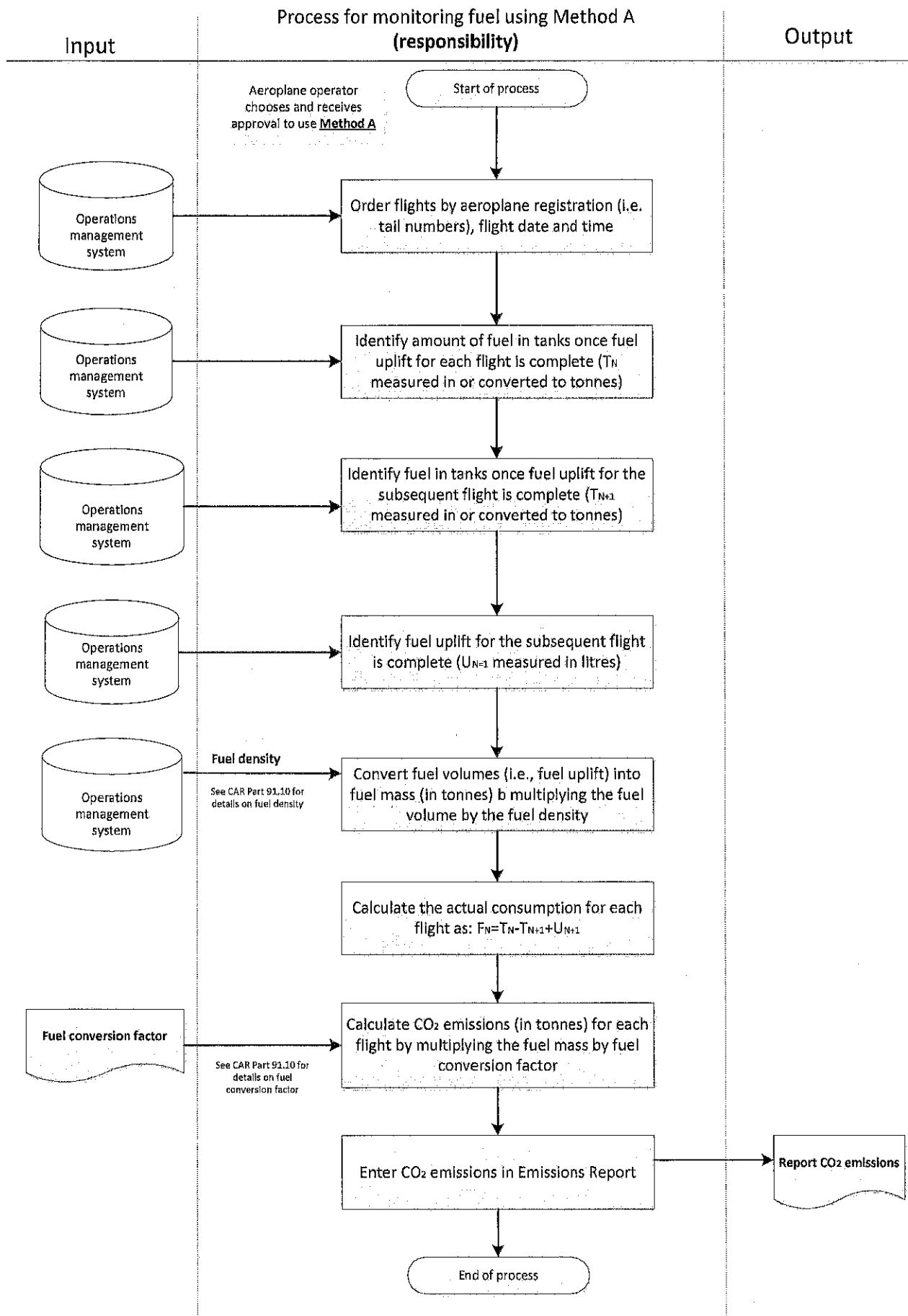
- (1) Location indicators shall be assigned by States and shall be checked by ICAO for conformity with the "Formulation and assignment of location indicators".
- (2) Details on the "Formulation and assignment of location indicators" and the list of ICAO four-letter location indicators for geographical locations throughout the world is defined in ICAO Doc 7910 which is available on the ICAO CORSIA website.
- (3) The applicability of the MRV requirements for international flights shall be determined as follows:



Determination of the applicability of CAR Part 91.10 to international flights (for MRV requirements)

91.10 6 Eligibility of monitoring methods

- (1) An aeroplane operator, excluding an operator eligible to use the ICAO CORSIA CO₂ Estimation & Reporting Tool (CERT), shall choose from the following fuel use monitoring methods:
 - (1.1) Method A: the process for monitoring fuel use by flight shall be as per the illustration diagram:



Monitoring fuel use by flight using Method A

- (a) An aeroplane operator shall use the following formula to compute fuel use according to Method A:

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

where:

F_N = Fuel consumed for the flight under consideration (=flight N) determined using Method A (in tonnes);

T_N = Amount of fuel contained in aeroplane tanks once fuel uplifts for the flight under consideration (i.e., flight N) are complete (in tonnes);

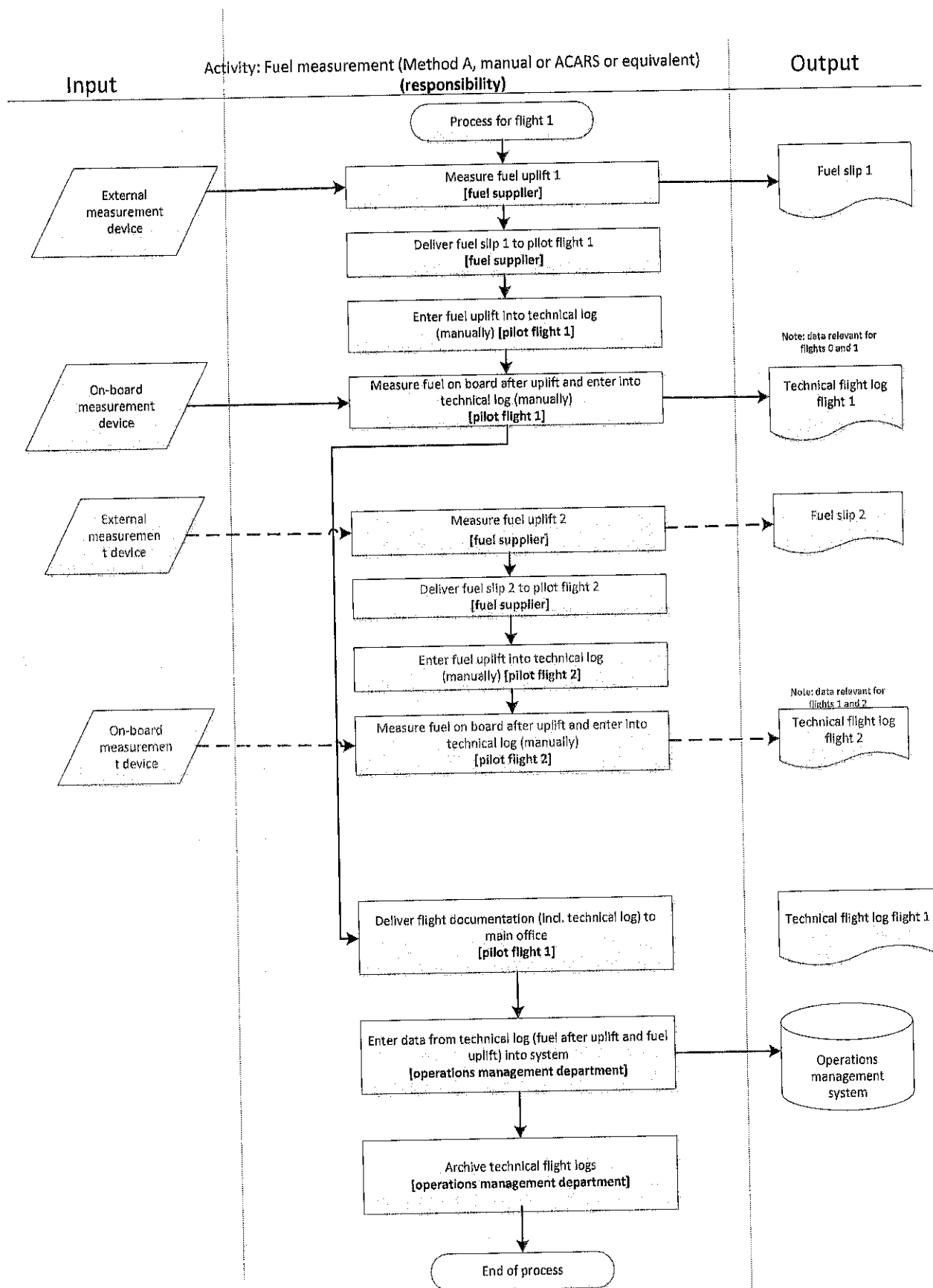
T_{N+1} = Amount of fuel contained in aeroplane tanks once fuel uplifts for the subsequent flight (i.e., flight N+1) are complete (in tonnes);

U_{N+1} = Sum of fuel uplifts for the subsequent flight (i.e., flight N+1) measured in volume and multiplied with a density value (in tonnes).

Note 1: Requirements on fuel density values are prescribed in CAR 91 Subpart 10. Fuel uplift U_{N+1} is determined by the measurement by the fuel supplier, as documented in the fuel delivery notes or invoices for each flight.

Note 2: For ensuring completeness of the data, it is important to note that not only data generated during the flight under consideration (i.e., flight N) is needed, but also data generated from the subsequent flight (i.e., flight N+1). This is of particular importance when a domestic flight is followed by an international flight, as defined in CAR 91 Subpart 10 or vice versa. In order to avoid data gaps, it is therefore recommended that, the Block-on fuel or the amount of fuel in the tank after all fuel uplifts for a flight is always recorded on flights of aeroplane which are used for international flights, as defined in CAR 91 Subpart 10. For the same reasons, fuel uplift data for all flights of those aeroplanes should be collected, before deciding which flights are international.

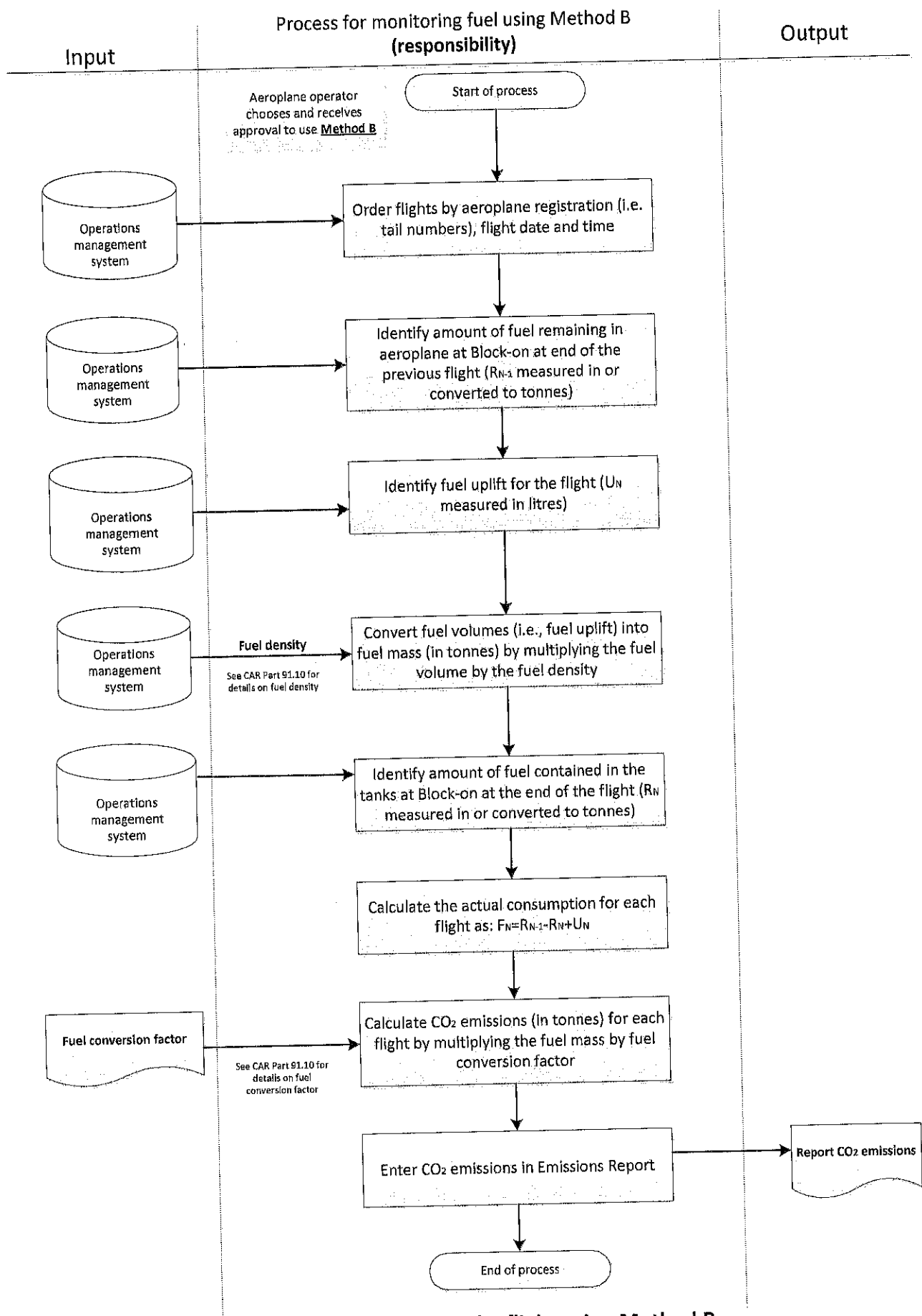
- (b) An aeroplane operator performing on an ad-hoc basis, flights attributed to another aeroplane operator, shall provide to the latter the fuel measurement values according to the Block-off / Block-on method;
- (c) Where no fuel uplift for the flight or subsequent flight takes place, the amount of fuel contained in an aeroplane tank (T_N or T_{N+1}) shall be determined at block-off for the flight or subsequent flight; and
- (d) Where an aeroplane performs activities other than a flight, including undergoing major maintenance involving the emptying of the tanks, after the flight to be monitored; an aeroplane operator may substitute the quantity "T_{N+1} + U_{N+1}" with the 'amount of fuel remaining in a tank at the start of the subsequent activity of an aeroplane or fuel in tank at Block-on, as recorded by technical logs.



Collection of required data to implement Method A with fuel uplift from fuel supplier

(1.2) Method B

(a) The process for monitoring fuel use by flight using Method B shall be as illustrated:



Monitoring fuel use by flight using Method B

(b) The aeroplane operator shall use the following formula to compute fuel use:

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

Where:

F_N = Fuel consumed for the flight under consideration (i.e., flight N) determined using Method B (in tonnes);

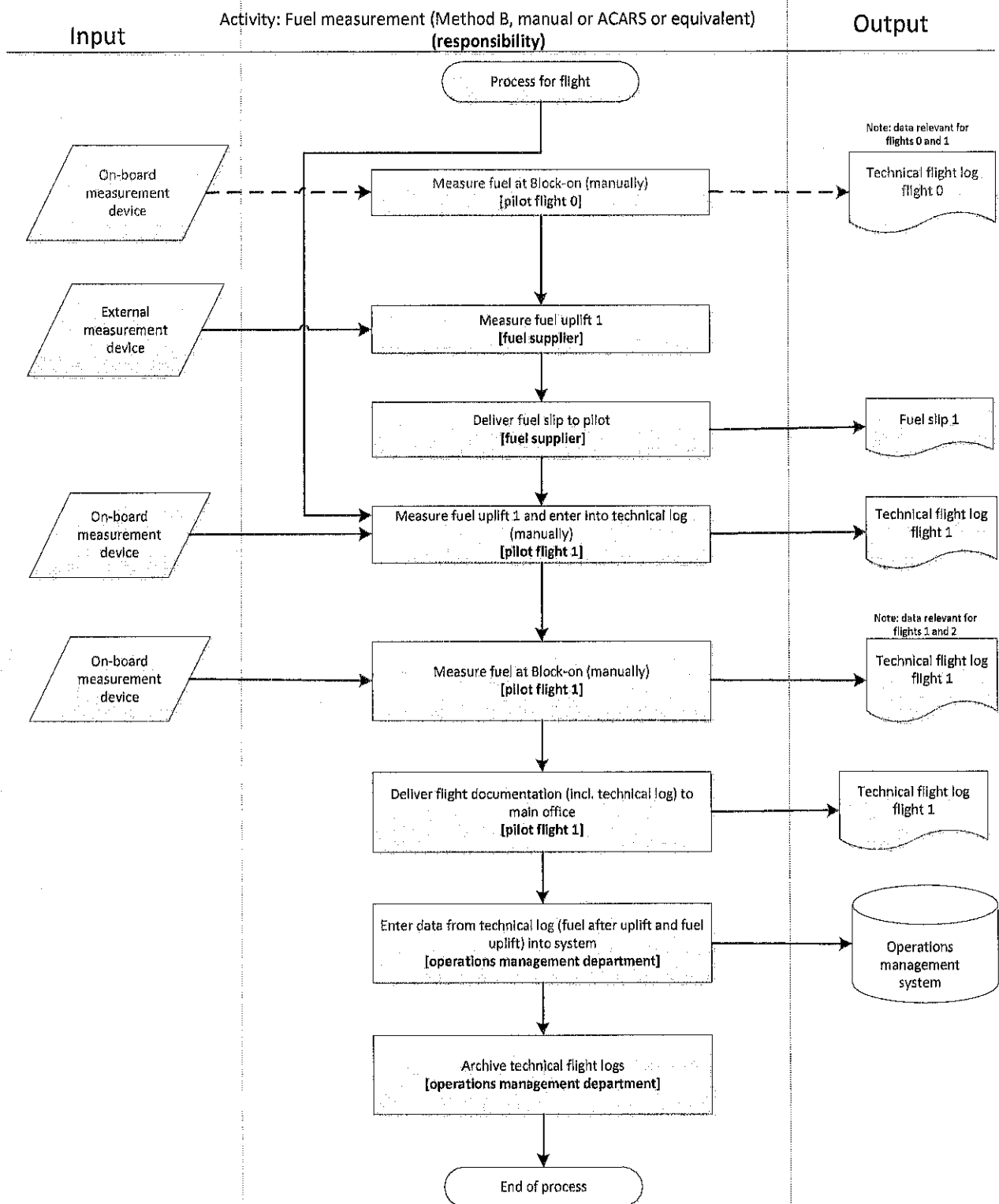
R_{N-1} = Amount of fuel remaining in aeroplane tanks at the end of the previous flight (i.e., flight $N-1$) at Block-on before the flight under consideration, (in tonnes);

R_N = Amount of fuel remaining in aeroplane tanks at the end of the flight under consideration (i.e., flight N) at Block-on after the flight, (in tonnes);

U_N = Fuel uplift for the flight considered measured in volume and multiplied with a density value (in tonnes).

Note: Requirements on fuel density values are prescribed in CAR 91 Subpart 10. Fuel uplift is determined by the measurements by the fuel supplier, as documented in the fuel delivery notes or invoices for each flight. For ensuring completeness of the data, it is important to note that not only data generated during the flight under consideration (i.e., flight N) is needed, but also data generated from the previous flight (i.e., flight $N-1$). This is in particular important when a domestic flight is followed by an international, or vice versa.

The process diagram for collecting the required data to implement Method B is illustrated as follows:

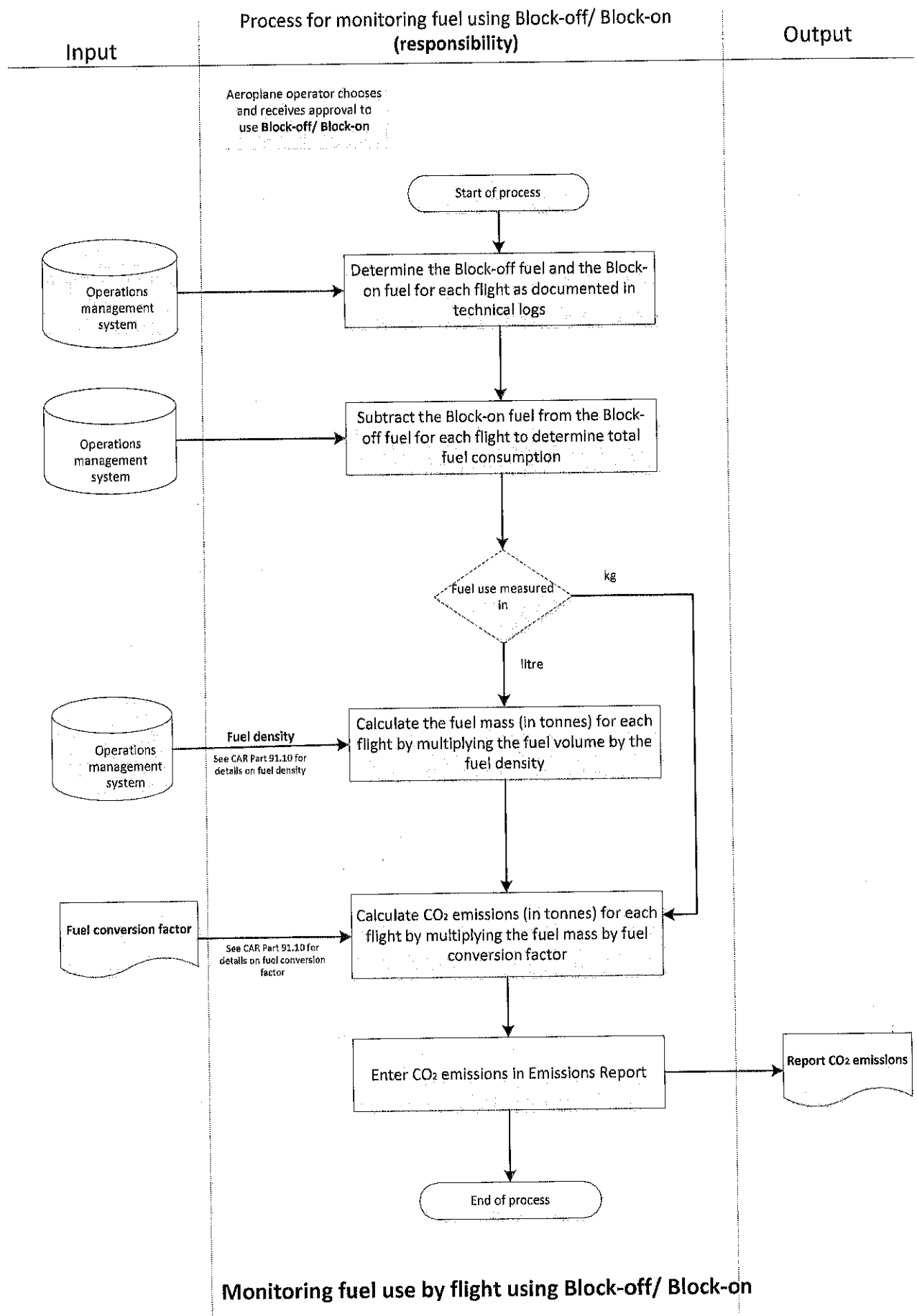


Collection of required data to implement Method B with fuel uplift (manual process)

- (c) The aeroplane operator performing on an ad-hoc basis, flights attributed to another aeroplane operator, shall provide to the latter the fuel measurement values according to the Block-off / Block-on method; and
- (d) Where an aeroplane does not perform a flight previous to the flight for which fuel consumption is being monitored (e.g., if the flight follows a major revision or maintenance), the aeroplane operator may substitute the quantity R_{N-1} with the Amount of fuel remaining in aeroplane tanks at the end of the previous activity of the aeroplane, as recorded by technical logs.

(1.3) Block-off/ Block-on method

- (a) The process for monitoring fuel use by flight using Method Block-off/ Block-on shall be as illustrated:



(b) The aeroplane operator shall use the following formula to compute fuel use:

$$F_N = T_N - R_N$$

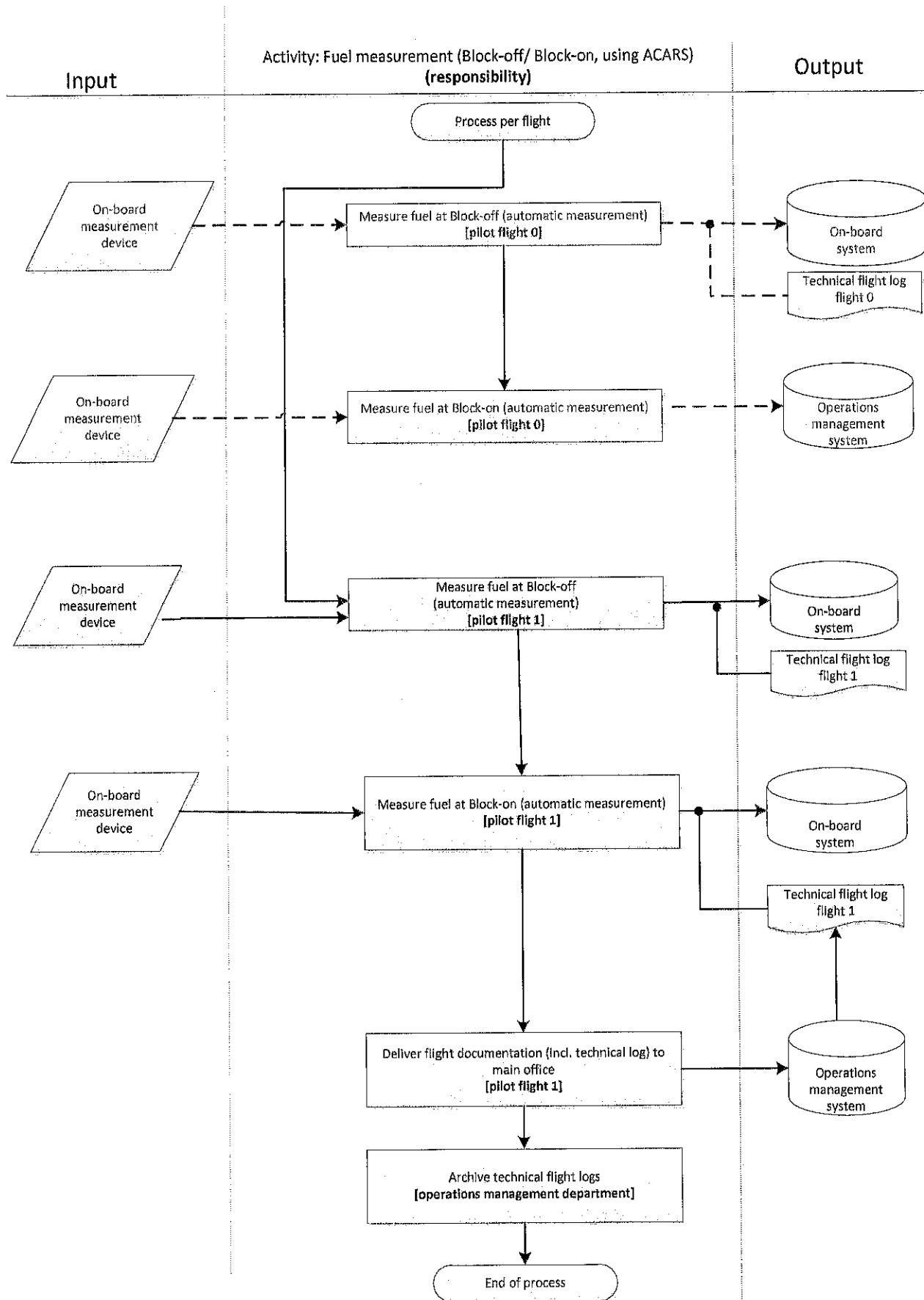
where:

F_N = Fuel consumed for the flight under consideration (=flight N)
determined using Block-off / Block-on Method (in tonnes);

T_N = Amount of fuel contained in aeroplane tanks at Block-off for the
flight under consideration i.e., flight N (in tonnes);

R_N = Amount of fuel remaining in aeroplane tanks at Block-on of the
flight under consideration i.e., flight N (in tonnes).

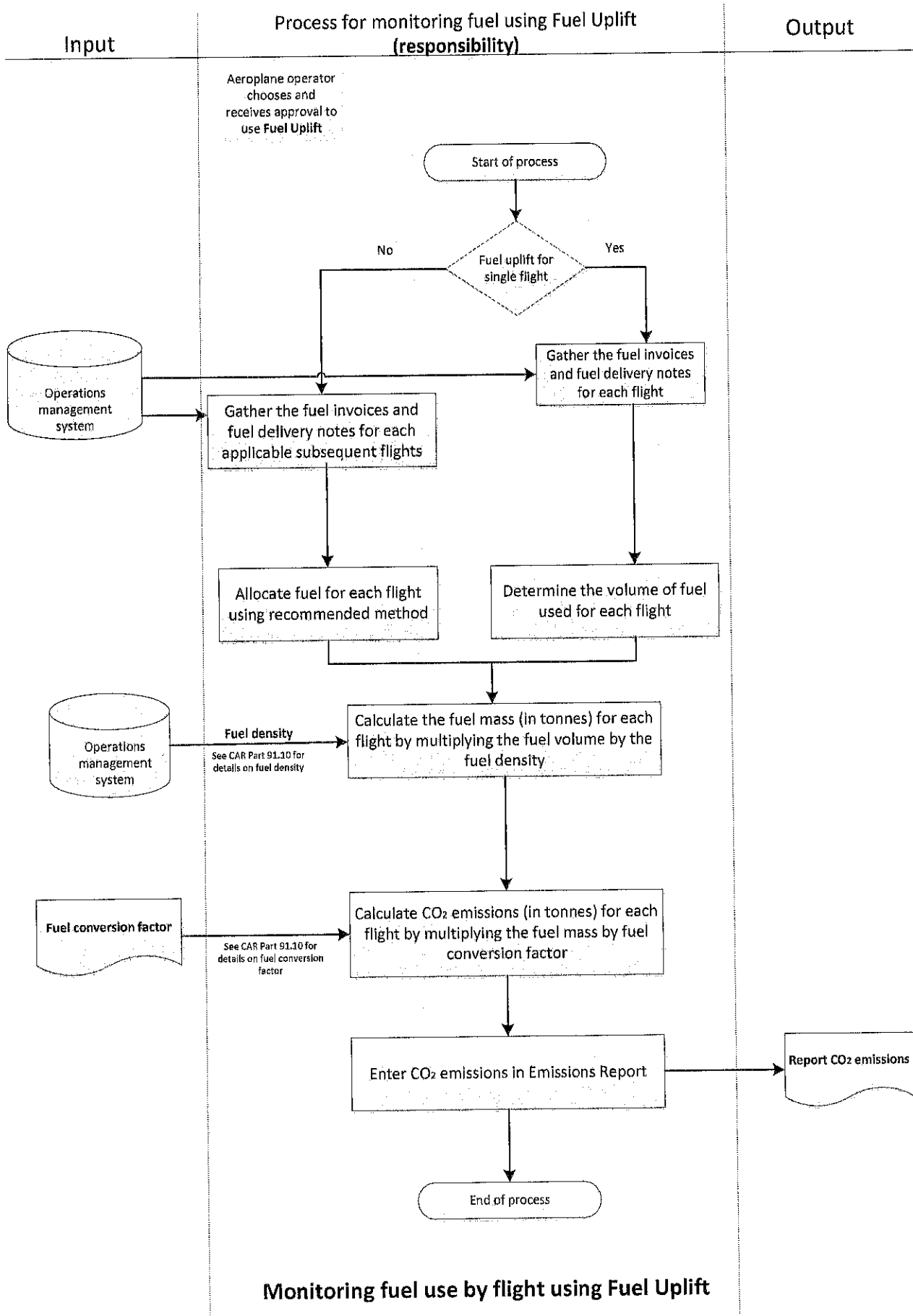
(c) The process for collecting the required data to implement the Block-off/ Block-on method shall be as illustrated:



Collection of required data to implement Block-off/ Block-on

(1.4) Fuel Uplift method

- (a) The process for monitoring fuel using the Fuel Uplift method shall be as illustrated:



- (b) For flights with a fuel uplift unless the subsequent flight has no uplift, the aeroplane operator shall use the following formula to compute fuel use according to the Fuel Uplift Method:

$$F_N = U_N$$

Where:

F_N = Fuel consumed for the flight under consideration (i.e., flight N) determined using fuel uplift (in tonnes);

U_N = Fuel uplift for the flight considered, measured in volume and multiplied with a density value (in tonnes).

- (c) For flight(s) without a fuel uplift (i.e., flight $N+1$, ..., flight $N+n$), an aeroplane operator shall use the following formula to allocate fuel use from the previous fuel uplift (i.e., from flight N) proportionally to block hour:

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

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

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

Where:

F_N = Fuel consumed for the flight under consideration (i.e., flight N) determined using fuel uplift (in tonnes);

F_{N+1} = Fuel consumed for the subsequent flight (i.e., flight $N+1$) determined using fuel uplift (in tonnes);

F_{N+n} = Fuel consumed for the follow-on flight (i.e., flight $N+n$) determined using fuel uplift (in tonnes);

U_N = Fuel uplift for the flight under consideration (i.e., flight N) (in tonnes);

BH_N = Block hour for the flight under consideration (i.e., flight N) (in hours);

BH_{N+1} = Block hour for the subsequent flight (i.e., flight $N+1$) (in hours).

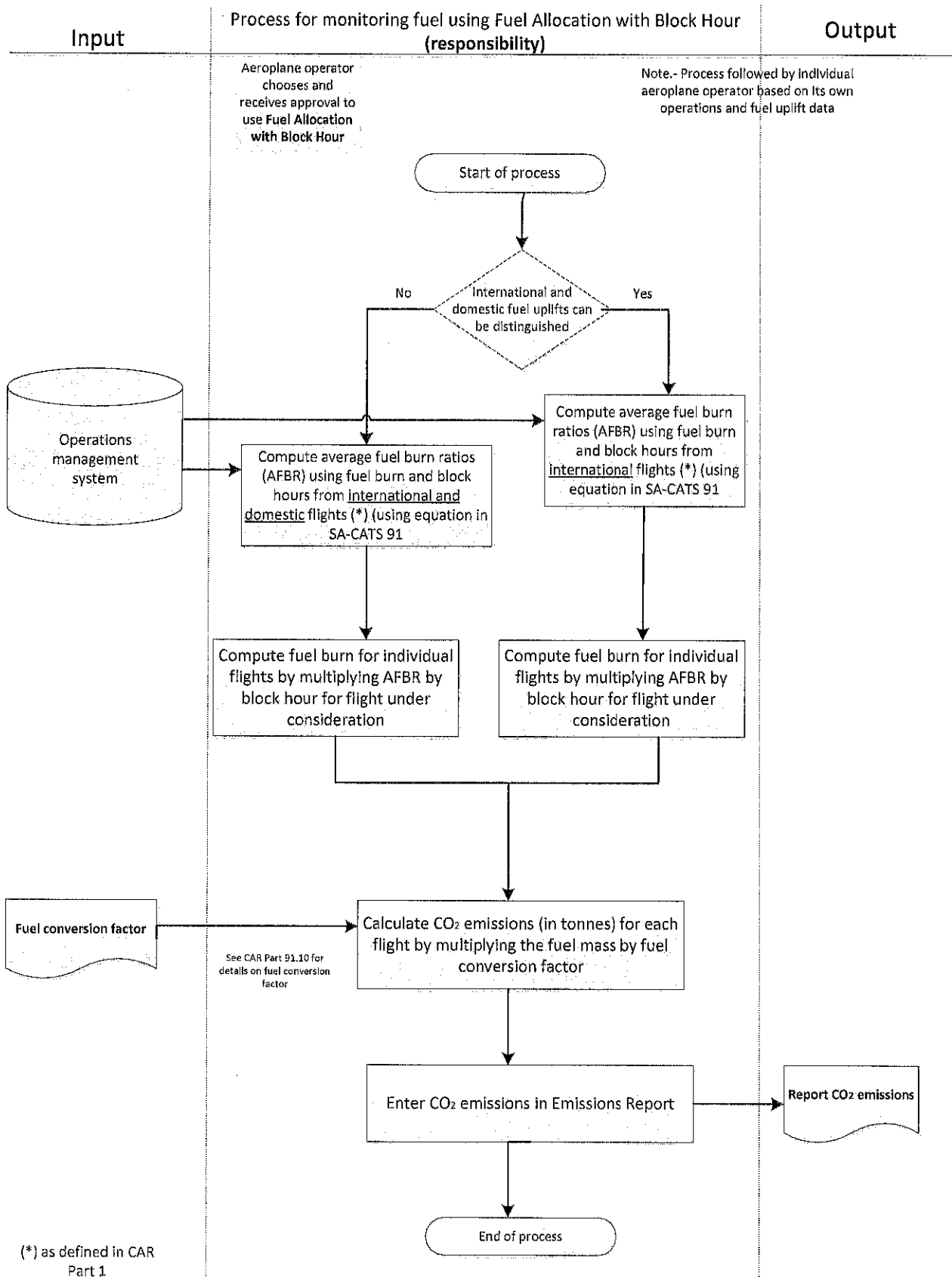
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BH_{N+n} = Block hour for the follow-on flight (i.e., flight $N+n$) (in hours).

Note. — Fuel uplift is determined by the measurement by the fuel supplier, as documented in the fuel delivery notes or invoices for each flight.

(1.5) Fuel Allocation with Block Hour method

- (a) The process for monitoring fuel using the Fuel Allocation with Block Hour method shall be as illustrated:



Monitoring fuel use by flight using Fuel Allocation with Block Hour

(b) Computation of average fuel burn ratios

- (i) an aeroplane operator with distinguished fuel uplifts, shall compute, for each aeroplane type, the average fuel burn ratios by summing up all actual fuel uplifts from international flights, as defined in CAR 91 Subpart 10, divided by the sum of all actual block hours from international flights for a given year, according to the following formula:

$$AFBR_{AO,AT} = \frac{\sum_N U_{AO,AT,N}}{\sum_N BH_{AO,AT,N}}$$

where:

AFBR_{AO,AT} = Average fuel burn ratios for aeroplane operator (AO) and aeroplane type (AT) (in tonnes per hour).

U_{AO,AT,N} = Fuel uplifted for the international flight N for aeroplane operator (AO) and aeroplane type (AT) determined using monitoring method Fuel Uplift (in tonnes).

BH_{AO,AT,N} = Block hour for the international flight N for aeroplane operator (AO) and aeroplane type (AT) (in hours).

- (ii) an aeroplane operator with undistinguished fuel uplifts, shall compute for each aeroplane type, the average fuel burn ratios by summing up all actual fuel uplifts from international and domestic flights divided by the sum of all actual block hours from these flights for a given year, according to the following formula:

$$AFBR_{AO,AT} = \frac{\sum_N U_{AO,AT,N}}{\sum_N BH_{AO,AT,N}}$$

where:

AFBR_{AO,AT} = Average fuel burn ratios for aeroplane operator (AO) and aeroplane type (AT) (in tonnes per hour).

U_{AO,AT,N} = Fuel uplifted for the international or a domestic flight N for aeroplane operator (AO) and aeroplane type (AT) measured in volume and multiplied with a specific density value (in tonnes).

BH_{AO,AT,N} = Block hour for the international and domestic flight N for aeroplane operator (AO) and aeroplane type (AT) (in hours).

- (iii) An aeroplane operator specific average fuel burn ratios shall be calculated on a yearly basis by using the yearly data from the actual

reporting year. The average fuel burn ratios shall be reported, for each aeroplane type, in the aeroplane operator's Emissions Report.

Note CAR 91 Subpart 10 for requirements on fuel density values. Aeroplane types are contained in Doc 8543 on ICAO Aircraft Type Designators available on the ICAO CORSIA website.

(c) Computation of fuel use for individual flights

- (i) an aeroplane operator shall compute the fuel consumption for each international flight by multiplying the aeroplane operator specific average fuel burn ratios with the flight's block hour according to the following formula:

$$F_N = AFBR_{AO,AT} * BH_{AO,AT,N}$$

Where:

F_N = Fuel allocated to the international flight under consideration (i.e., flight N) using the Fuel Allocation Block Hour method (in tonnes);

AFBR_{AO,AT} = Average fuel burn ratios for aeroplane operator (AO) and aeroplane type (AT) (in tonnes per hour);

BH_{AO,AT,N} = Block hour for the international flight under consideration (=flight N) for aeroplane operator (AO) and aeroplane type (AT) (in hours).

Note— Fuel uplift is determined by the measurement by the fuel supplier, as documented in the fuel delivery notes or invoices for each flight. The Verification Report of the external verification body includes an assessment of the aeroplane operator specific average fuel burn ratio per ICAO aircraft type designator used. Average fuel burn ratio (AFBR) based on all flights for a reporting year and rounded to at least three decimal places.

- (ii) Verification body shall cross-check whether the emissions reported are reasonable in comparison to other fuel related data of an aeroplane operator.

(2) Use of the CERT for complying with monitoring and reporting requirements-

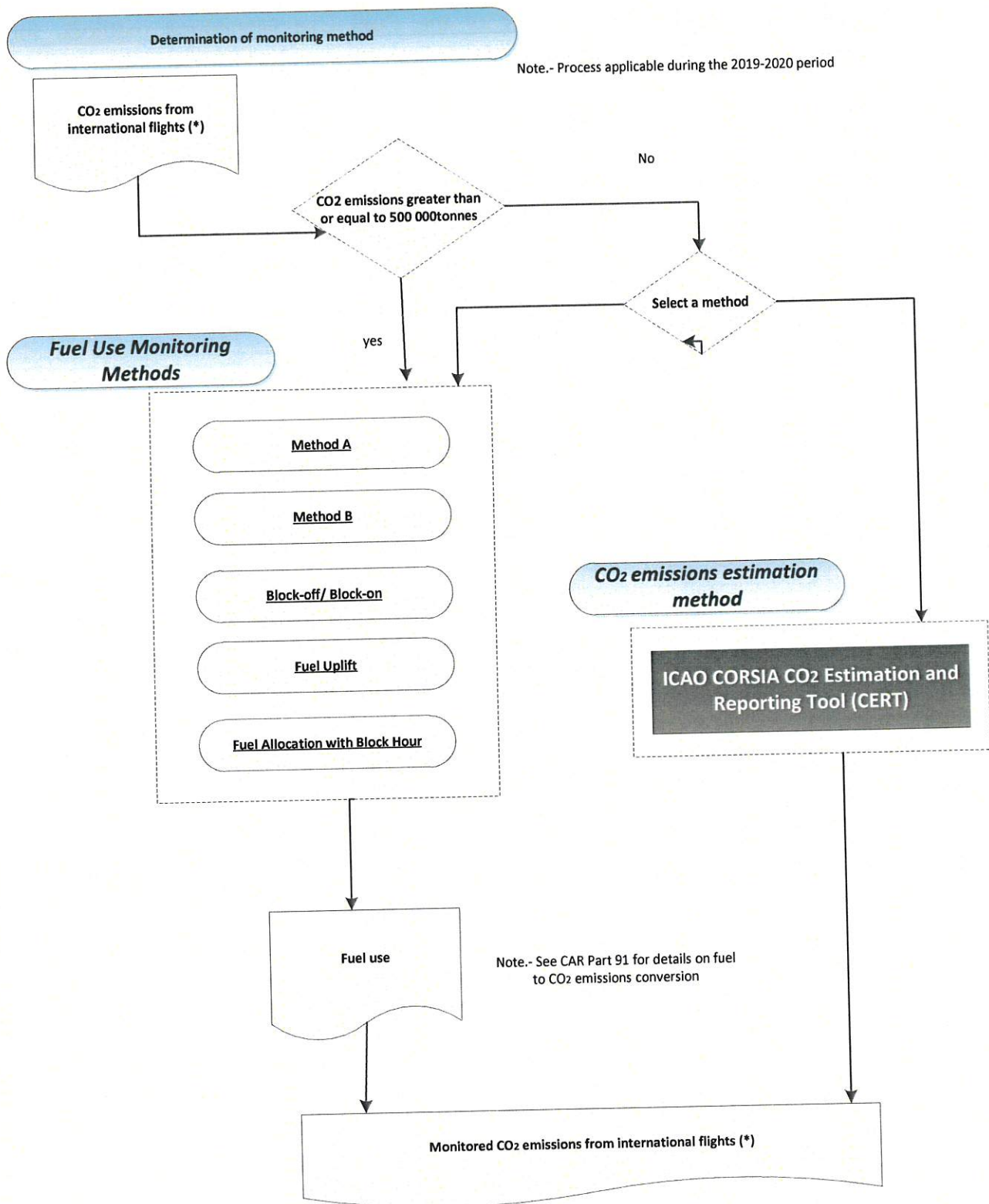
- (a) an aeroplane operator shall use the CERT according to the eligibility criteria and as approved by the Director;

- (b) an aeroplane operator shall use either the Block Time input method or the Great Circle Distance input method to enter the necessary information into the CERT;
- (c) an aeroplane operator approved to use the Block Time input method shall collect the following data for submission into the CERT to estimate its CO₂ emissions during the compliance year:
 - (i) ICAO aircraft type-model designator;
 - (ii) Origin aerodrome ICAO Designator;
 - (iii) Destination aerodrome ICAO Designator;
 - (iv) Block time in hours;
 - (v) Number of flights;
 - (vi) Date (optional); and
 - (vii) Flight ID (optional).
- (d) an aeroplane operator approved to use the Great Circle Distance input method shall collect the following data for submission into CERT to estimate its CO₂ emissions during the compliance year:
 - (i) ICAO aircraft model - type designator;
 - (ii) Origin aerodrome;
 - (iii) Destination aerodrome;
 - (iv) Number of flights;
 - (v) Date (optional); and
 - (vi) Flight ID (optional).

Note: The ICAO CORSIA CERT is developed for and made available to aeroplane operators to support the monitoring and reporting of their CO₂ emissions. The CERT supports aeroplane operators in fulfilling their monitoring and reporting requirements by populating the standardized Emissions Monitoring Plan and Emissions Report templates available on the ICAO CORSIA website.

- (3) The Director shall contribute to improving the ICAO CO₂ estimation module used within the CORSIA CERT by:
 - (a) collecting the following flight level fuel burn data from aeroplane operators:
 - (i) date and time in Universal Time Coordinated;
 - (ii) ICAO aircraft type - model designator;
 - (iii) origin aerodrome ICAO Designator;
 - (iv) destination aerodrome ICAO Designator;
 - (v) block hour (in hours to 2 decimal places);
 - (vi) fuel used (in tonnes to at least 1 decimal place) based on a Fuel Use Monitoring method;
 - (vii) type of Fuel Use Monitoring method used;
 - (viii) aircraft maximum certificated take-off mass (in kg); and
 - (ix) flight Great Circle Distance (in km)
 - (b) sharing the aeroplane operator data with ICAO:
 - (i) date and time in Universal Time Coordinated;

- (ii) generic code to de-identify aeroplane operator information and allow integration of information;
 - (iii) ICAO Aircraft Type - Model Designator;
 - (iv) flight Great Circle Distance (in km);
 - (v) block hour (in hours to 2 decimal places);
 - (vi) fuel used (in tonnes to at least 1 decimal place based on a fuel use monitoring method; and
 - (vii) type of Fuel Use Monitoring method used.
- (c) anonymising the aeroplane operator data shared with ICAO.
- (4) When determining the eligibility of the Fuel Use Monitoring methods for the compliance period 2019-2020, the following process shall be applicable:



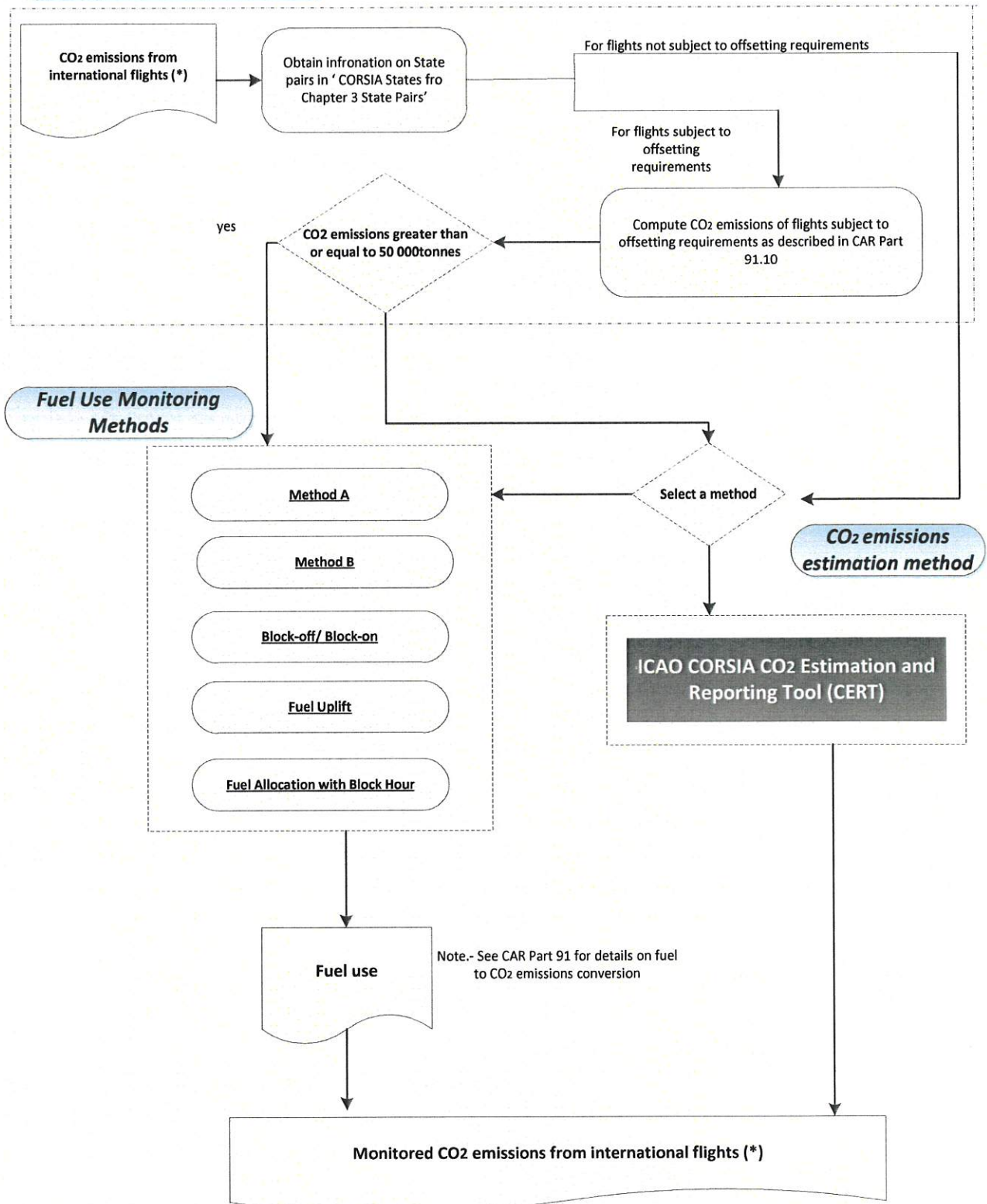
(*) as defined in CAR Part 1

Determination of eligible Fuel Use Monitoring Methods during the 2019-2020 period

(5) When determining the eligibility of the Fuel Use Monitoring methods for the compliance period 2021-2035, the following process shall be applicable:

Determination of monitoring method

Note.- Process applicable during the 2021-2035 period



(*) as defined in CAR Part 1

Determination of eligible Fuel Use Monitoring Methods during the compliance periods (2021-2035)

91.10.7 EMP

(1) An aeroplane operator shall develop and submit an EMP to the Director, containing the following information:

(a) Identification of the Aeroplane Operator-

- (i) Name and address of the aeroplane operator with legal responsibility;
- (ii) Information for attributing the aeroplane operator to a State:
 - (aa) ICAO Designator(s) used for air traffic control purposes, as listed in ICAO Doc 8585;
 - (bb) if an aeroplane operator does not have an ICAO Designator, an aeroplane operator shall include a copy of the air operator certificate; and
 - (cc) if an aeroplane operator does not have an ICAO Designator or an air operator certificate, an aeroplane operator shall submit its place of juridical registration.
- (iii) details of the ownership structure relative to any other aeroplane operator with international flights, including identification of whether the aeroplane operator is a parent company to other aeroplane operators with international flights or subsidiaries that are aeroplane operators with international flights;
- (iv) if an aeroplane operator, in a parent-subsidiary relationship, seeks to be considered a single aeroplane operator for purposes of this Subpart, then confirmation shall be provided that the parent and subsidiary are attributed to the Republic and that the subsidiary is wholly-owned by the parent;
- (v) Contact information for a person responsible for an aeroplane operator's Emissions Monitoring Plan; and
- (vi) description of an aeroplane operator's activities.

Note: A template of an EMP is provided on the ICAO CORSIA website.

(b) Fleet and operations data

- (i) an aeroplane operator shall list all aeroplane types and the type of fuel used in aeroplanes operated for international flights, at the time of submission of the Emissions Monitoring Plan. The list shall include:
 - (aa) Aeroplane types with a maximum certificated take-off mass of 5 700 kg or greater and the number of aeroplane per type, including owned and leased aeroplanes;

Note: An aeroplane operator using the ICAO CORSIA CERT could use the functionality of the CERT to identify applicable aeroplane types.

(bb) Type of fuel(s) used by an aeroplane.

Note: The aeroplane operator using the ICAO CORSIA CERT does not need to specify the type of petroleum-based fuel used for aeroplanes.

- (ii) The information to be used for attributing international flights, as defined in regulation CAR 91 Subpart 10, to an aeroplane operator shall be:
 - (aa) list of the ICAO Designator(s) used in Item 7 of an aeroplane operator's flight plans;
 - (bb) if an aeroplane operator does not have an ICAO Designator, then a list of the nationality or common mark, or registration mark of aeroplanes that are explicitly stated in the air operator certificate and used in Item 7 of an aeroplane operator's flight plans; and
 - (cc) if an aeroplane operator does not have an ICAO Designator or an air operator certificate, then the aeroplane operator shall propose an alternative means for flight attribution based on what it reports in Item 7 of an aeroplane operator's flight plans.
- (iii) Procedures on how changes in an aeroplane fleet and fuel used will be tracked, and integrated into the Emissions Monitoring Plan;
- (iv) Procedures on how to track specific flights of an aeroplane to ensure completeness of monitoring;
- (v) Procedures for determining which aeroplane flights comply with the definition of "international" flights and are subject to the requirements prescribed in CAR 91 Subpart 10;
- (vi) list of States to where an aeroplane operator operates international flights, at the time of initial submission of the Emissions Monitoring Plan;

Note. — An aeroplane operator using the estimation functionality of the ICAO CORSIA CERT to assess its eligibility to use the CERT, could use the output of the tool as input to the Emissions Monitoring Plan submission. An aeroplane operator using the applicable ICAO CORSIA CERT, could use the functionality of the CERT to identify flights subject to offsetting requirements, in a given year of compliance.

- (vii) Procedures for identifying domestic flights and/or humanitarian, medical or firefighting international flights, that may not be subject to the requirements of regulation Part 91 Subpart 10.

(c) Methods and means of calculating emissions from international flights

- (i) For the methods and means for establishing the average Emissions during the 2019-2020 Period-
 - (aa) If the aeroplane operator meets the eligibility criteria in regulation CAR 91 Subpart 10 and chooses to use the ICAO

CORSIA CERT as described in Document SA-CATS 91, then the following information shall be provided:

- (A) An estimate of CO₂ emissions for all international flights, for 2019 with supporting information on how the estimation was calculated;
- (B) The type of input method used in the ICAO CORSIA CERT;
 - Great Circle Distance input method; or
 - Block Time input method.

Note. – Guidance on estimating CO₂ emissions for 2019 is provided in the Procedures for demonstrating compliance with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) available on the ICAO CORSIA website.

- (bb) If the aeroplane operator meets the eligibility criteria in regulation CAR 91 Subpart 10, or chooses to use a Fuel Use Monitoring method as described in Document SA-CATS 91, then the following information shall be provided:
 - (A) The Fuel Use Monitoring Method that will be used:
 - Method A;
 - Method B;
 - Block-off/ Block-on;
 - Fuel Uplift; or
 - Fuel Allocation with Block Hour.
- (cc) if different Fuel Use Monitoring Methods are to be used for different aeroplane types, then the aeroplane operator shall specify which method applies to which aeroplane type;
- (cc) Information on the procedures for determining and recording fuel density values (standard or actual) as used for operational and safety reasons and a reference to the relevant aeroplane operator documentation;
- (dd) The systems and procedures to monitor fuel consumption in both owned and leased aeroplane. If the aeroplane operator has chosen the Fuel Allocation with Block Hour method, information shall be provided on the systems and procedures used to establish the average fuel burn ratios as described in Document SA-CATS 91; and
- (ee) If the aeroplane operator is in a parent-subsidary relationship and seeks to be considered as a single

aeroplane operator for purposes of CAR 91 Subpart 10, then it shall provide the procedures that will be used for maintaining records of fuel used and emissions monitored during the 2019-2020 period of the various corporate entities. This shall be used to establish individual average emissions during the 2019-2020 period for the parent and subsidiary (or subsidiaries).

- (ii) For the methods and means for Emissions Monitoring and Compliance on or after 1 January 2021-
- (aa) If an aeroplane operator has international flights, as defined in regulation CAR 91 Subpart 10, but these are not subject to offsetting requirements as defined in regulation CAR 91 Subpart 10, then it shall confirm whether it plans to use the ICAO CORSIA CERT or the Fuel Use Monitoring Methods as described in Document SA-CATS 91;
- (bb) If an aeroplane operator meets the eligibility criteria in regulation CAR 91 Subpart 10, and it chooses to use the ICAO CORSIA CERT as described in Document SA-CATS 91, then the following information shall be provided:
- (A) An estimate of CO₂ emissions for all international flights, as defined in regulation CAR 91 Subpart 10, subject to offsetting requirements, as defined in regulation CAR 91 Subpart 10, for the year before the emissions monitoring is to occur (for example, an estimate of such emissions for 2020 for monitoring in 2021), as well as information on how the estimation was calculated;
- (B) The type of input method used in the ICAO CORSIA CERT;
- Great Circle Distance input method; or
 - Block Time input method.
- (cc) If the aeroplane operator meets the eligibility criteria in regulation CAR 91 Subpart 10, or chooses to use a Fuel Use Monitoring Method as described in Document SA-CATS 91, then the following information shall be provided:
- (A) The Fuel Use Monitoring Method that will be used:
- Method A;
 - Method B;
 - Block-off/ Block-on;

- Fuel Uplift; or
 - Fuel Allocation with Block Hour.
- (B) if different Fuel Use Monitoring Methods are to be used for different aeroplane types, then the aeroplane operator shall specify which method applies to which aeroplane type;
- (C) Information on the procedures for determining and recording fuel density values (standard or actual) as used for operational and safety reasons and a reference to the relevant aeroplane operator documentation; and
- (D) The systems and procedures to monitor fuel consumption in both owned and leased aeroplane. If the aeroplane operator has chosen the Fuel Allocation with Block Hour method, information shall be provided on the systems and procedures used to establish the average fuel burn ratios as described in Document SA-CATS 91.
- (dd) If an aeroplane operator is using a Fuel Use Monitoring method, as defined in Document SA-CATS 91, it shall state whether it plans to use the ICAO CORSIA CERT for international flights, as defined in regulation CAR 91 Subpart 10, that are subject to emissions monitoring but not offsetting requirements. If so, the aeroplane operators shall also state which input method into the ICAO CORSIA CERT is being used (i.e., Great Circle Distance Input Method, or Block Time Input Method).
- (d) Data management, data flow and control
- (i) An aeroplane operator shall provide the following information:
- (aa) roles, responsibilities and procedures on data management;
- (bb) procedures to handle data gaps and erroneous data values, including:
- (A) Secondary data reference sources which would be used as an alternative;
- (B) Alternative method in case the secondary data reference source is not available; and
- (C) For those aeroplane operators using a Fuel Use Monitoring Method, information on systems and procedures for identifying data gaps and for assessing whether the 5 per cent threshold for significant data gaps has been reached.
- (cc) documentation and record keeping plan;

- (dd) assessment of the risks associated with the data management processes and means for addressing significant risks;
- (ee) procedures for making revisions to the Emissions Monitoring Plan and resubmitting relevant portions to the Director when there are material changes;
- (ff) procedures for providing notice in the Emissions Report of non-material changes that require the attention of the Director; and
- (gg) a data flow diagram summarizing the systems used to record and store data associated with the monitoring and reporting of CO₂ emissions.

91.10.9 Monitoring of CORSIA Eligible Fuels

- (1) The CORSIA sustainability Criteria is defined in the ICAO document entitled 'CORSIA Sustainability Criteria for CORSIA Eligible Fuels' that is available on the ICAO CORSIA website.
- (2) The aeroplane operator that intends to claim for emissions reductions from the use of CORSIA eligible fuels shall only use CORSIA eligible fuels from fuel producers that are certified by an approved Sustainability Certification Scheme included in the ICAO document entitled "CORSIA Approved Sustainability Certification Schemes", that is available on the ICAO CORSIA website.

Note 1. The CORSIA eligible fuels purchased by a particular aeroplane operator may not be physically used in its aeroplane, and it will not be feasible to determine the specific CORSIA eligible fuel content at the point of uplift in an aeroplane. Claims of emissions reductions from the use of CORSIA eligible fuels by an aeroplane operator are based on mass of CORSIA eligible fuels according to purchasing and blending records.

Note 2. – The emissions reductions from the use of a CORSIA eligible fuel are calculated as part of the CO₂ offsetting requirements. These calculations use the approved life cycle emissions value (LS_f) for the CORSIA eligible fuel.

91.10.10 Reporting requirements for aeroplane operator annual CO₂ emissions

- (1) Fuel use shall be reported to the nearest tonne, unless otherwise stated.
- (2) An Emissions Report from an aeroplane operator shall be submitted to the Director and shall contain following information:
 - (a) Content of aeroplane operator Emissions Report

<u>Field #</u>	<u>Data Field</u>	<u>Details</u>
<u>Field 1</u>	<u>Aeroplane operator information</u>	<u>1a. Name of aeroplane operator</u> <u>1b. Detailed contact information of aeroplane operator</u> <u>1.c Name of a point of contact</u> <u>1.d Method and identifier used to attribute an aeroplane operator to the State in accordance with regulation CAR 91 Subpart 10</u> <u>1.e State</u>
<u>Field 2</u>	<u>Reference details of aeroplane operator Emissions Monitoring Plan</u>	<u>2 Reference to the Emissions Monitoring Plan that is the basis for emissions monitoring that year</u> <i>Note. – The Director may require providing reference to updated Emissions Monitoring Plan, if applicable.</i>
<u>Field 3</u>	<u>Information to identify the verification body and Verification Report</u>	<u>3a. Name and contact information of the verification body</u> <u>3b. Verification Report to be a separate report from aeroplane operator's Emissions Report</u>
<u>Field 4</u>	<u>Reporting year</u>	<u>4. Year during which emissions were monitored</u>
<u>Field 5</u>	<u>Type and mass of fuel(s) used</u>	<u>5. Total fuel mass per type of fuel:</u> <ul style="list-style-type: none"> • <u>Jet-A (in tonnes)</u> • <u>Jet-A1 (in tonnes)</u> • <u>Jet-B (in tonnes)</u> • <u>AvGas (in tonnes)</u> <i>Note 1. – Above totals to include CORSIA eligible fuels.</i> <i>Note 2.- The aeroplane operator using the ICAO CORSIA CERT, as described in SA-CATS 91, does not need to report Field 5.</i>

<u>Field 6</u>	<u>Total number of international flights during the reporting period</u>	<p>6a. <u>Total number of international flights, during the reporting period</u></p> <p><i>Note. - Total (sum of values from Field 7)</i></p>
<u>Field 7</u>	<u>Number of international flights per State pair or aerodrome pair</u>	<p>7a. <u>Number of international flights, per State pair (no rounding), or:</u></p> <p>7b. <u>Number of international flights, per aerodrome pair (no rounding).</u></p>
<u>Field 8</u>	<u>CO₂ emissions per aerodrome pair or State pair</u>	<p>8a. <u>CO₂ emissions from international flights, as defined in CAR 91 Subpart 10 per State pair (in tonnes); or</u></p> <p>8b. <u>CO₂ emissions from international flights, as defined in regulation CAR 91 Subpart 10 per aerodrome pair (in tonnes).</u></p>
<u>Field 9</u>	<u>Scale of data gaps</u>	<p>9a. <u>Per cent of data gaps (according to criteria defined in regulation CAR 91 Subpart 10 and rounded to the nearest 0.1%)</u></p> <p>9b. <u>Reason for data gaps if per cent of data gaps exceeds the threshold defined in regulation CAR 91 Subpart 10</u></p>
<u>Field 10</u>	<u>Aeroplane information</u>	<p>10a. <u>List of aeroplane types</u></p> <p>10b. <u>Aeroplane identifiers used in flight plans' Item 7 during the year for all international flights, as defined in regulation CAR 91 Subpart 10. Where the identifier is based on an ICAO Designator, only the ICAO Designator is to be reported</u></p> <p>10c. <u>Information on leased aeroplanes</u></p> <p>10d. <u>Average fuel burn ratio (AFBR) for each aeroplane</u></p>

		<p>type under 10a. in line with ICAO Aircraft Type Designator Doc. 8643 (in tonnes per hour to 3 decimal places)</p> <p><i>Note: - 10.d is only required if the aeroplane operator is using the Fuel Allocation with Block Hour method.</i></p>
Field 11	Eligibility for and use of the ICAO CORSIA CERT as per regulation CAR 91 Subpart 10	<p>11a. Version of the ICAO CORSIA CERT used</p> <p>11b. Scope of use of the ICAO CORSIA CERT i.e., on all flights or only on the international flights, not subject to offsetting requirements.</p>
<p>Field 12</p> <p><i>Note. - If emissions reductions from the use of CORSIA eligible fuel are claimed, see paragraph (b) for supplementary information that is to be provided with the aeroplane operator's Emissions Report.</i></p>	CORSIA eligible fuel Claimed	<p>12a Fuel type (i.e., type of fuel, feedstock and conversion process)</p> <p>12b Total mass of the neat CORSIA eligible fuel claimed (in tonnes) per fuel type</p>
	Emissions Information (per fuel type)	<p>12c Approved Life Cycle Emissions values</p> <p>12d Emission reductions claimed from a CORSIA eligible fuel, as calculated in accordance with equations prescribed in CAR 91 Subpart 10 and reported in tonnes.</p>
	Emissions Reductions (total)	<p>12.e Total emissions reductions claimed from the use of all CORSIA eligible fuels (in tonnes)</p> <p><i>Note. – During the 2019-2020 period, fields 12.a to 12.e are not required as the applicability of offsetting regulations start on 1 January 2021</i></p>
Field 13o	Total CO ₂ emissions	13a Total CO ₂ emissions (based on total mass of fuel in tonnes from Field 5 and reported in tonnes)

		<u>13b Total CO₂ emissions from flights subject to offsetting requirements.</u> <u>13c Total CO₂ emissions from international flights, that are not subject to offsetting requirements.</u> <u>Note. – During the 2019-2020 period, only fields 13.a is required as the applicability of offsetting regulations start on 1 January 2021.</u>
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Note. - The Director may expand on this; list to include additional or more detailed data from aeroplane operators registered under Part 47.

(3) The content of an Emissions Report from the Director to ICAO shall contain the following information:

(a) The list of aeroplane operators attributed to the Republic and the verification bodies accredited in the Republic as per the below table.

<u>Field #</u>	<u>Data Field</u>	<u>Details</u>
<u>Field 1</u>	<u>List of aeroplane operators attributed to the Republic</u>	<u>1.a Name and contact information of aeroplane operator</u> <u>1.b Aeroplane operator Code</u> <u>1.c Method and identifier used to attribute aeroplane operator to the Republic in accordance with regulation CAR 91 Subpart 10</u>
<u>Field 2</u>	<u>List of verification bodies accredited in the State (for a given year of compliance)</u>	<u>2.a State</u> <u>2.b Name of verification body</u>

Note. – Information on the following fields can be found in the ICAO document entitled; "CORSIA Central Registry (CCR): Information and Data for Transparency" that is available from the ICAO CORSIA website:

(b) The Emissions Report from the Director to ICAO for 2019 and 2020 as per below table

<u>Field #</u>	<u>Data Field</u>	<u>Details</u>
<u>Field 1</u>	<u>Total annual CO₂ emissions per State</u>	<u>Note. – Include emissions from CORSIA eligible fuels.</u>

	<u>pair aggregated for all aeroplane operators attributed to the Republic (in tonnes)</u>	<u>calculated using fuel conversion factor(s) from corresponding conventional aviation fuels, in accordance with regulation CAR 91 Subpart 10</u>
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- (c) The Emissions Report from the Director to ICAO annually after 2021 as per below table

<u>Field #</u>	<u>Data Field</u>	<u>Details</u>
<u>Field 1</u>	<u>Total annual CO₂ Emissions on each State pair aggregated for all aeroplane operators attributed to the Republic</u>	<u>1a. Total annual CO₂ emissions on each State pair subject to offsetting requirements, as defined in regulation CAR 91 Subpart 10, aggregated for all aeroplane operators attributed to the Republic (in tonnes)</u> <u>1b. Total annual CO₂ emissions on each State pair not subject to offsetting requirements, as defined in regulation CAR 91 Subpart 10, aggregated for all aeroplane operators attributed to the Republic (in tonnes)</u>
<u>Field 2</u>	<u>Total annual CO₂ emissions for each aeroplane operator attributed to the Republic</u>	<u>2a. Total annual CO₂ emissions for each aeroplane operator attributed to the Republic</u> <u>2b. Indicate whether the ICAO CORSIA CERT, as defined in Document SA-CATS 91 is used</u>
<u>Field 3</u>	<u>Total aggregated annual CO₂ emissions for all State pairs subject to offsetting requirements, for each aeroplane operator attributed to the Republic</u>	
<u>Field 4</u>	<u>Total aggregated annual CO₂ emissions for all State pairs not</u>	

	subject to offsetting requirements, for each aeroplane operator attributed to the Republic	
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Note 1. – Information on the following fields can be found in the ICAO document entitled; “CORSIA Central Registry (CCR): Information and Data for Transparency” that is available from the ICAO CORSIA website:

Note 2. – Where CO₂ emissions are based on the ICAO CORSIA CERT as described in Document SA-CATS 91, this will be indicated.

Note 3. – All data recognized as confidential in accordance with regulation CAR 91 Subpart 10 will be aggregated and published by ICAO without attribution to a specific aeroplane operator or State pair but with distinction between State pairs subject to offsetting requirements and those not subject to offsetting requirements.

- (4) Where an aeroplane operator operates a very limited number of State pairs that are subject to offset requirements, and a very limited number of State pairs that are not subject to offset requirements, an aeroplane operator may request in writing to the Director that such data not be published at an aeroplane operator level, explaining the reasons why disclosure may harm its commercial interests.

Note. –the annual CO₂ emissions of an aeroplane operator on a given State pair are considered as commercially sensitive if they are determined using a fuel use monitoring method.

- (5) Where aggregated State pair data may be attributed to an identified aeroplane operator as a result of a very limited number of aeroplane operators conducting flights on a State pair, an aeroplane operator may request in writing to the Director that such data not be published at State pair level, explaining the reasons why disclosure may harm their commercial interests.

91.10.11 Reporting of CORSIA eligible fuel

- (1) An aeroplane operator's Emissions Report may, when claiming emissions reductions from the use of each CORSIA eligible fuel, contain the following supplementary information:

<u>Field #</u>	<u>Data Field</u>	<u>Details</u>
<u>Field 1</u>	<u>Purchase date of the CORSIA eligible fuel</u>	

<u>Field 2</u>	<u>Identification of the producer of the CORSIA eligible fuel</u>	<u>2a. Name of producer of the CORSIA eligible fuel</u> <u>2b. Contact information of the producer of the CORSIA eligible fuel</u>
<u>Field 3</u>	<u>Fuel Production</u>	<u>3a. Production date of the CORSIA eligible fuel</u> <u>3b. Production location of the neat CORSIA eligible fuel</u> <u>3c. Batch number of each batch of CORSIA eligible fuel</u> <u>3d. Mass of each batch of CORSIA eligible fuel produced</u>
<u>Field 4</u>	<u>Fuel type</u>	<u>4a. Type of fuel (i.e., Jet-A, Jet-A1, Jet-B, AvGas)</u> <u>4b. Feedstock used to create the CORSIA eligible fuel</u> <u>4c. Conversion process used to create the CORSIA eligible fuel</u>
<u>Field 5</u>	<u>Fuel Purchased</u>	<u>5a. Proportion of neat CORSIA eligible fuel batch purchased (rounded to the nearest %)</u> <u>Note. - If less than an entire batch of CORSIA eligible fuel is purchased.</u> <u>5b. Total mass of each batch of CORSIA eligible fuel purchased (in tonnes)</u> <u>5c. Mass of neat CORSIA eligible fuel purchased (in tonnes)</u> <u>Note. — Field 5c is equal to the total for all batches of CORSIA eligible fuels reported in Field 5b.</u>
<u>Field 6</u>	<u>Evidence that fuel satisfies the CORSIA</u>	<u>i.e., valid sustainability certification document</u>

	<u>Sustainability Criteria</u>	
<u>Field 7</u>	<u>Life cycle emissions values of the CORSIA eligible fuel</u>	<p><u>7a. Default or Actual Life Cycle Emissions Value (LSf) value for given CORSIA eligible fuel f, which is equal to the sum of 7.b and 7.c (in gCO₂e/MJ rounded to the nearest whole number)</u></p> <p><u>7b. Default or Actual Core Life Cycle Assessment (LCA) value for given CORSIA eligible fuel f (in gCO₂e/MJ rounded to the nearest whole number)</u></p> <p><u>7c. Default Induced Land Use Change (ILUC) value for given CORSIA eligible fuel f (in gCO₂e/MJ rounded to the nearest whole number)</u></p>
<u>Field 8</u>	<u>Intermediate purchaser</u>	<p><u>8a. Name of the intermediate purchaser</u></p> <p><u>8b. Contact information of the intermediate purchaser</u></p> <p><i><u>Note. — This information would be included in the event that the aeroplane operator claiming emissions reductions from the use of CORSIA eligible fuels was not the original purchaser of the fuel from the Producer (e.g., the aeroplane operator purchased fuel from a broker or a distributor). In such cases, the information is needed to demonstrate the complete chain of custody from production to blend point.</u></i></p>
<u>Field 9</u>	<u>Party responsible for shipping of the neat CORSIA eligible fuel to the fuel blender</u>	<p><u>9a. Name of party responsible for shipping of the neat CORSIA eligible fuel to the fuel blender</u></p> <p><u>9b. Contact information of party responsible for shipping</u></p>

		<u>of the neat CORSIA eligible fuel to the fuel blender</u>
<u>Field 10</u>	<u>Fuel Blender</u>	<u>10a. Name of the party responsible for blending neat CORSIA eligible fuel with conventional aviation fuel</u> <u>10b. Contact information of the party responsible for blending neat CORSIA eligible fuel with conventional aviation fuel</u>
<u>Field 11</u>	<u>Location where neat CORSIA eligible fuel is blended with conventional aviation fuel</u>	
<u>Field 12</u>	<u>Date the neat CORSIA eligible fuel was received by blender</u>	
<u>Field 13</u>	<u>Mass of neat CORSIA eligible fuel received (in tonnes)</u>	<u>This number may differ from the number in Field 5.c in cases where only a portion of a batch or batches are claimed by an aeroplane operator.</u>
<u>Field 14</u>	<u>Blend ratio of CORSIA eligible fuel and conventional aviation fuel (rounded to the nearest %)</u>	
<u>Field 15</u>	<u>Documentation demonstrating that the batch or batches of CORSIA eligible fuel were blended into conventional aviation fuel (e.g., the subsequent Certificate of Analysis of the blended fuel)</u>	
<u>Field 16</u>	<u>Mass of neat CORSIA eligible fuel claimed (in tonnes)</u>	

- (2) The information referred to in sub-section (1) shall be provided through to the blend point, and shall include information received from both the unblended fuel producer and the fuel blender.
- (3) An aeroplane operator has the option to decide when to make a CORSIA eligible fuel claim within a given compliance period for all CORSIA eligible fuel received by a blender within that compliance period. For blending that occurs in the second half of the final year of a compliance period, the aeroplane operator and the Director may determine what, if any, flexibility is needed in terms of submitting reports.
- (4) If an aeroplane operator purchases fuel from a supplier downstream from the fuel blender, a fuel supplier shall provide all of the requisite documentation in order for an aeroplane operator to claim the emissions reductions from the use of CORSIA eligible fuels.
- (5) The CORSIA eligible fuels supplementary information to the Emissions Report from the Director to ICAO shall contain the following information:

<u>Field #</u>	<u>Data Field</u>	<u>Details</u>	<u>Notes</u>
<u>Field 1</u>	<u>Production</u>	<u>1a. Production year of CORSIA eligible fuel claimed</u> <u>1b. Producer of CORSIA eligible fuel</u>	
<u>Field 2</u>	<u>Batch of Fuel of CORSIA eligible Fuel</u>	<u>2a. Batch number(s) of each CORSIA eligible fuel claimed</u> <u>2b. Total mass of each batch of CORSIA eligible fuel claimed (in tonnes)</u>	
<u>Field 3</u>	<u>CORSIA eligible Fuel Claimed</u>	<u>3a. Fuel types (i.e., type of fuel, feedstock and conversion process)</u> <u>3b. Total mass of the neat CORSIA eligible fuel (in tonnes) per fuel</u>	<u>This would provide a total mass for each fuel type being claimed by aeroplane operators attributed to the Republic.</u>

		<u>type being claimed by all the aeroplane operators attributed to the Republic.</u>	
<u>Field 4</u>	<u>Emissions Information (per fuel type)</u>	<u>4. Total emissions reductions claimed from the use of a CORSIA eligible fuel (in tonnes)</u>	
<u>Field 5</u>	<u>Emissions Reductions (total)</u>	<u>5. Total emission reductions claimed by all aeroplane operators attributed to the Republic from the use of all CORSIA eligible fuel use (in tonnes)</u>	

Note. – In order to avoid double claiming of CORSIA eligible fuels, information on the following fields can be found in the ICAO document entitled: “CORSIA Central Registry (CCR): Information and Data for Transparency” that is available from the ICAO CORSIA website:

91.10. 12 Verification of Co2 emissions

- (1) A verification body shall be accredited to ISO 14065:2013, and shall comply with the following requirements in order to be eligible to verify an Emissions Report, and Emissions Unit Cancellation Report of an aeroplane operator:
 - (a) if a leader of a verification team undertakes six annual verifications for one aeroplane operator, then a leader of a verification team shall take three consecutive year breaks from providing verification services to that same aeroplane operator. The six-year maximum period includes any greenhouse gas verifications performed for an aeroplane operator prior to it requiring verification services under CAR 91 Subpart 10;
 - (b) a verification body, and any part of the same legal entity, shall not be an aeroplane operator, an owner of an aeroplane operator or owned by an aeroplane operator;
 - (c) a verification body shall also be independent from bodies that trade emission units;
 - (d) a relationship between a verification body and an aeroplane operator shall not be based on common ownership, common governance, common management or personnel, shared resources, common finances and common contracts or marketing;
 - (e) a verification body shall not take over any delegated activities from the aeroplane operator with regard to the preparation of the Emissions Monitoring Plan, the Emissions Report (including monitoring of fuel use and calculation of CO₂ emissions) and the Emissions Unit Cancellation Report where applicable;
 - (f) to enable an assessment of impartiality and independence by the national accreditation body, the verification body shall document how it relates to other parts of the same legal entity.

- (g) a verification body shall establish, implement and document a method for evaluating the competence of the verification team personnel against the competence requirements outlined in respective ISO documents;
- (h) a verification body shall maintain records to demonstrate the competency of the verification team and personnel in accordance with paragraph (g) above;
- (i) a verification body shall:
 - (i) identify and select competent team personnel for each engagement;
 - (ii) ensure appropriate verification team composition for an aviation engagement;
 - (iii) ensure that a verification team includes a team leader who is responsible for the engagement planning and management of the team;
 - (iv) ensure continued competence of all personnel conducting verification activities, including continual professional development and training for verifiers to maintain and/or develop competencies; and
 - (v) conduct regular evaluations of the competence assessment process to ensure continued relevance for CAR 91 Subpart 10.
- (j) a verification team and an independent reviewer, shall demonstrate knowledge of CAR 91 Subpart 10 and relevant ICAO CORSIA documents;
- (k) a verification team and an independent reviewer, shall demonstrate knowledge in the following technical competencies:
 - (i) general technical processes in the field of civil aviation;
 - (ii) aviation fuels and their characteristics, including CORSIA eligible fuel;
 - (iii) fuel related processes including flight planning and fuel calculation;
 - (iv) relevant aviation sector trends or situations that may impact the CO₂ emissions estimate;
 - (v) CO₂ emissions quantification methodologies as outlined in this standard, including assessment of Emissions Monitoring Plans;
 - (vi) fuel use monitoring and measurement devices, and related procedures for monitoring of fuel use related to greenhouse gas emissions, including procedures and practices for operation, maintenance and calibration of such measurement devices;
 - (vii) greenhouse gas information and data management systems and controls, including quality management systems and quality assurance / quality control techniques;
 - (viii) aviation related IT systems such as flight planning software or operational management systems; and
 - (x) knowledge of approved CORSIA Sustainability Certification Schemes relevant for CORSIA eligible fuels, including certification scopes.
- (l) evidence of the technical competencies shall include previous and direct professional experience in a technical capacity within the aviation sector, complemented by appropriate training and education credentials;

- (m) a verification team shall demonstrate knowledge of ISO 14064-3:2006, including demonstrated ability to develop a risk-based verification approach, perform verification procedures including assessing data and information systems and controls, collect sufficient and appropriate evidence and draw conclusions based on that evidence;
- (n) evidence of data and information auditing expertise and competencies shall include previous professional experience in auditing and assurance activities, complemented by appropriate training and education credentials;
- (o) a verification body shall document the roles and responsibilities of the verification personnel, including contracted persons involved in the verification activity;
- (p) a verification body shall not outsource the final decision on a verification and the issuance of a verification statement;
- (q) an independent review shall only be outsourced as long as the outsourced service is appropriate, competent, and covered by the accreditation;
- (r) a verification body shall ensure it has the express consent of an aeroplane operator prior to submission of a Verified Emissions Report, Emissions Unit Cancellation Report where applicable, and a Verification Report to the Director. The mechanism for authorising this consent shall be specified in the contract between a verification body and an aeroplane operator.
- (s) a verification body shall keep records on the verification process for a minimum of ten years, including:
 - (i) client's Emissions Monitoring Plan, Emissions Report and Emissions Unit Cancellation Report where applicable;
 - (ii) Verification Report and related internal documentation;
 - (iii) identification of team members and criteria for selection of team; and
 - (iv) working papers with data and information reviewed by the team in order to allow for an independent party to assess the quality of the verification activities and conformance with verification requirements.
- (t) a contract between a verification body and an aeroplane operator shall specify the conditions for verification by stating:
 - (i) the scope of verification, verification objectives, level of assurance, materiality threshold and relevant verification standards (ISO 14065, ISO 14064-3, Subpart CAR 91 Subpart 10 and the Environment Technical Manual);
 - (ii) amount of time allocated for verification;
 - (iii) flexibility to change time allocation if this proves necessary because of findings during the verification;
 - (iv) conditions which have to be fulfilled to conduct the verification such as access to all relevant documentation, personnel and premises;
 - (v) requirement of the aeroplane operator to accept the audit as a potential witness audit by national accreditation body's assessors;
 - (vi) requirement of the aeroplane operator to authorize the release of the Emissions Report, the Emissions Unit Cancellation Report, where

- applicable, and the Verification Report by the verification body to the Director; and
- (vii) liability coverage.

(2) A verification team shall conduct the Verification of Emissions Report and where applicable, the Emissions Unit Cancellation Report according to ISO 14064-3:2006, and the following additional requirements:

- (a) when conducting the verification of an Emissions Report, a verification body shall perform sufficient procedures to conclude whether:
- (i) greenhouse gas assertion is materially fair and an accurate representation of emissions over the period of the Emissions Report and is supported by sufficient and appropriate evidence;
 - (ii) an aeroplane operator has monitored, quantified and reported its emissions over the period of the Emissions Report in accordance with regulation CAR 91 Subpart 10 and the approved Emissions Monitoring Plan;
 - (iii) an aeroplane operator has correctly applied the method of flight attribution documented in the approved Emissions Monitoring Plan and in accordance with regulation CAR 91 Subpart 10, to ensure a correct attribution of leased aeroplane and international flights, as defined in regulation CAR 91 Subpart 10, operated by other aeroplane operators under the same corporate structure;
 - (iv) the stated amount of emission reductions from the use of CORSIA eligible fuels is materially fair and an accurate representation of emission reductions over the reporting period, and is supported by sufficient and appropriate internal and external evidence;
 - (v) the claimed batches of CORSIA eligible fuels have not also been claimed by the aeroplane operator under any other voluntary or mandatory schemes it has participated in (where the emission reductions from CORSIA eligible fuels may be claimed), during the current compliance period, as well as the compliance period immediately preceding it; and
 - (vi) the aeroplane operator has monitored, calculated and reported its emission reductions associated from the use of CORSIA eligible fuels over the period of the reporting period in accordance with this standard.
- (b) when conducting the verification of an Emissions Report, the scope of the verification shall reflect the period of time and information covered by the Report and the CORSIA eligible fuels claim(s) where applicable. This includes:
- (i) CO₂ emissions from aeroplane fuel monitoring methods, calculated in accordance with regulation CAR 91 Subpart 10; and
 - (ii) Emissions reductions from the use of CORSIA eligible fuel.
- (c) a verification boundary associated with the review of the CORSIA eligible fuel claim(s) shall include the following in a Emissions Report:
- (i) any internal aeroplane operator procedures for CORSIA eligible fuels, including aeroplane operator controls to ensure the claimed CORSIA eligible fuels satisfies the CORSIA Sustainability Criteria;

- (ii) checks for double claiming are limited to the specific aeroplane operator. Any findings outside of this scope are not relevant for the verification statement, however they should still be included in the Verification Report for further consideration by the Director;
 - (iii) assessment of verification risk with appropriate changes to the verification plan; and
 - (iv) assessment of whether there is sufficient access to relevant internal and external information to obtain sufficient confidence in each CORSIA eligible fuel claim.
 - (v) where evidence of the sustainability or the size of the CORSIA eligible fuels claim is considered either inappropriate or insufficient, further information should be sought directly from the fuel producer with direct access facilitated through an aeroplane operator.
- (d) When conducting the verification of an Emissions Report, the verification body shall apply the following materiality thresholds of:
 - (i) 2 per cent for an aeroplane operator with annual emissions on international flights above 500 000 tonnes; and
 - (ii) 5 per cent for an aeroplane operator with annual emissions on international flights equal or less than 500 000 tonnes of CO₂.
 - (iii) when conducting the verification of an Emissions Report, the over and understatements in sub-paragraph (i) shall be allowed to balance out in both cases.
- (e) prior to the development of the verification approach, a verification body shall assess the risk of misstatements and non-conformities and their likelihood of a material effect on the basis of a strategic analysis of an aeroplane operator's greenhouse gas emissions information. A verification body shall revise the risk assessment and modify or repeat the verification activities to be performed;
- (f) a verification team shall prepare a verification plan on the basis of the strategic analysis and assessment of risks. A verification plan shall include a description of the verification activities for each variable that has a potential impact on the reported emissions. The verification team shall consider the assessment of risk, and the requirement to deliver a verification opinion with reasonable assurance, when determining sample size;
- (g) a verification plan shall include the following:
 - (i) verification team members, roles, responsibilities and qualifications;
 - (ii) any external resources required;
 - (iii) schedule of verification activities; and
 - (iv) sampling plan, including the processes, controls and information to be verified and details of the risk assessment conducted to identify these.
- (h) an Emissions Report sampling plan shall include the following:
 - (i) number and type of records and evidence to be examined;
 - (ii) methodology used to determine a representative sample; and
 - (iii) justification for the selected methodology.
- (i) when conducting the verification of an Emissions Unit Cancellation Report, the verification body shall not rely on sampling;

- (j) a verification team shall confirm that the Emissions Report data has been collected in accordance with the approved Emissions Monitoring Plan and monitoring requirements specified in this technical standard;
- (k) verification body shall carry out substantive data testing consisting of analytical procedures and data verification to assess the plausibility and completeness of data in accordance with the Emissions Report sampling plan;
- (l) a verification team shall, as a minimum, assess the plausibility of fluctuations and trends over time or between comparable data items as well as identify and assess immediate outliers, unexpected data, anomalies, and data gaps;
- (m) verification and sampling plans shall be amended, depending on the outcome of Emissions Report data testing and assessment, the assessment of risk, where necessary;
- (n) a verification body shall use an independent reviewer not involved in the verification activities to assess the internal verification documentation, and the Verification Report, prior to its submission to an aeroplane operator and the Director;
- (o) the scope of the independent review includes the complete verification process and shall be recorded in the internal verification documentation;
- (p) an independent review shall be performed to ensure that the verification process has been conducted in accordance with provisions of Technical Standard 91 and ISO 14065:2013, ISO 14064-3:2006 and that the evidence gathered is appropriate and sufficient to enable a verification body to issue a Verification Report with reasonable assurance;
- (q) a verification body shall submit a copy of the Verification Report to an aeroplane operator and upon authorisation by an aeroplane operator, a verification body shall forward a copy of the Verification Report together with the Emissions Report, where applicable, the Emissions Unit Cancellation Report, or both, to the Director;
- (r) a Verification Report shall include:
 - (i) names of the verification body and verification team members
 - (ii) time allocation (including any revisions and dates);
 - (iii) scope of the verification;
 - (iv) main results of impartiality and avoidance of conflict of interest assessment;
 - (v) criteria against which the Emissions Report was verified;
 - (vi) aeroplane operator information and data used by the verification body to cross-check data and carry out other verification activities;
 - (vii) main results of the strategic analysis and assessment of risk;
 - (viii) description of verification activities undertaken, where each was undertaken (on-site vs off-site) and results of checks made on the CO₂ emissions information system and controls;
 - (ix) description of data sampling and testing conducted, including records or evidence sampled, sample size, and sampling method(s) used;
 - (x) the results of all data sampling and testing, including cross-checks;
 - (xi) compliance with the Emissions Monitoring Plan;

- (xii) any non-compliances of the Emissions Monitoring Plan with this standard;
 - (xiii) non-conformities and misstatements identified (including a description of how these have been resolved);
 - (xiv) conclusions on data quality and materiality;
 - (xv) conclusions on the verification of the Emissions Report;
 - (xvi) where applicable, conclusions on the verification of the Emissions Unit Cancellation Report;
 - (xvii) justifications for the verification opinion made by the verification body;
 - (xix) results of the independent review and the name of the independent reviewer; and
 - (xx) concluding verification statement.
- (s) a verification body shall provide a conclusion on each of the verification objectives listed, as applicable, in the concluding verification statement;
 - (t) when conducting the verification of an Emissions Report or an Emissions Unit Cancellation Report, the verification body shall choose between two types of verification opinion statements, either 'verified as satisfactory' or 'verified as not satisfactory';
 - (u) if a Report includes non-material misstatements and / or non-material non-conformities, the Report shall be 'verified as satisfactory with comments', specifying the misstatements and non-conformities;
 - (v) if a Report contains material misstatements and / or material non-conformities, or if the scope of the verification is too limited or a verification body is not able to obtain sufficient confidence in the data, then the Report shall be 'verified as not satisfactory';
 - (w) on request of the Director, a verification body shall disclose the internal verification documentation on a confidential basis; and
 - (x) a verification body shall notify the Director where a previously issued Verification Statement is rendered invalid or inaccurate".

AMENDMENT OF TECHNICAL STANDARD 121

5. Technical Standard 121 is hereby amended by-

- (a) the insertion in technical standard 121.06.2 after section 3 (2)(b)(xiv) of the following sub-paragraphs:
 - “(xv) maintains the mass and balance records for all aircraft;
 - (xvi) completes all required reports and submits them to the operations manager for forwarding to the Authority; and
 - (xvii) management of all ground handling functions, including but not limited to the following:

- (aa) passenger services;
- (bb) baggage services;
- (cc) cabin services;
- (dd) weight and balance control;
- (ee) ground support equipment;
- (ff) fuel services; and
- (gg) ramp operations”.

- (a) the deletion in technical standard 121.06.2 of section 3 (3)(b) of the following sub-paragraphs:

[(xiii) maintains the mass and balance records for all aircraft;

(xiv) completes all required reports and submits them to the operations manager for forwarding to the Authority; and

(xv) management of all ground handling functions, including but not limited to the following:

- (aa) passenger services;**
- (bb) baggage services;**
- (cc) cabin services;**
- (dd) weight and balance control;**
- (ee) ground support equipment;**
- (ff) fuel services; and**
- (gg) ramp operations]**

AMENDMENT OF TECHNICAL STANDARD 127

- 6. Technical standard 127 is hereby amended by the substitution in technical standard 127.07.9 with the following technical standard

"127.07.9 REFUELLING AND DEFUELLING WITH PASSENGERS ON BOARD

[Helicopters may be fuelled with passengers embarking, disembarking or on board under the following conditions:] A helicopter shall not be refuelled, rotors stopped or turning, when

- (a) **[in order to ensure that crew members receive prompt notification of a situation threatening safety such as major fuel spill or a fire, a means is**

established for the ground crew supervising the fuelling to alert the qualified personnel on board the helicopter that the passengers shall disembark or be evacuated as necessary;] passengers are embarking or disembarking; or

- (b) [the helicopter engines are not running unless the helicopter incorporates a rotor brake and the brake is set;] when oxygen is being replenished;

- (c) [during the fuelling process:] the helicopter is refuelled with passengers on board, rotors stopped or turning, it shall be properly attended by sufficient qualified personnel, ready to initiate and direct an evacuation of the helicopter by the most practical, safe and expeditious means available. In order to achieve this:

- (i) helicopter ground power generators or other electrical ground power supplies are not being connected or disconnected;
- (ii) combustion heaters installed on the helicopter [(e.g. integral cabin heaters)] such as integral cabin heaters are not operated;
- (iii) [known high-energy equipment such as High Frequency (HF) radios are not operated, unless in accordance with the helicopter manufacturer's approved flight manual where the manual contains procedures for the use of this equipment during fuelling;] a constant two-way communication is maintained by the helicopter's inter-communication system or other suitable means between the ground crew supervising the refuelling and the qualified personnel on board the helicopter;
- (iv) weather-mapping radar equipment in the helicopter is not operated unless in accordance with the manufacturer's approved helicopter flight manual where the manual contains procedures for use of the radar equipment during fuelling;
- (v) helicopter batteries are not being removed or installed;
- (vi) helicopter-borne APUs which have an efflux discharging into the zone are not started after filler caps are removed or fuelling connections are made;
- (vii) if an auxiliary power unit is stopped for any reason during fuelling it shall not be restarted until the flow of fuel has ceased and there is no risk of igniting fuel vapours; however, the APU may be operated in accordance with the manufacturer's approved helicopter flight manual if the manual contains procedures for starting the APU during fuelling;
- (viii) electric tools or similar tools likely to produce sparks or arcs are not being used; [and]
- (ix) photographic equipment is not used within 3 metres of the fuelling equipment or the fill or vent points of the helicopter fuel systems;

- (x) the flight crew shall ensure that the passengers are briefed on what actions to take if an incident occurs during refuelling; and

Note. — Caution needs to be exercised when using radios for this purpose due to the potential for stray currents and radio-induced voltages.

- (xi) during an emergency shutdown procedure, the flight crew shall ensure that any personnel or passengers outside the helicopter are clear of the rotor area.
- (d) fuelling is immediately suspended when there are lightning discharges within 8 km of the aerodrome;
- (e) **[the]** a helicopter is fuelled in accordance with manufacturer's procedures for that type of helicopter;
- (f) **[the]** a helicopter emergency lighting system is armed or on, if applicable;
- (g) "No Smoking" signs on board the helicopter is illuminated, if installed;
- (h) procedures are established to ensure that passengers do not smoke, operate portable electronic devices or otherwise produce sources of ignition;
- (i) at least the entry door through which the passengers embarked is designated as the evacuation exit during fuelling and is open;
- (j) the designated evacuation exits during fuelling are identified by helicopter type and published in the operator's operations manual and are clear and available for immediate use by passengers and crew members **[should]** if an evacuation **[be]** is required;
- (k) the operator has procedures in place to ensure that there is a ready escape route from each designated evacuation exit during fuelling;
- (l) a member of the flight crew or a person designated by the operator who has received training in fuelling operations with passengers on board shall be in attendance and identified to the passengers as the person responsible for cabin safety during the fuelling procedures; **[and]**
- (m) the emergency exit shall be opposite to where the refuelling or defueling is taking place~~[.]~~;
- (n) doors on the refuelling side of a helicopter remain closed where possible, unless these are the only suitable exits;
- (o) doors on the non-refuelling side of the helicopter remain open, weather permitting, unless otherwise specified by the RFM;
- (p) fire-fighting facilities of the appropriate scale must be positioned so as to be immediately available in the event of a fire;
- (q) if the presence of fuel vapour is detected inside the helicopter, or any other hazard arises during refuelling, fuelling shall be stopped immediately;
- (r) the ground or deck area beneath the exits intended for emergency evacuation shall be kept clear;
- (s) seat belts shall be unfastened to facilitate rapid egress;
- (t) with rotors turning, only ongoing passengers shall remain on board;
- (u) a helicopter shall not be refueled with AVGAS (aviation gasoline) or wide-cut

type fuel or a mixture of these types of fuel, when passengers are on board;
and

- (v) a helicopter shall not be defueled at any time when:
- (i) passengers remain on board; or
 - (ii) passengers are embarking or disembarking; or
 - (iii) oxygen is being replenished”.

AMENDMENT OF TECHNICAL STANDARD 128

7. Technical standard 128 is hereby amended by the substitution in technical standard 128.07.8 with the following technical standard: –

“128.07.8 REFUELLING AND DEFUELING WITH PERSONS ON BOARD

A Helicopter[s] may be fuelled with persons embarking, disembarking or on board under the following conditions –

- (a) in order to ensure that crew members receive prompt notification of a situation threatening safety such as major fuel spill or a fire, a means is established for the ground crew supervising the fuelling to alert the qualified personnel on board the helicopter that the persons **[must] shall** disembark or be evacuated as necessary;
- (b) the helicopter engines are not running unless **[the] a** helicopter incorporates a rotor brake and the brake is set;
- (c) during the fuelling process:
 - (i) helicopter ground power generators or other electrical ground power supplies are not being connected or disconnected;
 - (ii) combustion heaters installed on the helicopter **[(e.g. integral cabin heaters)]** such as integral cabin heaters are not operated;
 - (iii) known high-energy equipment such as High Frequency (HF) radios are not operated, unless in accordance with the helicopter manufacturer's approved flight manual where the manual contains procedures for the use of this equipment during fuelling;
 - (iv) weather-mapping radar equipment in the helicopter is not operated unless in accordance with the manufacturer's approved helicopter flight manual where the manual contains procedures for use of the radar equipment during fuelling;
 - (v) helicopter batteries are not being removed or installed;
 - (vi) helicopter-borne APUs which have an efflux discharging into the zone are not started after filler caps are removed or fuelling connections are made;
 - (vii) if an auxiliary power unit is stopped for any reason during fuelling it shall not be restarted until the flow of fuel has ceased and there is no risk of igniting fuel vapours; however, the APU may be operated in accordance

- with the manufacturer's approved flight manual if the manual contains procedures for starting the APU during fuelling;
- (viii) electric tools or similar tools likely to produce sparks or arcs are not being used; **[and]**
- (ix) photographic equipment is not used within 3 meter of the fuelling equipment or the fill or vent points of the helicopter fuel systems; and
- (x) when a helicopter is refuelled with passengers on board, rotors stopped or turning, it shall be properly attended by sufficiently qualified personnel, ready to initiate and direct an evacuation of a helicopter by the practical, safe and expeditious means available.
- (d) fuelling is immediately suspended when there are lightning discharges within 8 km of the aerodrome;
- (e) **[the]** a helicopter is fuelled in accordance with manufacturer's procedures for that type of a helicopter;
- (f) **[The]** a helicopter emergency lighting system is armed or on, if applicable;
- (g) "No Smoking" signs on board the helicopter are illuminated, if installed;
- (h) procedures are established to ensure that people on board do not smoke, operate portable electronic devices or otherwise produce sources of ignition;
- (i) at least the entry door through which the people embark is designated as the evacuation exit during fuelling and is open;
- (j) the designated evacuation exits during fuelling are identified by helicopter type and published in the operator's operations manual and are clear and available for immediate use by all persons on board, including crew members, **[should]** if an evacuation [be] is required;
- (k) **[the]** an operator has procedures in place to ensure that there is a ready escape route from each designated evacuation exit during fuelling;
- (l) a member of the flight crew or a person designated by the operator who has received training in fuelling operations with persons on board shall be in attendance and identified to the persons as the person responsible for cabin safety during the fuelling procedures; **[and]**
- (m) the emergency exit shall be opposite to where the refuelling or defueling is taking place~~[.]~~; and
- (n) a helicopter shall not be refuelled, rotors stopped or turning, when:
 - (i) passengers are embarking or disembarking; or
 - (ii) when oxygen is being replenished".

AMENDMENT OF TECHNICAL STANDARD 139

8. Document SA CATS 139 is hereby amended by:

- (a) the insertion after the definition of "obstacles limitation surfaces" of the following definition:

“Outer main gear wheel span (OMGWS)” means the distance between the outside edges of the main gear wheels”.

- (b) the insertion of the following technical standards:

“139.01.10 Lights which endanger the safety of aircraft

1. Lights which may endanger the safety of aircraft

- (1) An aerodrome licence holder shall establish a procedure to monitor and control non aeronautical lights.
- (2) For laser emissions which may endanger the safety of aircraft and in order to protect the safety of aircraft against the hazardous effects of laser emitters, the following protected zones shall be established around aerodromes:
 - (a) a laser-beam free flight zone (LFFZ);
 - (b) a laser-beam critical flight zone (LCFZ); and
 - (c) a laser-beam sensitive flight zone (LSFZ).
- (3) Figures referred as 1, 2 and 3 may be used to determine the exposure levels and distances that adequately protect flight operations:
 - (a) the restrictions on the use of laser beams in the three protected flight zones, (LFFZ), (LCFZ) and (LSFZ), refer to visible laser beams only;
 - (b) laser emitters operated by the authorities in a manner compatible with flight safety are excluded;
 - (c) in all navigable airspace, the irradiance level of any laser beam, visible or invisible, is expected to be less or equal to the maximum permissible exposure (MPE) unless such emission has been notified to the Authority and permission obtained; and
 - (d) the protected flight zones are established in order to mitigate the risk of operating laser emitters in the vicinity of aerodromes.

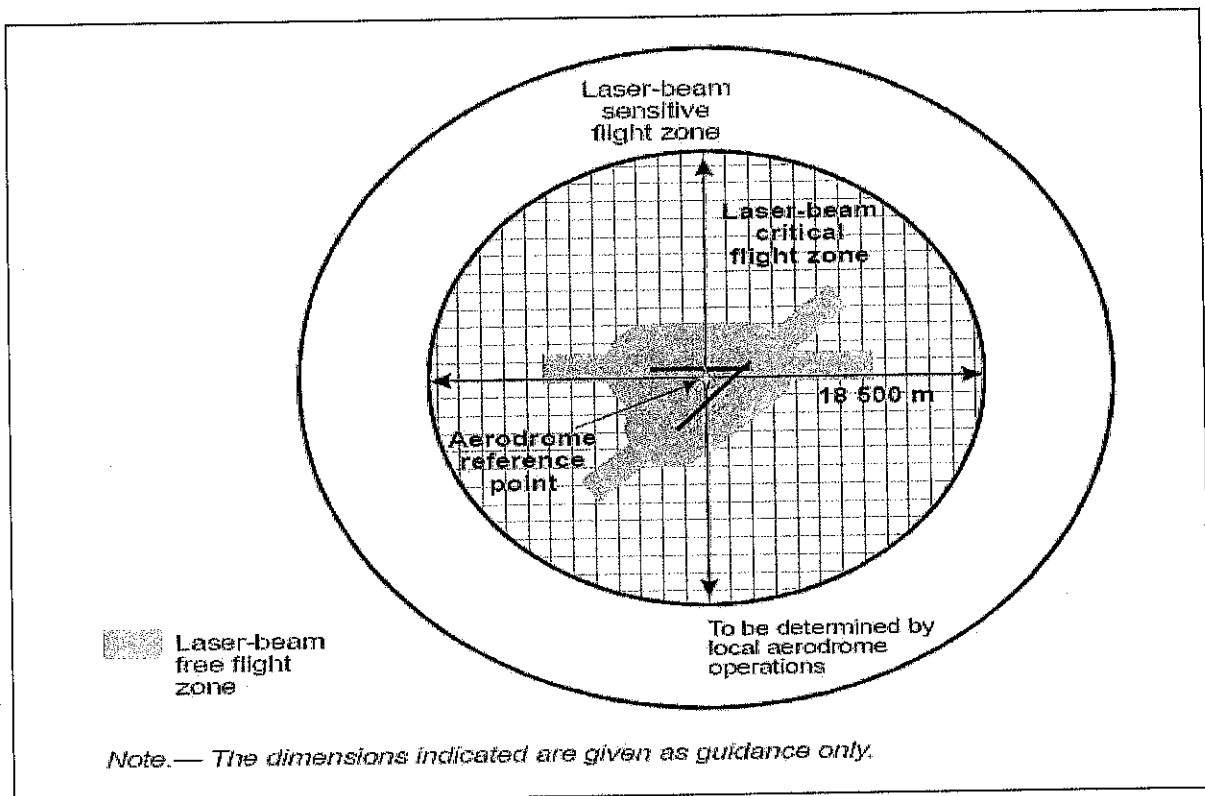


Figure 1: Protected flight zones

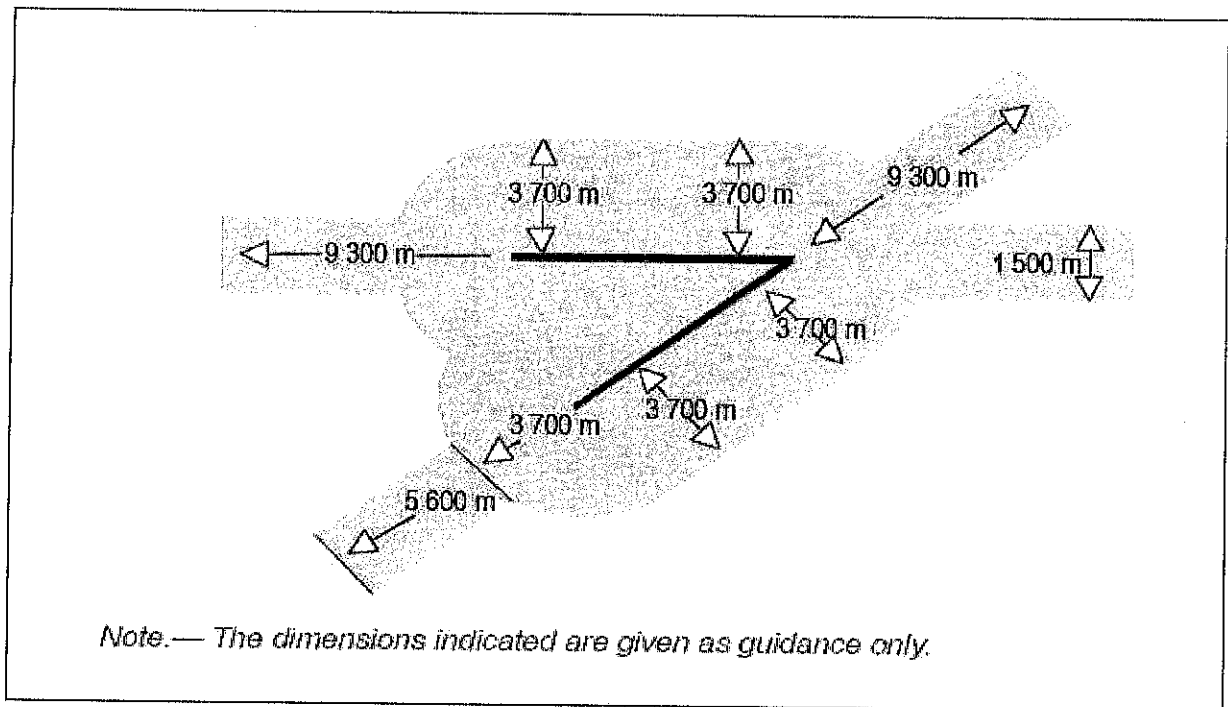


Figure 2: Multiple runway laser-beam free flight zone

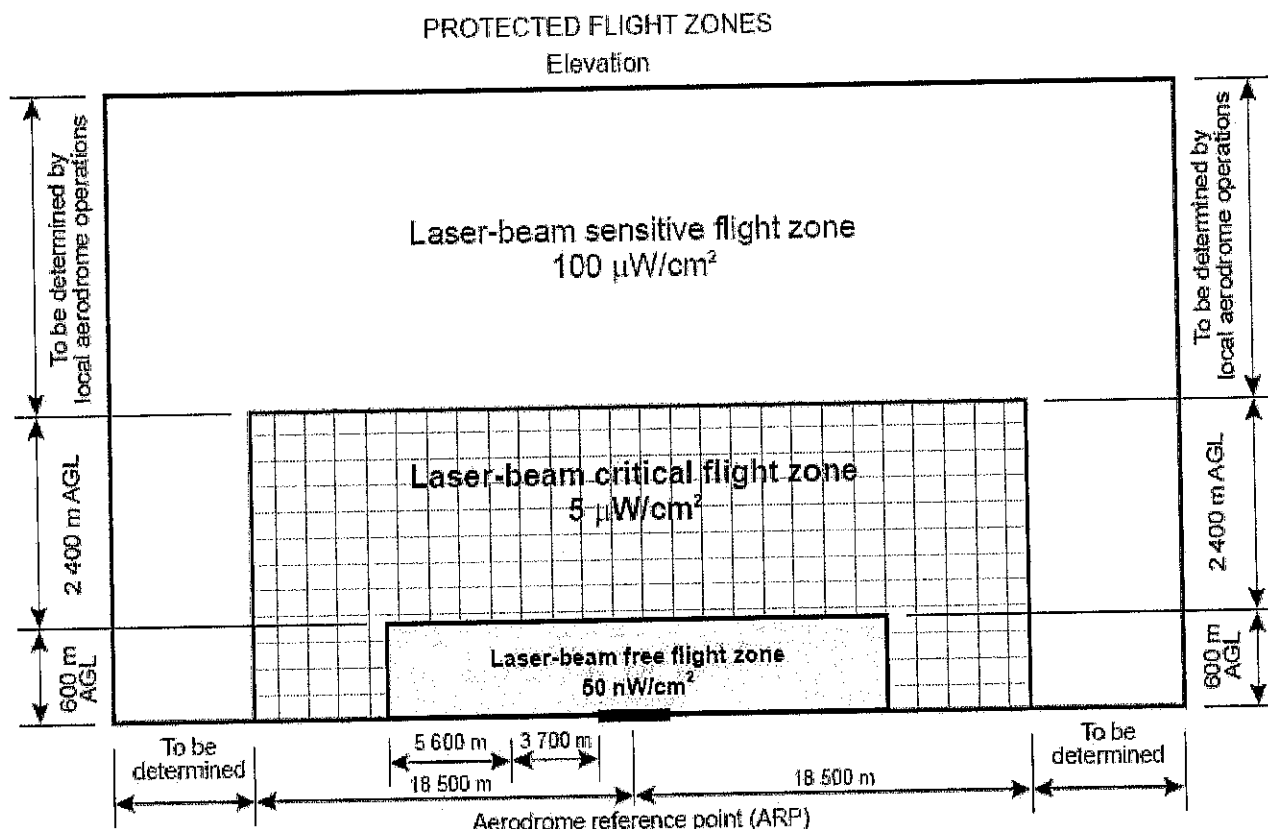


Figure 3: Protected flight zones with indication of maximum irradiance levels for visible beams

2. Lights which may cause confusion

- (1) With reference to lights that may cause confusion, attention shall be directed to a non-aeronautical ground light visible from the air within the areas described hereunder, when creating procedures at an aerodrome:
 - (a) instrument runway – code number 4: within the areas before the threshold and beyond the end of the runway extending at least 4500 m in length from the threshold and runway end and 750 m either side of the extended runway centre line in width.
 - (b) instrument runway – code number 2 or 3: as in a), except that the length shall be at least 3 000 m.
 - (c) instrument runway – code number 1; and non-instrument runway: within the approach area.

3. Aeronautical ground lights which may cause confusion to mariners

In the case of aeronautical ground lights near navigable waters, consideration needs to be provided to ensure that the lights do not cause confusion to mariners".

(c) the deletion in Technical Standard 132.02.1 of section 1 of the following section:

[1. Physical characteristics

1.1 Runways

(1) Aerodrome reference code

- (a) An aerodrome reference code — code number and letter — which is selected for aerodrome planning purposes; shall be determined in accordance with the characteristics of the aeroplane for which an aerodrome facility is intended.
- (b) The code number for element 1 shall be determined from Table 1, column 1, selecting the code number corresponding to the highest value of the aeroplane reference field lengths of the aeroplanes for which the runway is intended

Table 1: Aerodrome reference code

Code Number	Aeroplane reference field length	Code letter	Wing span	Outer main gear wheel span
1	Less than 800 m	A	Up to but not including 15 m	Up to but not including 4,5 m
2	800 m up to but not including 1200 m	B	15 m up to but not including 24 m	4,5 m up to but not including 6 m
3	1200 m up to but not including 1800 m	C	24 m up to but not including 36 m	6 m up to but not including 9 m
4	1800 m and over	D	36 m up to but not including 52 m	9 m up to but not including 14 m
		E	52 m up to but not including 65 m	9 m up to but not including 14 m
		F	65 m up to but not including 80 m	14 m up to but not including 16 m

(2) Runway width

- (a) The width of a runway shall be not less than the appropriate dimension specified in table2.

- (b) The width of a precision approach runway shall be not less than 30m where the code number is 1 or 2.

Table 2: Runway widths

Code Number	Code Letter					
	A	B	C	D	E	F
1	18m	18m	23m	-	-	-
2	23m	23m	30m	-	-	-
3	30m	30m	30m	45m	-	-
4	-	-	45m	45m	45m	60m

(3) Runway length

- (a) Except where a runway is associated with a stopway or clearway, the actual runway length to be provided for a primary runway shall be adequate to meet the operational requirements of the aircraft for which the runway is intended to serve.
- (b) The surface of runways shall –
- be constructed without irregularities that shall impair the runway surface friction characteristics or otherwise adversely affect the take-off or landing of an aircraft;
 - be so constructed or resurfaced as to provide friction characteristics at or above the minimum friction level specified by the Director.

Table 3: Friction levels for new and existing runway surfaces

Test equipment	Test tire type	Test tire pressure (KPa)	Test Speed (km/h)	Test water depth (mm)	Design objective new surface	Maintenance planning level	Minimum friction level
Mu-meter trailer	A		65	1.0	0,72		0,42
	A	70 70	95	1.0	0,66	0,52 0,38	0,26
Skiddometer Trailer	B		65	1.0	0,82		0,50
	B	210 210	95	1.0	0,74	0,60 0,47	0,34
Surface Friction Tester Vehicle	B		65	1.0	0,82		0,50
	B	210 210	95	1.0	0,74	0,60 0,47	0,34

Runway Friction Tester Vehicle	B B	210 210	65 95	1.0 1.0	0,82 0,74	0,60	0,54	0,50 0,41
TATRA Friction Tester Vehicle	B B	210 210	65 95	1.0 1.0	0,76 0,67	0,57	0,52	0,48 0,42
Grip Tester Trailer	C C	140 140	65 95	1.0 1.0	0,74 0,64	0,53	0,36	0,43 0,24

(4) Runway slopes

(a) Longitudinal slopes:

The overall longitudinal slope, calculated by dividing the difference in elevation between the runway ends by the length of the runway, shall not exceed 1% (1:100) for runways where the code number is 3 or 4 and 2% (1:50) for runways where the code number is 1 or 2.

(b) Local longitudinal slopes on runways shall not exceed –

- (i) 1.25% (1:80) where the code number is 4;
- (ii) 1.5% (1:66) where the code number is 3;
- (iii) 2.0% (1:50) where the code number is 1 or 2.

(c) The first and last quarters of precision approach runways Category II or III, the longitudinal slope shall not exceed 0.8% (1:125).

(d) Longitudinal slope changes along a runway have an effect on the operation of aircraft which is in direct ratio to the slope change and inverse ratio to the length of transition between successive slopes. Slope changes shall be minimised on new construction and wherever possible on existing runways during the course of major runway maintenance.

(e) Where a slope cannot be avoided, the change between two consecutive slopes shall not exceed –

- (i) 1.5% where the code number is 3 or 4;
- (ii) 2.0% where the code number is 1 or 2.

(f) The transition from one slope to another shall be accomplished by a curved surface with a rate of change not exceeding –

- (i) 0.1% per 30m (minimum radius of curvature of 30 000m) where the code number is 4;
- (ii) 0.2% per 30m (minimum radius of curvature of 15 000m) where the code number is 3;
- (iii) 0.4% per 30m (minimum radius of curvature of 7500m) where the code number is 1 or 2.

(g) Rapid drainage of water from a paved runway is assisted by a cambered surface. The surface of a new runway shall be cambered. However, a single cross-fall from high to low in the direction of the wind flow most

frequently associated with rain may ensure a more rapid drainage of water.

- (h) The transverse slope on either side of the crown shall be symmetrical and shall be 1,5% (1:66) where the code letter is C, D, E or F; and 2% (1:50) where the code letter is A or B; but shall not exceed 1,5% or 2% as applicable, nor be less than 1% except at runway or taxiway intersections where flatter slopes may be necessary.
- (i) A 1.5% slope shall be provided on a straight cross-fall.

(5) Runway shoulders

- (a) Runway shoulders shall be provided for a runway where –
 - (i) the code letter is D or E, and the runway width is less than 60 m;
 - or
 - (ii) the code letter is F.
- (b) The runway shoulders shall extend symmetrically on each side of the runway so that the overall width of the runway and its shoulders is not less than –
 - (i) 60m where the code letter is D or E; and
 - (ii) 75m where the code letter is F.
- (c) The surface of the shoulder that abuts the runway shall be flush with the surface of the runway and its transverse slope shall not exceed 2.5%.
- (d) A runway shoulder shall be prepared or constructed so as to be capable of supporting ground vehicles which may operate on the shoulder and, in the event of an aircraft running off the runway, of supporting the aircraft without inducing structural damage to the aircraft.
- (6) Runway turn pads
 - (a) Where the end of a runway is not served by a taxiway or a taxiway turnaround and where the code letter is D, E or F, a runway turn pad shall be provided to facilitate a 180-degree turn of aircraft.
 - (b) The design of a runway turn pad shall be such that when the cockpit of the aircraft for which the turn pad is intended remains over the turn pad marking, the clearance distance between any wheel of the aircraft landing gear and the edge of the turn pad shall be not less than 4.5m.
 - (c) The surface of a runway turn pad shall not have surface irregularities that may cause damage to an aircraft using the turn pad.

(7) Runway strips

- (a) A strip shall extend before the threshold and beyond the end of the paved runway or stopway for a distance of at least –
 - (i) 60m where the aerodrome reference code is 2, 3 or 4;
 - (ii) 60m where the aerodrome reference code 1 instrument.
 - (iii) 30m where the aerodrome reference code 1 non-instrument.
- (b) A strip including a precision approach runway shall, wherever practicable, extend laterally to a distance of at least –

- (i) 150m where the code number is 3 or 4-; and
 - (ii) 75m where the code number is 1 or 2-, on each side of the centre line of the runway and its extended centre line throughout the length of the strip.
 - (c) A strip including a non-precision approach runway shall extend laterally to a distance of at least –
 - (i) 150m where the code number is 3 or 4-; and
 - (ii) 75m where the code number is 1 or 2-,
 on each side of the centre line of the runway and its extended centre line throughout the length of the strip.
 - (d) A strip including a non-instrument runway shall extend on each side of the centre line of the runway and its extended centre line throughout the length of the strip, to a distance of at least –
 - (i) 75m where the code number is 3 or 4;
 - (ii) 40m where the code number is 2; and
 - (iii) 30m where the code number is 1.
 - (e) No fixed object, other than visual aids required for air navigation purposes and satisfying the relevant frangibility requirements shall be permitted on a runway strip –
 - (i) within 77.5m of the runway centre line of a precision approach runway category I, II or III where the code number is 4 and the code letter is F; or
 - (ii) within 60m of the runway centre line of a precision approach runway category I, II or III where the code number is 3 or 4; or
 - (iii) within 45m of the runway centre line of a precision approach runway category I where the code number is 1 or 2.
 - (f) No mobile object shall be permitted on those parts of the runway strip as prescribed in paragraph (a) during use of the runway for landing or take-off.
 - (g) The surface of that portion of a strip that abuts a runway, shoulder or stopway shall be flush with the surface of the runway, shoulder or stopway.
- (8) Runway end safety area (RESA)
- (a) A RESA shall extend to a distance of at least 90 metres from the end of the runway strip.
 - (b) If required by the Director, RESA may extend –
 - (i) to a distance of at least 240 metres from the end of the runway strip; or
 - (ii) to the greatest distance that is practicable between the 90 metres required in paragraph(a) and the 240 metres required sub-paragraph (i).

- (c) The width of a RESA shall –
 - (i) be at least twice the width of the associated runway and be positioned symmetrically on either side of the extended centre line of the runway; and
 - (ii) where practicable, be equal to the width of the graded portion of the associated runway strip.
- (d) A RESA shall be constructed to –
 - (i) provide a cleared and graded area to reduce the risk of damage to an aircraft that undershoots or overruns the runway; and
 - (ii) be clear of any object which might endanger an aircraft that undershoots or overruns the runway.
- (e) A RESA shall not penetrate the approach or take-off climb surface for the runway.
- (f) If a RESA has a longitudinal slope –
 - (i) any downward shall not exceed 5%;
 - (ii) slope changes shall be as gradual as practicable; and
 - (iii) abrupt changes or sudden reversals of slopes shall be avoided.
- (g) If a RESA has a transverse slope –
 - (i) any upward or downward slope shall not exceed 5%; and
 - (ii) slope changes shall be as gradual as practicable.
- (h) A RESA shall be provided for –
 - (i) Code 3 and 4 runways; and
 - (ii) Code 1 and 2 instrument runways.

(9) Clearways

- (a) Where applicable, the clearway shall –
 - (i) be at the end of the take-off run available;
 - (ii) not have a length exceeding half the length of the take-off run available;
 - (iii) extend laterally to a distance of at least 75m on each side of the extended centre line of the runway.
 - (iv) not project above a plane having an upward slope of 1.25 %, the lower limit of this plane being a horizontal line which is perpendicular to the vertical plane containing the runway centre line; and
 - (v) passes through a point located on the runway centre line at the end of the take-off run available.
- (b) An object situated on a clearway which may endanger aircraft in the air shall be regarded as an obstacle and shall be removed.

(10) Stopways

- (a) A stopway shall have the same width as the runway with which it is associated.

- (b) Slopes and changes in slope on a stopway shall comply with the longitudinal slopes of the associated runway.
 - (c) A stopway shall be prepared or constructed so as to be capable, in the event of an abandoned take-off, of supporting the aircraft which the stopway is intended to serve without inducing structural damage to the aircraft.
 - (d) The surface of a paved stopway shall be so constructed or resurfaced as to provide surface friction characteristics at or above those of the associated runway.
- (11) Radio Altimeter operating area
- (a) A radio altimeter operating area shall be established in the pre-threshold area of a precision approach runway.
 - (b) A radio altimeter operating area shall extend before the threshold for a distance of at least 300m.
 - (c) A radio altimeter operating area shall extend laterally, on each side of the extended centre line of the runway, to a distance of 60m, except that, when special circumstances so warrant, the distance may be reduced to no less than 30m if an aeronautical study indicates that such reduction shall not affect the safety of operations of aircraft.
 - (d) On a radio altimeter operating area, slope changes shall be avoided or kept to a minimum.
 - (e) Where slope changes cannot be avoided, the slope changes shall be as gradual as practicable and abrupt changes or sudden reversals of slopes avoided. The rate of change between two consecutive slopes shall not exceed 2% per 30m.
- (12) Taxiways
- (a) The design of a taxiway shall be such that, when the cockpit of the aircraft for which the taxiway is intended remains over the taxiway centre line markings, the clearance distance between the outer main wheel of the aircraft and the edge of the taxiway shall be not less than that provided by Table 4.

Table 4: Clearance distance between outer main wheel of an aeroplane and the edge of the taxiway

Code letter	Clearance
A	1.5m
B	2.25m
C	3m on straight portions
	3 m on curved portions if the taxiway is intended to be used by aircraft with a wheel base less than 18 m

	4.5 m on curved portions if the taxiway is intended to be used by aircraft with a wheel base equal to or greater than 18 m
D	4.5m
E	4.5m
F	4.5m

Table 5: Taxiway widths

- (b) A straight portion of a taxiway shall have a width of not less than that provided by the following tabulation-

Code letter	Taxiway width
A	7.5m
B	10.5m
C	15m
D	18m if the taxiway is intended to be used by aircraft with an outer main gear wheel span of less than 9m
	23m if the taxiway is intended to be used by aircraft with an outer main gear wheel span equal to or greater than 9m
E	23m
F	25m

- (c) The separation distance between the centre line of a taxiway and the centre line of a runway, the centre line of a parallel taxiway or an object shall not be less than the appropriate dimension specified in Table 6 Taxiway minimum separation distances.

Table 6: Taxiway minimum separation

Code letter	Distance between taxiway centre line and runway centre line (metres)								Taxiway centre line to taxiway centre line (metres)	Taxiway, other than aircraft stand taxilane, centre line to object (metres)	Aircraft stand taxilane centre line to aircraft stand taxilane centre line (metres)	Aircraft stand taxilane centre line to object (metres)
	Instrument runways Code number				Non-instrument runways Code number							
	1	2	3	4	1	2	3	4				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
A	82.5	82.5	—	—	37.5	47.5	—	—	23	15.5	19.5	12
B	87	87	—	—	42	52	—	—	32	20	28.5	16.5
C	—	—	168	—	—	—	93	—	44	26	40.5	22.5

D	—	—	176	176	—	—	101	101	63	37	59.5	33.5
E	—	—	—	182.5	—	—	—	10 7.5	76	43.5	72.5	40
F	—	—	—	190	—	—	—	11 5	91	51	87.5	47.5

Note 1 - The separation distances shown in columns (2) to (9) represent ordinary combinations of runways and taxiways. The basis for development of these distances is provided in the Aerodrome Design Manual (Doc 9157), Part 2.

Note 2 - The distances in columns (2) to (9) do not guarantee sufficient clearance behind a holding aeroplane to permit the passing of another aeroplane on a parallel taxiway. See the Aerodrome Design Manual (Doc 9157), Part 2.

- (d) The strength of a taxiway shall be at least equal to that of the runway it serves, due consideration being provided to the fact that a taxiway shall be subjected to a greater density of traffic and, as a result of slow moving and stationary aircraft, to higher stresses than the runway it serves.

(13) Taxiway slopes

- (a) The longitudinal slopes of taxiways shall be kept to a minimum to avoid tracking or handling problems. The longitudinal slopes shall not exceed-
- (i) 1,5% (1:66) where the code letter is C, D, E or F; and
 - (ii) 3,0% (1:33) where the code letter is A or B.
- (b) Where longitudinal slope changes on a taxiway cannot be avoided, the transition from one slope to another shall be accomplished by a curved surface with a rate of change not exceeding:
- (i) 1% per 30m (minimum radius of curvature of 3000m) where the code letter is C, D, E or F; and
 - (ii) 1% per 25m (minimum radius of curvature of 2500m) where the code letter is A or B.
- (c) The transverse slope of a taxiway shall be sufficient to prevent the accumulation of water, but shall not exceed:
- (i) 1,5% (1:66) where the code letter is C, D, E or F;
 - (ii) 2,0% (1:50) where the code letter is A or B

(14) Taxiway Shoulders

- (a) Straight portions of a taxiway where the code letter is C, D, E or F shall be provided with shoulders which extend symmetrically on each side of the taxiway so that the overall width of the taxiway and its shoulders on straight portions is not less than:
- (i) 60m where the code letter is F;
 - (ii) 44m where the code letter is E;
 - (iii) 38m where the code letter is D; and

- (iv) 25m where the code letter is C.
- (b) On taxiway curves and on junctions or intersections where increased pavement is provided, the shoulder width shall be not less than that on the adjacent straight portions of the taxiway.

(15) Taxiway Strips

- (a) A taxiway, other than an aircraft stand taxilane, shall be included in a strip.
- (b) A taxiway strip shall extend symmetrically on each side of the centre line of the taxiway throughout the length of the taxiway to at least the distance from the centre line provided in Table 6, column 11.
- (c) The taxiway strip shall provide an area clear of objects which may endanger taxiing aircraft.
- (d) The centre portion of a taxiway strip shall provide a graded area to a distance from the centre line of the taxiway of at least:
 - (i) 11m where the code letter is A;
 - (ii) 12.5m where the code letter is B or C;
 - (iii) 19m where the code letter is D;
 - (iv) 22m where the code letter is E; and
 - (v) 30m where the code letter is F.
- (e) The surface of the strip shall be flush at the edge of the taxiway or shoulder, if provided, and the graded portion shall not have an upward transverse slope exceeding:
 - (i) 2.5% for strips where the code letter is C, D, E or F; and
 - (ii) 3% for strips of taxiways where the code letter is A or B.
- (f) The downward transverse slope shall not exceed 5% measured with reference to the horizontal.

(16) Holding bays, runway-holding positions, intermediate holding positions and road-holding positions

- (a) A runway-holding position shall be established
 - (i) on the taxiway, at the intersection of a taxiway and a runway; and
 - (ii) at an intersection of a runway with another runway when the former runway is part of a standard taxi-route.
- (b) A runway-holding position shall be established on a taxiway if the location or alignment of the taxiway is such that a taxiing aircraft or vehicle can infringe an obstacle limitation surface or interfere with the operation of radio navigation aids.
- (c) A road-holding position shall be established at an intersection of a road with a runway.
- (d) A runway-holding position shall be established:
 - (i) on the taxiway, at the intersection of a taxiway and a runway; and

- (ii) at an intersection of a runway with another runway when the former runway is part of a standard taxi-route.
- (e) A runway-holding position shall be established on a taxiway if the location or alignment of the taxiway is such that a taxiing aircraft or vehicle can infringe an obstacle limitation surface or interfere with the operation of radio navigation aids.
- (f) A road-holding position shall be established at an intersection of a road with a runway.
- (g) The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the centre line of a runway shall be in accordance with table 7 and, in the case of a precision approach runway, such that a holding aircraft or vehicle shall not interfere with the operation of radio navigation aids.
- (h) For a precision instrument approach runway, code numbers 3 and 4, the distance of 90m shall be increased to 107,5m where the code letter is F.

Table 7: Distance between runway centreline and road-holding position or holding bay and runway holding position at a taxiway/runway intersection

Type of Runway	Code Number			
	1	2	3	4
Non-instrument and Take-off	30m	40m	75m	75m
Non-precision approach	40m	40m	75m	75m
Precision approach category 1	60m	60m	90m	90m
Precision approach categories II and III	-	-	90m	90m

- (i) The location of a runway-holding position established in accordance with paragraph (e) shall be such that a holding aircraft or vehicle shall not infringe the obstacle free zone, approach surface, take-off climb surface or ILS/MLS critical/ sensitive area or interfere with the operation of radio navigation aids.
- (17) Aprons
- (a) An apron shall be provided to permit the on- and off-loading of passengers, cargo or mail as well as the servicing of aircraft without interfering with the aerodrome traffic.
 - (b) Each part of an apron shall be capable of withstanding the traffic of an aircraft it is intended to serve, due consideration being provided to the fact that some portions of the apron shall be subjected to a higher density of traffic and, as a result of slow moving or stationary aircraft.
 - (c) Slopes on an apron, including those on an aircraft stand taxilane, shall be sufficient to prevent accumulation of water on the surface of the apron

but shall be kept as level as drainage requirements permit. The maximum slope allowable is 1%.

- (d) An aircraft stand shall provide the following minimum clearances between an aircraft entering or exiting the stand and any adjacent building, aircraft on another stand and other objects:

Table 8: aircraft stand minimum clearance distances

Code letter	Clearance
A	3m
B	3m
C	4.5m
D	7.5m
E	7.5m
F	7.5m

(18) Isolated aircraft parking position

An isolated aircraft parking position shall be designated or the aerodrome control tower shall be advised of an area or areas suitable for the parking of an aircraft which is known or believed to be the subject of unlawful interference, or which for other reasons needs isolation from normal aerodrome activities.

(19) Obstacle limitation surfaces

- (a) The following obstacle limitation surfaces shall be established for a runway
- (i) conical surface; and
 - (ii) inner horizontal surface;
 - (iii) approach surface; and
 - (iv) transitional surfaces
- (b) The following additional obstacle limitation surfaces shall be established for a precision approach runway category II or III:
- (i) inner approach surface;
 - (ii) inner transitional surfaces; and
 - (iii) balked landing surface.
- (c) For a non-instrument runway, new objects or extensions of existing objects shall not be permitted above an approach or transitional surface except when the new object or extension shall be shielded by an existing

immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft.

- (d) For a non-precision approach runway, new objects or extensions of existing objects shall not be permitted above an approach surface within 3000m of the inner edge or above a transitional surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft.
- (e) For a precision approach runway fixed objects shall not be permitted above the inner approach surface, the inner transitional surface or the balked landing surface, except for frangible objects which because of their function shall be located on the strip. Mobile objects shall not be permitted above these surfaces during the use of the runway for landing.
- (f) For a precision approach runway, new objects or extensions of existing objects shall not be permitted above an approach surface or a transitional surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft.
- (g) A take-off climb surface shall be established for a runway meant for take-off.
- (h) New objects or extensions of existing objects shall not be permitted above a take-off climb surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft.

(20) Visual aids for navigation

Wind direction indicator

- (a) An aerodrome shall be equipped with at least one wind direction indicator.
- (b) A wind direction indicator shall be located so as to be visible from aircraft in flight or on the movement area and in such a way as to be free from the effects of air disturbances caused by nearby objects.
- (c) The wind direction indicator shall –
 - (i) be in the form of a truncated cone made of fabric and shall have a length of not less than 3.6m and a diameter, at the larger end, of not less than 0.9m; and
 - (ii) be constructed so that it gives a clear indication of the direction of the surface wind and a general indication of the wind speed.

- (d) The colour or colours shall be selected to make the wind direction indicator clearly visible and understandable from a height of at least 300m, having regard to background.
- (e) Where practicable, a single colour, preferably white or orange, shall be used.
- (f) The location of at least one wind direction indicator shall be marked by a circular band 15 m in diameter and 1.2m wide and the band shall be centred about the wind direction indicator support and shall be in a colour chosen to give adequate conspicuity, preferably white.
- (g) Provision shall be made for illuminating at least one wind indicator at an aerodrome intended for use at night.

(21) Signalling devices

Where applicable:

- (a) A signalling lamp shall be provided at a controlled aerodrome in the aerodrome control tower.
- (b) A signalling lamp shall be capable of producing red, green and white signals, and of -
 - (i) being aimed manually at any target as required;
 - (ii) giving a signal in any one colour followed by a signal in either of the two other colours; and
 - (iii) transmitting a message in any one of the three colours by Morse Code up to a speed of at least four words per minute.

(22) Signalling panel and signalling area

- (a) The signal area shall be located so as to be visible for all angles of azimuth above an angle of 10° above the horizontal when viewed from a height of 300m.
- (b) The signal area shall be an even horizontal surface at least 9m square.
- (c) The colour of the signal area shall be chosen to contrast with the colours of the signal panels used, and it shall be surrounded by a white border not less than 0.3m wide.

(23) Markings

Colour

- (a) Runway markings shall be white.
- (b) Taxiway markings, runway turn pad markings and aircraft stand markings shall be yellow.

- (c) Apron safety lines shall be of a conspicuous colour which shall contrast with that used for aircraft stand markings.

(24) Runway markings

- (a) A runway designation marking, centre line marking and threshold marking shall be provided on all paved runways.

Table 9: threshold stripes

Runway Width	Number of stripes
18m	4
23m	6
30m	8
45m	12
60m	16

- (b) At an intersection of 2 or more runways the markings of the primary runway, except for the runway side stripe marking, shall be displayed and the markings of the other runway(s) shall be interrupted. The runway side stripe marking of the primary runway may be either continued across the intersection or interrupted.
- (c) At an intersection of a runway and taxiway the markings of the runway shall be displayed and the markings of the taxiway interrupted, except that runway side stripe markings may be interrupted.
- (d) Where a runway threshold is displaced from the extremity of a paved runway or where the extremity of a paved runway is not square with the runway centre line, a transverse stripe shall be added to the threshold marking. The transverse stripe shall be 1.8m wide and shall be located 6m from the threshold markings.
- (e) Where a paved runway threshold is permanently displaced, arrows shall be provided on the portion of the runway before the displaced threshold.
- (f) An aiming point marking shall be provided at each approach end of a paved instrument runway where the aerodrome reference code number is 2, 3 or 4. The location and dimension of the aiming point markings shall be in accordance with Table 10."
- (g) A touchdown zone marking shall be provided in the touchdown zone of a paved precision approach runway where the aerodrome reference code number is 2, 3 or 4.

Table 10: Location and dimensions of aiming point marking

	Landing distance available
--	----------------------------

Location and dimensions	Less than 800m	800m up to but not including 1 200m	1 200m up to but not including 2 400m	2 400m and above
(1)	(2)	(3)	(4)	(5)
Distance from threshold to beginning of marking	150m	250m	300m	400m
Length of stripe ^a	30–45m	30–45m	45–60m	45–60m
Width of stripe	4m	6m	6–10m ^b	6–10m ^b
Lateral spacing between inner sides of stripes	6m ^c	9m ^c	18–22.5m	18–22.5m
a) The greater dimensions of the specified ranges are intended to be used where increased conspicuity is required.				
b) The lateral spacing may be varied within these limits to minimize the contamination of the marking by rubber deposits.				
c) These figures were deduced by reference to the outer main gear wheel span which is element 2 of the aerodrome reference code.				

- (h) A touchdown zone marking shall consist of pairs of rectangular markings symmetrically disposed about the runway centre line with the number of such pairs related to the landing distance available and, where the marking is to be displayed at both the approach directions of a runway, the distance between the thresholds, as provided in Table 11.

Table 11: Touchdown zone markings

Landing distance available or the distance between thresholds	Pairs of markings
less than 900m	1
900m up to but not including 1 200m	2
1 200m up to but not including 1 500m	3
1 500m up to but not including 2 400m	4
2400m or more	6

- (i) A runway side stripe marking shall be provided between the thresholds of a paved runway where there is a lack of contrast between the runway edges and the shoulders or the surrounding terrain.
- (j) Where a paved runway turn pad is provided, a runway turn pad marking shall be provided for continuous guidance to enable the aircraft to complete a 180 degree turn and align with the runway centre line.

- (k) On a paved runway or taxiway a runway-holding position marking shall be displayed along a runway-holding position.

(25) Taxiway centre line marking

- (a) Taxiway centre line marking shall be provided on a paved taxiway and apron where the aerodrome reference code number is 3 or 4, in such a way as to provide continuous guidance between the runway centre line and aircraft stands.
- (b) Taxiway centre line marking shall be provided on a paved runway when the runway is part of a standard taxi-route where:
 - (i) there is no runway centre line marking; or
 - (ii) the taxiway centre line is not coincident with the runway centre line.
- (c) Where provided, enhanced taxiway centre line marking shall be installed at each taxiway and runway intersection.
- (d) An enhanced taxiway centre line marking shall extend from the runway-holding position Pattern A to a distance of up to 47m in the direction of travel away from the runway.
- (e) If the enhanced taxiway centre line marking intersects another runway-holding position marking, such as for a precision approach category II or III runway, which is located within 47m of the first runway-holding position marking, the enhanced taxiway centre line marking shall be interrupted 0.9 m prior to and after the intersected runway-holding position marking.

The enhanced taxiway centre line marking shall continue beyond the intersected runway-holding position marking for at least three dashed line segments or 47m from start to finish, whichever is greater

(26) VOR aerodrome check-point marking

When a VOR aerodrome check-point is established, it shall be indicated by a VOR aerodrome check-point marking.

(27) Road-holding position marking

A road-holding position marking shall be provided at all paved road entrances to a runway.

(28) Mandatory instruction marking

Where it is impracticable to install a mandatory instruction sign, a mandatory marking shall be provided on the surface of the pavement.

(29) Information marking

Where an information sign shall normally be installed and it is impracticable to install, an information marking shall be displayed on the surface of the pavement.

(30) Lights

(a) Elevated approach lights

- (i) Elevated approach lights and their supporting structures shall be frangible except that, in that portion of the approach lighting system beyond 300m from the threshold:**
 - (aa) where the height of a supporting structure exceeds 12m, the frangibility requirement shall apply to the top 12m only; and**
 - (bb) where a supporting structure is surrounded by non-frangible objects, only that part of the structure that extends above the surrounding objects shall be frangible.**
- (b) When an approach light fixture or supporting structure is not in itself sufficiently conspicuous, it shall be suitably marked.**

(31) Elevated lights

Elevated runway and taxiway lights shall be frangible and their height shall be sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

(32) Surface lights

Light fixtures inset in the surface of runways, taxiways, and aprons shall be so designed and fitted as to withstand being run over by the wheels of an aircraft without damage either to the aircraft or to the lights themselves.

(33) Light intensity and control

- (a) The intensity of runway lighting shall be adequate for the minimum conditions of visibility and ambient light in which use of the runway is intended, and compatible with that of the nearest section of the approach lighting system when provided.**
- (b) A suitable intensity control shall be incorporated to allow for adjustment of the light intensity to meet the prevailing conditions.**
- (c) Separate intensity controls other suitable methods shall be provided to ensure that the following systems, when installed, can be operated at compatible intensities –**
 - (i) approach lighting system**
 - (ii) runway edge lights;**

- (iii) runway threshold lights;
- (iv) runway end lights;
- (v) runway centre line lights;
- (vi) runway touchdown zone lights; and
- (vii) taxiway centre line lights.

(34) Aerodrome beacon

- (a) An aerodrome beacon shall be provided at an aerodrome intended for use at night if one or more of the following conditions exist –
 - (i) aircraft navigate predominantly by visual means;
 - (ii) reduced visibilities are frequent;
 - (iii) it is difficult to locate the aerodrome from the air due to surrounding lights or terrain; and
 - (iv) where aerodromes are in close proximity, to avoid confusion, coordination needs to be effected to distinguish between the various aerodromes

(35) Approach lighting systems

- (a) Where physically practicable, a simple approach lighting system shall be provided to serve a non-precision approach runway, except when the runway is used only in conditions of good visibility or sufficient guidance is provided by other visual aids.
- (b) Where physically practicable, a precision approach category I lighting system shall be provided to serve a precision approach runway category I.
- (c) A precision approach category II and III lighting system shall be provided to serve a precision approach runway category II or III.

(36) Visual approach slope indicator systems

- (a) A visual approach slope indicator system shall be provided to serve the approach to a runway whether or not the runway is served by other visual approach aids or by non-visual aids, where one or more of the following conditions exist –
 - (i) the runway is used by turbojet, turbofan, or other aircraft with similar approach guidance requirements;
 - (ii) the pilot of any type of aircraft may have difficulty in judging the approach due to inadequate visual guidance such as is experienced during an approach over water or featureless terrain by day or in the absence of sufficient extraneous lights in the approach area by night; or
 - (iii) misleading information produced by deceptive surrounding terrain or runway slopes

- (b) The presence of objects in the approach area may involve serious hazard if an aircraft descends below the normal approach path, particularly if there are no non-visual or other visual aids to give warning of such objects.
- (c) Physical conditions at either end of the runway present a serious hazard in the event of an aircraft undershooting or overrunning the runway.
- (d) Terrain or prevalent meteorological conditions are such that the aircraft may be subjected to unusual turbulence during approach.
- (e) PAPI, T-VASIS or AT-VASIS shall be provided where the aerodrome reference code number is 3 or 4; when 1 or more of the conditions specified in paragraphs (a) to (e) exist.
- (f) PAPI or APAPI shall be provided where the aerodrome reference code number is 1 or 2; when 1 or more of the conditions specified in paragraphs (a) to (e) exist.

(37) Obstacle protection surface

- (a) An obstacle protection surface shall be established when it is intended to provide a visual approach slope indicator system.
- (b) New objects or extensions of existing objects shall not be permitted above an obstacle protection surface except when the new object or extension shall be shielded by an existing immovable object.
- (c) Existing objects above an obstacle protection surface shall be removed except when the object is shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety of operations of aircraft.
- (d) Where an aeronautical study indicates that an existing object extending above an obstacle protection surface could adversely affect the safety of operations of aircraft one or more of the following measures shall be taken –
 - (i) suitably raise the approach slope of the visual approach slope indicator system;
 - (ii) reduce the azimuth spread of the visual approach slope indicator system so that the object is outside the confines of the beam;
 - (iii) displace the axis of the visual approach slope indicator system and its associated obstacle protection surface by no more than 5 degrees;
 - (iv) suitably displace the runway threshold; and
 - (v) where paragraph (d) is found to be impracticable, suitably displace the visual approach slope indicator system upwind of the runway threshold to provide an increase in threshold crossing height equal to the height of the object penetration.

(38) Runway edge lights and runway end lights

Runway edge lights and runway end lights shall be provided for a runway intended for use at night or for a precision approach runway intended for use by day or night.

(39) Runway threshold and wing bar lights

- (a) Runway threshold lights shall be provided for a runway equipped with runway edge lights, except on a non-instrument or non-precision approach runway where the threshold is displaced and wing bar lights are provided.**
- (b) Wing bar lights shall be provided on a non-instrument or non-precision approach runway where the threshold is displaced and runway threshold lights are required, but are not provided.**

(40) Runway centre line lights

- (a) Runway centre line lights shall be provided on a precision approach runway category II or III.**
- (b) Runway centre line lights shall be provided on a runway intended to be used for take-off with an operating minimum below a runway visual range of 400m.**

(41) Runway touchdown zone lights

Touchdown zone lights shall be provided in the touchdown zone of a precision approach runway category II or III.

(42) Taxiway centre line lights

- (a) Taxiway centre line lights shall be provided on an exit taxiway, taxiway and apron intended for use in runway visual range conditions of less than 350m in such a manner as to provide continuous guidance between the runway centre line and aircraft stands, except that these lights need not be provided where the traffic density is light and centre line marking provides adequate guidance.**
- (b) Taxiway centre line lights shall be provided on a runway forming part of a standard taxi-route and intended for taxiing in runway visual range conditions of less than 350m, except that these lights need not be provided where the traffic density is light and centre line marking provides adequate guidance.**

(43) Taxiway edge lights

- (a) Taxiway edge lights shall be provided at the edges of a holding bay, apron and other similar areas intended for use at night and on a taxiway not provided with taxiway centre line lights and intended for use at night except that taxiway edge lights need not be provided where, considering the nature of the operations, adequate guidance can be achieved by surface illumination or other means.
- (b) Taxiway edge lights shall be provided on a runway forming part of a standard taxi-route and intended for taxiing at night where the runway is not provided with taxiway centre line lights.

(44) Runway turn pad lights

Runway turn pad lights shall be provided for continuous guidance on a runway turn pad intended for use in runway visual range conditions of less than 350m, to enable an aircraft to complete a 180 degree turn and align with the runway centre line.

(45) Stop bars

- (a) A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway shall be used in runway visual range conditions of less than 550m, except where –
 - (i) appropriate aids and procedures are available to assist in preventing inadvertent incursions of traffic onto the runway; or
 - (ii) operational procedures exist to limit, in runway visual range conditions of less than 550m, the number of—
 - (aa) aircraft on the manoeuvring area to 1 at a time; and
 - (bb) vehicles on the manoeuvring area to the essential minimum.
 - (iii) Where there is more than 1 stop bar associated with a taxiway or runway intersection, only one shall be illuminated at any provided time.

(46) Intermediate holding position lights

Except where a stop bar has been installed, intermediate holding position in runway visual range conditions of less than 350m.

(47) Runway guard lights

- (a) Runway guard lights shall be provided at each intersection of a taxiway with a runway intended for use in—
 - (i) runway visual range conditions of less than 550m where a stop bar is not installed; and

- (ii) runway visual range conditions between 550m and 1200m where the traffic density is heavy.

(48) Visual docking guidance system

A visual docking guidance system shall be provided when it is intended to indicate, by a visual aid, the precise positioning of an aircraft on an aircraft stand and other alternative means, such as marshoulders, are not practicable.

(49) Signs

Signs shall be provided to convey a mandatory instruction, information on a specific location or destination on a movement area or to provide other information to meet the requirements of a surface movement guidance and control system.

(50) Lighting

(a) Signs shall be illuminated when intended for use—

- (i) in runway visual range conditions of less than 800m; or
- (ii) at night in association with an instrument runway; or
- (iii) at night in association with a non-instrument runway where the code number is 3 or 4.

(51) Mandatory instruction signs

- (a) A mandatory instruction sign shown on table 12 shall be provided at a controlled aerodrome to identify a location beyond which an aircraft taxiing or vehicle shall not proceed unless authorised by the aerodrome control tower.
- (b) Mandatory instruction signs shall include runway designation signs, category I, II or III holding position signs, runway-holding position signs, road-holding position signs and 'NO ENTRY' signs.

(52) Information signs

- (a) An information sign shown on table 13 shall be provided where there is an operational need to identify by a sign, a specific location, or routing (direction or destination) information.
- (b) Information signs shall include:
 - (i) direction signs;
 - (ii) location signs;
 - (iii) destination signs, and
 - (iv) runway exit signs, runway vacated signs and intersection take-off signs.

- (c) A runway exit sign shall be provided where there is an operational need to identify a runway exit.
- (d) A runway vacated sign shall be provided where the exit taxiway is not provided with taxiway centre line lights and there is a need to indicate to a pilot leaving a runway the perimeter of the ILS/MLS critical/sensitive area or the lower edge of the inner transitional surface, whichever is farther from the runway centre line.
- (e) A combined location and direction sign shall be provided when it is intended to indicate routing information prior to a taxiway intersection.
- (f) A direction sign shall be provided when there is an operational need to identify the designation and direction of taxiways at an intersection.
- (g) A location sign shall be provided in conjunction with a runway designation sign except at a runway/runway intersection.
- (h) A location sign shall be provided in conjunction with a direction sign, except that it may be omitted where an aeronautical study indicates that it is not needed.
- (i) Information signs shall, wherever practicable, be located on the left-hand side of the taxiway.
- (j) At a taxiway intersection, information signs shall be located prior to the intersection and in line with the intermediate holding position marking. Where there is no intermediate holding position marking, the signs shall be installed at least 60m from the centre line of the intersecting taxiway where the code number is 3 or 4, and at least 40m where the code number is 1 or 2.
- (k) A runway exit sign shall be located on the same side of the runway as the exit is located (i.e. left or right)
- (l) A runway exit sign shall be located prior to the runway exit point in line with a position at least 60m prior to the point of tangency where the code number is 3 or 4, and at least 30m where the code number is 1 or 2.
- (m) A runway vacated sign shall be located at least on one side of the taxiway located at the holding position.
- (n) Where provided in conjunction with a runway vacated sign, the taxiway location sign shall be positioned outboard of the runway vacated sign.
- (o) An information sign other than a location sign shall consist of an inscription in black on a yellow background.
- (p) A location sign shall consist of an inscription in yellow on a black background and where it is a stand-alone sign shall have a yellow border.
- (q) The inscription on a runway exit sign shall consist of the designator of the exit taxiway and an arrow indicating the direction to follow.
- (r) The inscription on a runway vacated sign shall depict the pattern A runway-holding position marking.
- (s) Where a location sign and direction signs shown on table 14 are used in combination –

- (i) all direction signs related to left turns shall be placed on the left side of the location sign, and all direction signs related to right turns shall be placed on the right side of the location sign, except that where the junction consists of one intersecting taxiway, the location sign may alternatively be placed on the left-hand side;
- (ii) the direction signs shall be placed such that the direction of the arrows departs increasingly from the vertical with increasing deviation of the corresponding taxiway;
- (iii) an appropriate direction sign shall be placed next to the location sign where the direction of the location taxiway changes significantly beyond the intersection; and
- (iv) adjacent direction signs shall be delineated by a vertical black line.

Table 12: Mandatory instruction sign

Runway designation
of a runway extremity
(Example)

25

Indicates a runway-holding position at a runway extremity

Runway designation
of both extremities
of a runway
(Example)

25-07

Indicates a runway-holding position located at
taxiway/runway intersection other than runway extremity

Category I hold
position
(Example)

25 CAT I

Indicates a category I runway-holding position
at the threshold of runway 25

Category II hold
position
(Example)

25 CAT II

Indicates a category II runway-holding position
at the threshold of runway 25

Category III hold
position
(Example)

25 CAT III

Indicates a category III runway-holding
position at the threshold of runway 25

Category II and III
hold position
(Example)

25 CAT II/III

Indicates a joint category II and III
runway-holding position at the
threshold of runway 25

Category I, II and III
hold position
(Example)

25 CAT I/II/III

Indicates a joint category I, II and III
runway-holding position at the
threshold of runway 25

NO ENTRY



Indicates that entry to an area is prohibited

Runway-holding
position
(Example)

B2

Indicates a runway-holding position (in accordance with 3.12.3)

Table 13: Information sign












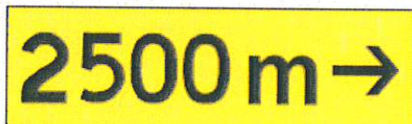
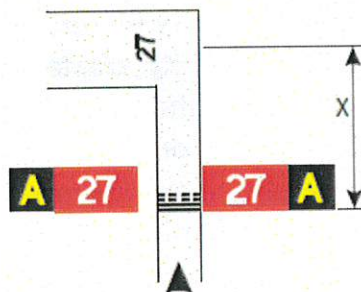
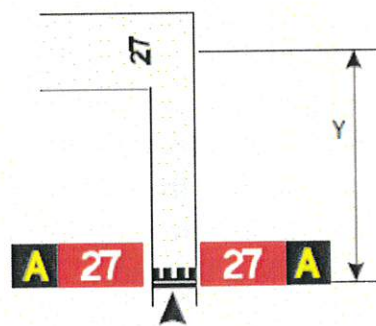
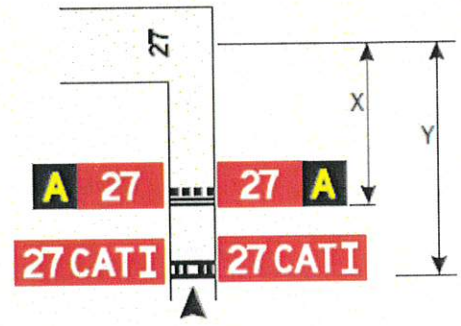
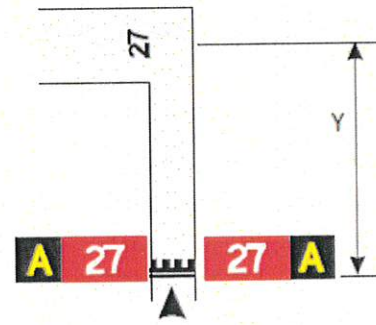
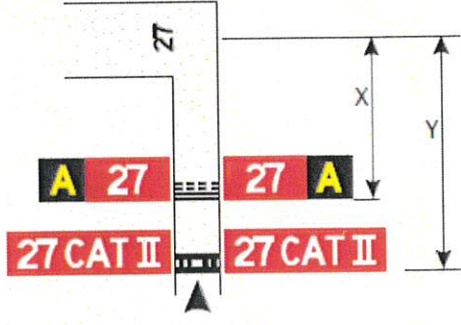
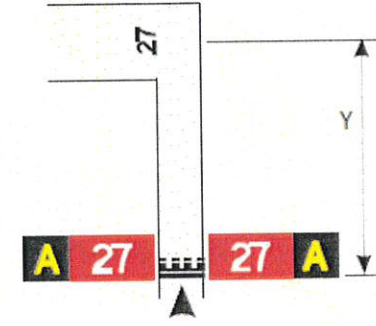
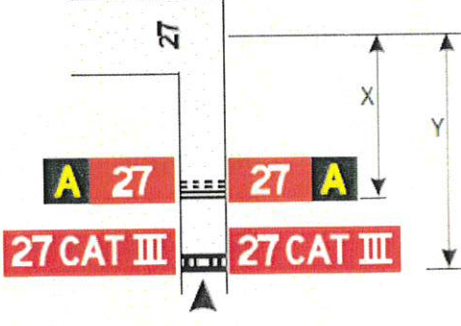
LEFT SIDE		RIGHT SIDE	
			
DIRECTION/LOCATION/DIRECTION			
			
LOCATION/DIRECTION		DESTINATION	
			
LOCATION/RUNWAY VACATED		RUNWAY VACATED/LOCATION	
			
RUNWAY EXIT		RUNWAY EXIT	
			
LOCATION		DIRECTION/LOCATION/DIRECTION/DIRECTION	
			
DIRECTION/DIRECTION/DIRECTION/LOCATION/DIRECTION/DIRECTION/DIRECTION			
			
INTERSECTION TAKE-OFF			

Table 14: Signs for location of positions at runways/takeways

NON-INSTRUMENT, NON-PRECISION, TAKE-OFF RUNWAYS		
		
PRECISION APPROACH RUNWAYS		
CATEGORY I		
CATEGORY II		
CATEGORY III		

(a) Objects to be marked and/or lighted

- (i) A fixed obstacle that extends above an approach surface within 3000m of the inner edge or above a transitional surface shall be marked and, if the runway is used at night, lighted, except that –**
 - (aa) Such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle; or**
 - (bb) the marking may be omitted when the obstacle is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150m; or**
 - (cc) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; or**
 - (dd) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.**
- (ii) A fixed object that extends above an obstacle protection surface shall be marked and, if the runway is used at night, lighted.**
- (iv) Vehicles and other mobile objects, excluding aircraft and aircraft servicing equipment and vehicles used only on aprons, on the movement area of an aerodrome are obstacles and shall be marked and, if the vehicles and aerodrome are used at night or in conditions of low visibility, lighted.**
- (v) Elevated aeronautical ground lights within the movement area shall be marked so as to be conspicuous by day. Obstacle lights shall not be installed on elevated ground lights or signs in the movement area.**
- (vi) All obstacles within the distance specified in Table 6 (Taxiway minimum separation which provides a distance between taxiway centre line and runway centre line), from the centre line of a taxiway, an apron taxiway, or aircraft stand taxilane shall be marked and, if the taxiway, apron taxiway, or aircraft stand taxilane is used at night, lighted.**

(54) Marking of objects

- (a) All fixed objects to be marked shall, whenever practicable, be coloured, but if this is not practicable, markers or flags shall be displayed on or above them, except that objects that are sufficiently conspicuous by their shape, size, or colour need not be otherwise marked.**
- (b) All mobile objects to be marked shall be coloured or marked with display flags.**

(55) Use of markers

- (a) Markers displayed on or adjacent to objects shall be located in conspicuous positions so as to retain the general definition of the object and shall be recognizable in clear weather from a distance of at least 1000m for an object to be viewed from the air and 300m for an object to be viewed from the ground in all directions in which an aircraft is likely to approach the object.
- (b) The shape of markers shall be distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information, and they shall be such that the hazard presented by the object they mark is not increased.

(56) Lighting of objects

- (a) The presence of objects which shall be lighted, as specified in Table 6, shall be indicated by low-, medium- or high-intensity obstacle lights, or a combination of such lights.
- (b) Type C low-intensity obstacle lights shall be displayed on vehicles and other mobile objects excluding aircraft.
- (c) Type D low-intensity obstacle lights shall be displayed on follow-me Vehicles.

(57) Visual aids for denoting restricted use areas

- (a) Closed runways and taxiways

A closed marking shall be displayed on a runway or taxiway, or portion thereof, which is permanently closed to the use of all aircraft.

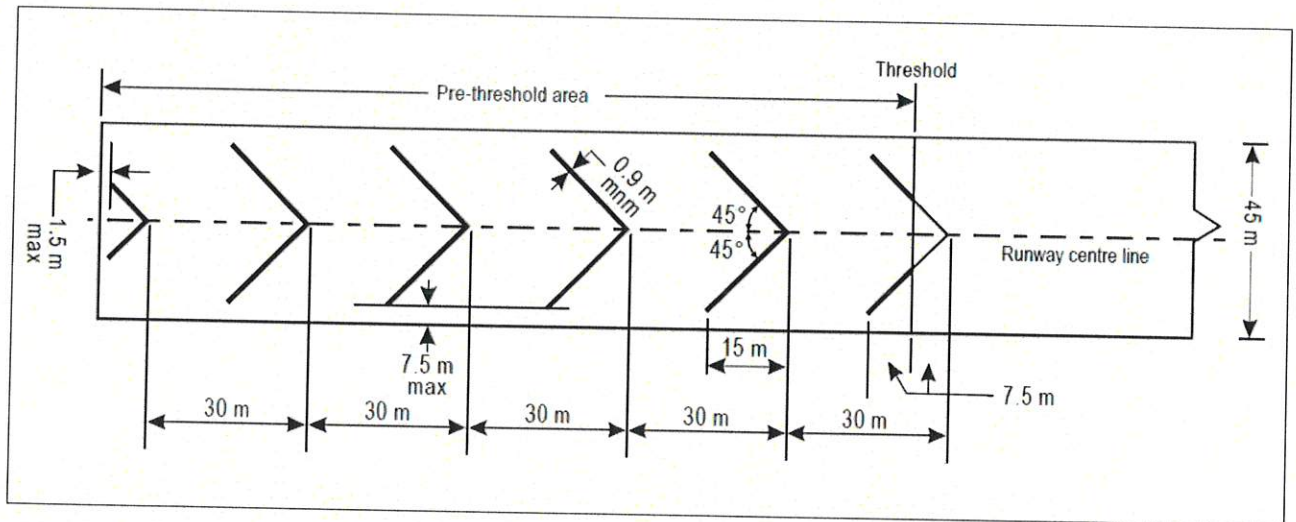
(58) Non-load-bearing surfaces

Shoulders for taxiways, holding bays and aprons and other non-load-bearing surfaces which cannot readily be distinguished from load-bearing surfaces and which, if used by aircraft, might result in damage to the aircraft shall have the boundary between such areas and the load-bearing surface marked by a side stripe marking.

(59) Pre-threshold area

- (a) When the surface before a threshold is paved and exceeds 60m in length and is not suitable for normal use by aircraft, the entire length before the threshold shall be marked with a chevron marking.
- (b) A chevron marking shall point in the direction of the runway and be placed as shown in table 15.

Table 15: Chevron marking



- (c) A chevron marking shall be of conspicuous colour and contrast with the colour used for the runway markings; it shall preferably be yellow. It shall have an overall width of at least 0.9m.

(60) Unserviceable areas

Unserviceability markers shall be displayed wherever any portion of a taxiway, apron or holding bay is unfit for the movement of aircraft but it is still possible for aircraft to bypass the area safely. On a movement area used at night, unserviceability lights shall not be used.

(61) Electrical Systems

(a) Power supply systems for air navigation facilities

- (i) Adequate primary power supply shall be available at aerodromes for the safe functioning of air navigation facilities.
- (ii) For aerodromes that are referred to in regulation 139.02.1(1), the design and provision of electrical power systems for the aerodrome visual and radio navigation aids shall be such that an equipment failure shall not leave pilots with inadequate visual and non-visual guidance or misleading information.

(62) Visual aids

- (a) For a precision approach runway, a secondary power supply capable of meeting the requirements specified in Table 8 for the appropriate

category of precision approach runway shall be provided. Electric power supply connections to those facilities for which secondary power is required shall be so arranged that the facilities are automatically connected to the secondary power supply on failure of the primary source of power.

- (b) For a runway meant for take-off in runway visual range conditions of less than 800 m, a secondary power supply capable of meeting the relevant requirements of Table 8 shall be provided

(63) System design

- (a) For a runway meant for use in runway visual range conditions of less than 550m, the electrical systems for the power supply, lighting and control of the lighting systems included in Table 12 shall be so designed that an equipment failure shall not leave the pilot with inadequate visual guidance or misleading information.
- (b) Where the secondary power supply of an aerodrome is provided by the use of duplicate feeders, such supplies shall be physically and electrically separate so as to ensure the required level of availability and independence.
- (c) Where a runway forming part of a standard taxi-route is provided with runway lighting and taxiway lighting, the lighting systems shall be interlocked to preclude the possibility of simultaneous operation of both forms of lighting.

(64) Monitoring

Where lighting systems are used for aircraft control purposes, such systems shall be monitored automatically so as to provide an indication of any fault which may affect the control functions. This information shall be automatically relayed to the air traffic service unit.

(65) Secondary power supply requirements

Secondary power supply requirements shown in Table 16.

Table 16: Secondary power supply requirements

Runway Classification	Lighting		Radio Aids	
	Visual Aids requiring power	Maximum switch-over time	Radio Aids Requiring Power	Max Switch-Over time
Non-Instrument	Visual Approach Slope Indicator Runway Edge Runway Threshold Runway End Obstacle	2 minutes 2 minutes 2 minutes 2 minutes 2 minutes		
Non-precision	Approach Lighting System Visual Approach Slope Indicator Runway Edge Runway Threshold Runway End Obstacle	15 seconds 15 seconds 15 seconds 15 seconds 15 seconds 15 seconds 15 seconds	SRE VOR NDB D/Facility	15 seconds 15 seconds 15 seconds 15 seconds 15 seconds
Precision approach category I	Approach Lighting System Runway Edge Runway Threshold Runway End Obstacle	15 seconds 15 seconds 15 seconds 15 seconds 15 seconds 15 seconds 15 seconds	ILS localizer ILS glide path ILS middle marker ILS outer marker PAR	10 seconds 10 seconds 10 seconds 10 seconds 10 seconds 10 seconds
Precision approach category II	Approach Lighting System Runway Edge Runway Threshold Runway End Runway Centre Line Runway Touchdown Zone Stop Bars at Taxi- Holding Positions	1 second 15 seconds 1 second 1 second 1 second 1 second 15 seconds	ILS localizer ILS glide path ILS inner marker ILS middle marker ILS outer marker	

	Essential Taxiway Including Stop Bars other than those at Taxi-Holding Positions Obstacles	15 seconds		
Precision approach category III	(Same As Category II Except all Stop Bars- 1 second)		Same as Category II	

Pavement Bearing strength (139.02.10(7))

- (1) The load-bearing qualities shall be sufficient to support the aircraft it is intended to serve without causing structural damage to the aircraft.
- (2) The bearing strength shall be reported using the ACN/PCN method.
- (3) Details of the five elements of the code and an example are shown below:

Table 17: Elements of the code and example

56	F	B	X	T	(e)
(a)	(b)	(c)	(d)		

- (a) The PCN number. Refer to aircraft manufacturer for individual aircraft requirements. The PCN shall not be less than the highest ACN.
- (b) Pavement type for ACN-PCN determination: code

R - Rigid pavement
F - Flexible pavement

- (c) Sub-grade strength category: Code

- A - High strength: Characterized by $K=150 \text{ Nm/m}^3$ and representing all K values above 120 Nm/m^3 for rigid pavements, and by $\text{CBR} = 15$ and representing all CBR values above 13 for flexible pavements.
- B - Medium strength; Characterized by $K=80 \text{ Nm/m}^3$ and representing a range in K of 60 to 120 Nm/m^3 for rigid pavements, and by $\text{CBR} = 10$ and representing a range in CBR of 8 to 13 for flexible pavements.
- C - Low strength: Characterized by $K=40 \text{ Nm/m}^3$ and representing a range in K of 25 to 60 Nm/m^3 for rigid pavements, and by $\text{CBR} = 6$ and representing a range in CBR of 4 to 8 for flexible pavements.

- D - Low strength:** Characterized by $K=20 \text{ Nm/m}^3$ and representing all K values below 25 Nm/m^3 for rigid pavements, and by $\text{CBR} = 3$ and representing all CBR values below 4 for flexible pavements.
- (d) Maximum allowable tyre pressure category: Code**

W - High: no pressure limit

X - Medium: pressure limited to 1, 50 MPa

Y - Low; pressure limited to 1, 00 MPa

Z - Very low: pressure limited to 0, 50 MPa

- (e) Evaluation method: Code**

T - Technical evaluation: representing a specific study of the pavement characteristics and application of pavement behaviour technology.

U - Using aircraft experience: representing a knowledge of the specific type and mass of aircraft satisfactorily being supported under regular

Paragraph to be Applied	Recommended Practices exempted or amended			Notes
	Recommendation Exempted for one or more AD categories	Category for which recommendation is exempted	Replacement for Recommended Practice	
Chapter 1: General 1.1 to 1.3; 1.6, 1.7				
Chapter 2: Aerodrome Data. 2.1 to 2.9; 2.12; 2.13	2.9.8-2.9.11	1-3 non-commercial and non-asphalt runways		For purposes of this Annex SACAA categorise aerodromes based on the Rescue and Firefighting Services (RFFS) categorisation system of 1-10.
Chapter 3: Physical Characteristics	3.1.10	1-3 non-commercial	Not less than largest of twice main gear span or 9m	
Chapter 3 all Standards and Recommended Practices	3.1.13-3.1.18	1-10	Not Aerodromes (AD's) with plans approved before Date of Publication	Notification through AD/Approach Control (APP)/NOTAM of

(SARPS) applicable except exemptions here listed			(DOP). Only for new AD's from DOP	change in condition. Does not mean friction testing at every instance.
	3.1.19–3.1.20	1–10	Not AD's with plans approved before DOP. Only for new/rehabilitated Runways (RWY's) from DOP	Notification through AD/Approach Control (APP)/NOTAM of change in condition. Does not mean friction testing at every instance.
	3.1.24	Cat 1, 2 and non-asphalt		
	3.2.4	1–10 Non-Asphalt	Not AD's with plans approved before DOP. Only for new/rehabilitated RWY's from DOP	
	3.3	1–10	If RWY width is adequate, no turn pad required.	
	3.3.13	1–10	If not compliant – achieve compliance by Dec 2015	
	3.4.5	1–2	Not less than 15m either side of the runway centre line	
	3.4.9	1–2	Not less than 15m either side of the runway centre line	
	3.5	4–10	Any aerodrome that is category 1 to 2. Cat 3 is exempted if it has a runway code 1 and 2 and is a non-instrument runway.	
	3.4.12–3.4.17	1–10	Not RWY's with plans approved before DOP. Only for new/changing functionality RWY's from DOP	
	3.4.17	1–2	Not less than 15m either side of the runway centre line	
	3.7	3–10	Not RWY's with plans approved before DOP. Only for new/changing	

			functionality RWY's from DOP	
	3.7	1–2	Annex 14 states that aerodromes do not have to have Stop-ways in paragraph 3.7	
	3.9.1	1.3	Backtrack on RWY allowed under certain traffic density conditions.	
	3.9.6	1–10	Can over steer provided risk of excursion is mitigated (e.g. cameras on aircraft (AC))	Supplement to Recommendation
	3.9.9–3.9.12	1–10	Not Taxiways (TWY's) with plans approved before DOP. Only for new/functionally changed TWY's from DOP	
	3.10.1	1–10	Not TWY's with plans approved before DOP. Only for new/functionally changed TWY's from DOP	
	3.11.4–3.11.6	1–10	Not TWY's with plans approved before DOP. Only for new/functionally changed TWY's from DOP	
	3.13.5	1–10	Not Aprons with plans approved before DOP. Only for new/functionally changed Aprons from DOP	
	3.13.6	1–10	When special circumstances so warrant, the clearances maybe reduced for Code letters C, D, E and F.	
	3.13.1	1–2	Not applicable	

Chapter 4: Obstacles All SARPS applicable except exemptions here listed	4.1	See Table 4.1		
	Table 4.2 and related recommendations	STOL use runways		
	4.2.12	1-10	Existing obstacles factored into procedure design (PD) limits. New obstacles to be assessed same.	
Chapter 5: Visual Aids Navigation Chapter 5 all applicable except exemptions here listed				
	5.1.1.4	1, 2 Manned Aerodromes	No circle required	
	5.1.3	1-10	Not required	
	5.1.4	1-10	Not applicable	
	5.2.1.7	1-10	Not enforced	
	5.2.8.4-5.2.8.11	4-10	New practice. Compliance as required. RWY Cat II and III	
	5.2.13.1	1-10 3 non-commercial	As required by traffic density.	
	5.2.16.2-5.2.16.10	1-10	To be complied with for Cat 3-10. From Jan 2014.	
	5.3.1.2	3-10	From June 2014	
	5.3.5.6-5.3.5.17	1-10	VASIS not in use anymore	
	5.4	1, 2, -3 and non-commercial		
	5.5.4	1-10	Not applicable to South Africa	
	5.5.5.1	1-2 1-10	Not required if taxiway can be d clearly distinguished	
	5.1.3	1-10	Signalling Lamps not in use anymore.	
Chapter 6: Visual Aids Obstacles All Applicable				
Chapter 7: Visual Aids Restricted				
Areas All Applicable				
Chapter 8: Electrical Systems All applicable except	8.1.9, Table 8.1	Cat 1 and 2, non-commercial		

exemptions here listed				
Chapter 9				
9.1 Emergency management programme	Not in used in CAR 139.02.29, 9.1.4-9.1.5 & 9.1.7-9.16	Cat 1 to 3 non-scheduled air operations	CAR 139.02.6	
9.2 Rescue and Firefighting	Not in used in CAR 139.02.29, 9.2.4 & 9.2.8 – 9.2.10 & 9.2.15 -9.2.25	Cat 1 to 3 non-scheduled air operations	CAR 139.02.7 and other	
9.3 Disabled Aircraft removal	Not in used in CAR 139.02.29, 9.3.1 & 9.3.2	Cat 1 to 3 non-scheduled air operations	CAR 139.02.6	
9.4 Wildlife strikes hazard reduction	9.4.5	Non-commercial AD's Cat 1 to 3 non-scheduled air operations		
9.5 Apron management services	9.5.1 & 9.5.2	Non-commercial AD's Cat 1 to 3 non-scheduled air operation		
	9.8	Based on risk assessment Radar not only option to achieve same effect		
	9.8.7, 9.8.8			
Chapter 10: Maintenance	10.2.5	Non-commercial AD's		
	10.3.3	1–10]		

(d) the insertion of Technical Standard 139.02.10 of the following technical standard:

“1. Physical characteristics

1.1 Runways

(1) Aerodrome reference code

- (a) Aerodrome reference code — code number and letter — which is selected for aerodrome planning purposes; shall be determined in accordance with the characteristics of the aeroplane for which an aerodrome facility is intended.

Table 1: Code element 1 of the aerodrome reference code

Code number	Aerodrome reference field length
<u>1</u>	Less than 800m
<u>2</u>	800m up to but not including 1200m

<u>3</u>	<u>1200m up to but not including 1800m</u>
<u>4</u>	<u>1800m and over</u>

Code element 2 of the aerodrome reference code

<u>Code letter</u>	<u>Wingspan</u>
<u>A</u>	<u>Up to but not including 15m</u>
<u>B</u>	<u>15m up to but not including 24m</u>
<u>C</u>	<u>24m up to but not including 36m</u>
<u>D</u>	<u>36m up to but not including 52m</u>
<u>E</u>	<u>52m up to but not including 65m</u>
<u>F</u>	<u>65m up to but not including 80m</u>

(2) Runway width

- (a) The width of a runway shall be not less than the appropriate dimension specified in table2. Runway widths as determined by OMGWS.

Table 2: Runway widths as determined by OMGWS

<u>Code number</u>	<u>Up to but not including 4.5m</u>	<u>4.5m up to not including 6m</u>	<u>6m up to but not including 9m</u>	<u>9m up to but not including 15m</u>
<u>1</u>	<u>18m</u>	<u>18m</u>	<u>23m</u>	<u>=</u>
<u>2</u>	<u>23m</u>	<u>23m</u>	<u>30m</u>	<u>=</u>
<u>3</u>	<u>30m</u>	<u>30m</u>	<u>30m</u>	<u>45m</u>
<u>4</u>	<u>=</u>	<u>=</u>	<u>45m</u>	<u>45m</u>

(3) Runway length

Except where a runway is associated with a stopway or clearway, the actual runway length to be provided for a primary runway shall be adequate to meet the operational requirements of the aircraft for which the runway is intended to serve.

(4) Runway surfaces

The surface of runways shall –

- (a) be constructed without irregularities that shall impair the runway surface friction characteristics or otherwise adversely affect the take-off or landing of an aircraft;
- (b) be constructed or resurfaced as to provide friction characteristics at or above the minimum friction level specified in Table 3.

Table 3: Friction levels for new and existing runway surfaces

<u>Test equipment</u>	<u>Test tire type</u>	<u>Test tire pressure (KPa)</u>	<u>Test Speed (km/h)</u>	<u>Test water depth (mm)</u>	<u>Design objective new surface</u>	<u>Maintenance planning level</u>	<u>Minimum friction level</u>
<u>Mu-meter trailer</u>	<u>A A</u>	<u>70 70</u>	<u>65</u> <u>95</u>	<u>1.0</u> <u>1.0</u>	<u>0.72</u> <u>0.66</u>	<u>0.52</u> <u>0.38</u>	<u>0.42</u> <u>0.26</u>
<u>Skiddometer Trailer</u>	<u>B B</u>	<u>210 210</u>	<u>65</u> <u>95</u>	<u>1.0</u> <u>1.0</u>	<u>0.82</u> <u>0.74</u>	<u>0.60</u> <u>0.47</u>	<u>0.50</u> <u>0.34</u>
<u>Surface Friction Tester Vehicle</u>	<u>B B</u>	<u>210 210</u>	<u>65</u> <u>95</u>	<u>1.0</u> <u>1.0</u>	<u>0.82</u> <u>0.74</u>	<u>0.60</u> <u>0.47</u>	<u>0.50</u> <u>0.34</u>
<u>Runway Friction Tester Vehicle</u>	<u>B B</u>	<u>210 210</u>	<u>65</u> <u>95</u>	<u>1.0</u> <u>1.0</u>	<u>0.82</u> <u>0.74</u>	<u>0.60</u> <u>0.54</u>	<u>0.50</u> <u>0.41</u>
<u>TATRA Friction Tester Vehicle</u>	<u>B B</u>	<u>210 210</u>	<u>65</u> <u>95</u>	<u>1.0</u> <u>1.0</u>	<u>0.76</u> <u>0.67</u>	<u>0.57</u> <u>0.52</u>	<u>0.48</u> <u>0.42</u>
<u>Grip Tester Trailer</u>	<u>C C</u>	<u>140 140</u>	<u>65</u> <u>95</u>	<u>1.0</u> <u>1.0</u>	<u>0.74</u> <u>0.64</u>	<u>0.53</u> <u>0.36</u>	<u>0.43</u> <u>0.24</u>

(5) Runway slopes

(a) Longitudinal slopes:

The overall longitudinal slope, calculated by dividing the difference in elevation between the runway ends by the length of the runway, shall not exceed 1% (1:100) for runways where the code number is 3 or 4 and 2% (1:50) for runways where the code number is 1 or 2.

(b) Local longitudinal slopes on runways shall not exceed –

- (i) 1.25% (1:80) where the code number is 4;
- (ii) 1.5% (1:66) where the code number is 3; and
- (iii) 2.0% (1:50) where the code number is 1 or 2.

(c) The first and last quarters of precision approach runways Category II or III, the longitudinal slope shall not exceed 0.8% (1:125).

(d) Slope changes shall be minimised on new construction and wherever possible on existing runways during the course of major runway maintenance.

(e) Where a slope cannot be avoided, the change between two consecutive slopes shall not exceed –

- (i) 1.5% where the code number is 3 or 4;

- (ii) 2.0% where the code number is 1 or 2.
- (f) The transition from one slope to another shall be accomplished by a curved surface with a rate of change not exceeding –
 - (i) 0.1% per 30m (minimum radius of curvature of 30 000m) where the code number is 4;
 - (ii) 0.2% per 30m (minimum radius of curvature of 15 000m) where the code number is 3;
 - (iii) 0.4% per 30m (minimum radius of curvature of 7500m) where the code number is 1 or 2.
- (g) The surface of a new runway shall be cambered.
- (h) For runways with a single cross-fall, the fall from high to low shall be in the direction of the wind flow most frequently associated with rain to ensure rapid drainage of water.
- (i) The transverse slope on either side of the crown shall be symmetrical and shall be 1.5% (1:66) where the code letter is C, D, E or F; and 2% (1:50) where the code letter is A or B; but shall not exceed 1.5% or 2% as applicable, nor be less than 1% except at runway or taxiway intersections where flatter slopes may be necessary.
- (j) A 1.5% slope shall be provided on a straight cross-fall.

(6) Runway shoulders

- (a) Runway shoulders shall be provided for a runway where the code letter is D, E or F.
- (b) For aeroplanes with OMGWS from 9m up to but not including 15m, the runway shoulders shall extend symmetrically on each side of the runway so that the overall width of the runway and its shoulders is not less than –
 - (i) 60m where the code letter is D or E;
 - (ii) 60m where the code letter is F with two- or three-engine aeroplanes;
and
 - (iii) 75m where the code letter is F with four or more-engine aeroplanes.
- (c) The surface of the shoulder that abuts the runway shall be flush with the surface of the runway and its transverse slope shall not exceed 2.5%.
- (d) The portion of a runway shoulder between the runway edge and a distance of 30 m from the runway centreline shall be prepared or constructed so as to be capable, in the event of an aeroplane running off the runway, of supporting the aeroplane without inducing structural damage to the aeroplane and of supporting ground vehicles which may operate on the shoulder.
- (e) A runway shoulder shall be prepared or constructed so as to resist erosion and the ingestion of the surface material by aeroplane engines.
- (f) Runway shoulders for code letter F aeroplanes should be paved to a minimum overall width of runway and shoulder of not less than 60 m.

(7) Runway turn pads

- (a) Where the end of a runway is not served by a taxiway or a taxiway turnaround and where the code letter is D, E or F, a runway turn pad shall be provided to facilitate a 180-degree turn of aircraft.
- (b) The design of a runway turn pad shall be such that when the cockpit of the aircraft for which the turn pad is intended remains over the turn pad marking, the clearance distance between any wheel of the aircraft landing gear and the edge of the turn pad shall be not less than the OMWGS specified in Table 4
- (c) The surface of a runway turn pad shall not have surface irregularities that may cause damage to an aircraft using the turn pad if-
 - (i) the turn pad is intended to be used by aeroplanes with a wheel base less than 18 m; and
 - (ii) the turn pad is intended to be used by aeroplanes with a wheel base equal to or greater than 18 m.

Table 4: Clearance distance between outer main wheel of an aeroplane and the edge of the turn pad

	OMWGS			
	Up to but not including 4.5m	4.5m up to but not including 6m	6m up to but not including 9m	9m up to but not including 15m
Clearance	1.50m	2.25m	3m or 4m	4m

(8) Runway strips

- (a) A strip shall extend before the threshold and beyond the end of the paved runway or stopway for a distance of at least –
 - (i) 60m where the aerodrome reference code is 2, 3 or 4;
 - (ii) 60m where the aerodrome reference code 1 instrument; and
 - (iii) 30m where the aerodrome reference code 1 non-instrument.
- (b) A strip including a precision approach runway shall, wherever practicable, extend laterally to a distance of at least –
 - (i) 140m where the code number is 3 or 4-; and
 - (ii) 70m where the code number is 1 or 2-, on each side of the centre line of the runway and its extended centre line throughout the length of the strip on each side of the centre line of the runway and its extended centre line throughout the length of the strip.
- (c) A strip including a non-precision approach runway shall extend laterally to a distance of at least –
 - (i) 140m where the code number is 3 or 4-; and
 - (ii) 70m where the code number is 1 or 2, on each side of the centre line of the runway and its extended centre line throughout the length of the strip.

- (d) A strip including a non-instrument runway shall extend on each side of the centre line of the runway and its extended centre line throughout the length of the strip, to a distance of at least –
 - (i) 75m where the code number is 3 or 4;
 - (ii) 40m where the code number is 2; and
 - (iii) 30m where the code number is 1.
- (e) No fixed object, other than visual aids required for air navigation purposes and satisfying the relevant frangibility requirements shall be permitted on a runway strip within–
 - (i) 77.5m of the runway centre line of a precision approach runway category I, II or III where the code number is 4 and the code letter is F; or
 - (ii) 60m of the runway centre line of a precision approach runway category I, II or III where the code number is 3 or 4; or
 - (iii) 45m of the runway centre line of a precision approach runway category I where the code number is 1 or 2.
- (f) Mobile object shall not permitted on those parts of the runway strip as prescribed in paragraph (a) during use of the runway for landing or take-off.
- (g) The surface of that portion of a strip that abuts a runway, shoulder or stopway shall be flush with the surface of the runway, shoulder or stopway.

(9) Runway End Safety Area (RESA)

- (a) A RESA shall extend to a distance of at least 90 metres from the end of the runway strip.
- (b) If required by the Director, RESA may extend –
 - (i) to a distance of at least 240 metres from the end of the runway strip;
 - or
 - (ii) to the greatest distance that is practicable between the 90 metres referred in paragraph(a) and the 240 metres referred sup-paragraph (i).
- (c) The width of a RESA shall –
 - (i) be at least twice the width of the associated runway and be positioned symmetrically on either side of the extended centre line of the runway;
 - and
 - (ii) where practicable, be equal to the width of the graded portion of the associated runway strip.
- (d) A RESA shall be constructed to –
 - (i) provide a cleared and graded area to reduce the risk of damage to an aircraft that undershoots or overruns the runway; and
 - (ii) be clear of any object which might endanger an aircraft that undershoots or overruns the runway.
- (e) A RESA shall not penetrate the approach or take-off climb surface for the runway.

- (f) If a RESA has a longitudinal slope –
 - (i) any downward shall not exceed 5%;
 - (ii) slope changes shall be as gradual as practicable; and
 - (iii) abrupt changes or sudden reversals of slopes shall be avoided.
- (g) If a RESA has a transverse slope –
 - (i) any upward or downward slope shall not exceed 5%; and
 - (ii) slope changes shall be as gradual as practicable.
- (h) A RESA shall be provided for –
 - (i) Code 3 and 4 runways; and
 - (ii) Code 1 and 2 instrument runways.

(10) Clearways

- (a) Where applicable, the clearway shall –
 - (i) be at the end of the take-off run available;
 - (ii) not have a length exceeding half the length of the take-off run available;
 - (iii) extend laterally to a distance of at least 75m on each side of the extended centre line of the runway.
 - (iv) not project above a plane having an upward slope of 1.25 %, the lower limit of this plane being a horizontal line which is perpendicular to the vertical plane containing the runway centre line; and
 - (v) passes through a point located on the runway centre line at the end of the take-off run available.
- (b) An object situated on a clearway which may endanger aircraft in the air shall be regarded as an obstacle and shall be removed.

(11) Stopways

- (a) A stopway shall have the same width as the runway with which it is associated.
- (b) Slopes and changes in slope on a stopway shall comply with the longitudinal slopes of the associated runway.
- (c) A stopway shall be prepared or constructed so as to be capable, in the event of an abandoned take-off, of supporting the aircraft which the stopway is intended to serve without inducing structural damage to the aircraft.
- (d) The surface of a paved stopway shall be so constructed or resurfaced as to provide surface friction characteristics at or above those of the associated runway.

(12) Radio Altimeter operating area

- (a) A radio altimeter operating area shall be established in the pre-threshold area of a precision approach runway.

- (b) A radio altimeter operating area shall extend before the threshold for a distance of at least 300m.
- (c) A radio altimeter operating area shall extend laterally, on each side of the extended centre line of the runway, to a distance of 60m, except that, when special circumstances so warrant, the distance may be reduced to no less than 30m if an aeronautical study indicates that such reduction shall not affect the safety of operations of aircraft.
- (d) On a radio altimeter operating area, slope changes shall be avoided or kept to a minimum.
- (e) Where slope changes cannot be avoided, the slope changes shall be as gradual as practicable and abrupt changes or sudden reversals of slopes avoided. The rate of change between two consecutive slopes shall not exceed 2% per 30m.

(13) Taxiways

- (a) The design of a taxiway shall be such that, when the cockpit of an aircraft for which the taxiway is intended remains over the taxiway centre line markings, the clearance distance between the outer main wheel of an aircraft and the edge of the taxiway shall be not less than that provided by Table 5- .
 - (i) on straight portions;
 - (ii) on curved portions if the taxiway is intended to be used by aeroplanes with a wheel base of less than 18m; and
 - (iii) on curved portions if the taxiway is intended to be used by aeroplanes with a wheel base equal to or greater than 18m.

Table 5: Clearance distance between outer main wheel of an aeroplane and the edge of the taxiway

	<u>OMGWS</u>			
	<u>Up to but not including 4.5 m</u>	<u>4.5 m up to but not including 6 m</u>	<u>6 m up to but not including 9 m</u>	<u>9 m up to but not including 15 m</u>
<u>Clearance</u>	<u>1.5m</u>	<u>2.25m</u>	<u>3m^{a,b} or 4m^c</u>	<u>4m</u>

- (b) A straight portion of a taxiway shall have a width of not less than that provided by Table 6.

Table 6: Taxiway widths

	<u>OMGWS</u>			
	<u>Up to but not including 4.5 m</u>	<u>4.5 m up to but not including 6 m</u>	<u>6 m up to but not including 9 m</u>	<u>9 m up to but not including 15 m</u>
		<u>m</u>	<u>m</u>	<u>m</u>

<u>Taxiway width</u>	<u>7.5m</u>	<u>10.5m</u>	<u>15m</u>	<u>23m</u>
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- (c) The separation distance between the centre line of a taxiway and the centre line of a runway, the centre line of a parallel taxiway or an object shall not be less than the appropriate dimension specified in Table 7 Taxiway minimum separation distances.

Table 7: Taxiway minimum separation

<u>Code letter</u>	Distance between taxiway centre line and runway centre line (metres)								Taxiway centre line to taxiway centre line (metres)	Taxiway, other than aircraft stand taxilane, centre line to object (metres)	Aircraft stand taxilane centre line to aircraft stand taxilane centre line (metres)	Aircraft stand taxilane centre line to object (metres)
	Instrument runways Code number				Non-instrument runways Code number							
	1	2	3	4	1	2	3	4				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
A	<u>77.5</u>	<u>77.5</u>	—	—	37.5	47.5	—	—	23	15.5	19.5	12
B	<u>82</u>	<u>82</u>	<u>152</u>	—	42	52	<u>87</u>	—	32	20	28.5	16.5
C	<u>88</u>	<u>88</u>	<u>158</u>	<u>158</u>	<u>48</u>	<u>58</u>	93	<u>93</u>	44	26	40.5	22.5
D	—	—	<u>166</u>	<u>166</u>	—	—	101	101	63	37	59.5	33.5
E	—	—	<u>172.5</u>	<u>172.5</u>	—	—	<u>107.5</u>	107.5	76	43.5	72.5	40
F	—	—	<u>180</u>	<u>180</u>	—	—	<u>115</u>	115	91	51	87.5	47.5

Note 1 - The separation distances shown in columns (2) to (9) represent ordinary combinations of runways and taxiways. The basis for development of these distances is provided in the Aerodrome Design Manual (Doc 9157), Part 2.

Note 2 - The distances in columns (2) to (9) do not guarantee sufficient clearance behind a holding aeroplane to permit the passing of another aeroplane on a parallel taxiway. See the Aerodrome Design Manual (Doc 9157), Part 2.

- (d) The strength of a taxiway shall at least be equal to that of the runway it serves, due consideration being provided to the fact that a taxiway shall be subjected to a greater density of traffic and, as a result of slow moving and stationary aircraft, to higher stresses than the runway it serves.

(14) Taxiway slopes

- (a) The longitudinal slopes of taxiways shall be kept to a minimum to avoid tracking or handling problems and shall not exceed –
- (i) 1,5% (1:66) where the code letter is C, D, E or F; and
 - (ii) 3,0% (1:33) where the code letter is A or B.

- (b) Where longitudinal slope changes on a taxiway cannot be avoided, the transition from one slope to another shall be accomplished by a curved surface with a rate of change not exceeding:
 - (i) 1% per 30m (minimum radius of curvature of 3000m) where the code letter is C, D, E or F; and
 - (ii) 1% per 25m (minimum radius of curvature of 2500m) where the code letter is A or B.
- (c) The transverse slope of a taxiway shall be sufficient to prevent the accumulation of water, but shall not exceed:
 - (i) 1.5% (1:66) where the code letter is C, D, E or F;
 - (ii) 2.0% (1:50) where the code letter is A or B

(15) Taxiway Shoulders

- (a) Straight portions of a taxiway where the code letter is C, D, E or F shall be provided with shoulders which extend symmetrically on each side of the taxiway so that the overall width of the taxiway and its shoulders on straight portions is not less than:
 - (i) 44m where the code letter is F;
 - (ii) 38m where the code letter is E;
 - (iii) 34m where the code letter is D; and
 - (iv) 25m where the code letter is C.
- (b) On taxiway curves and on junctions or intersections where increased pavement is provided, the shoulder width shall be not less than that on the adjacent straight portions of the taxiway.

(16) Taxiway Strips

- (a) A taxiway, other than an aircraft stand taxiway, shall be included in a strip.
- (b) A taxiway strip shall extend symmetrically on each side of the centre line of the taxiway throughout the length of the taxiway to at least the distance from the centre line provided in Table 7, column 11.
- (c) The taxiway strip shall provide an area clear of objects which may endanger taxiing aircraft.
- (d) The centre portion of a taxiway strip shall provide a graded area to a distance from the centre line of the taxiway of not less than that provided by the following:
 - (i) 10.25m where the OMGWS is up to but not including 4.5m;
 - (ii) not less than that provided by the 11m where the OMGWS is 4.5m up to but not including 6m;
 - (iii) 12.50m where the OMGWS is 6m up to but not including 9m;
 - (iv) 18.50m where the OMGWS is 9m up to but not including 15m, where the code letter is D;

- (v) 19m where the OMGWS is 9m up to but not including 15m, where the code letter is E; and
- (vi) 22m where the OMGWS is 9m up to but not including 15m, where the code letter is F".
- (e) The surface of the strip shall be flush at the edge of the taxiway or shoulder, if provided, and the graded portion shall not have an upward transverse slope exceeding:
 - (i) 2.5% for strips where the code letter is C, D, E or F; and
 - (ii) 3% for strips of taxiways where the code letter is A or B.
- (f) The downward transverse slope shall not exceed 5% measured with reference to the horizontal.

(17) Holding bays, runway-holding positions, intermediate holding positions and road-holding positions

- (a) A runway-holding position shall be established:
 - (i) on the taxiway, at the intersection of a taxiway and a runway; and
 - (ii) at an intersection of a runway with another runway when the former runway is part of a standard taxi-route.
- (b) A runway-holding position shall be established on a taxiway if the location or alignment of the taxiway is such that a taxiing aircraft or vehicle can infringe an obstacle limitation surface or interfere with the operation of radio navigation aids.
- (c) A road-holding position shall be established at an intersection of a road with a runway.
- (d) A runway-holding position shall be established on a taxiway if the location or alignment of the taxiway is such that a taxiing aircraft or vehicle can infringe an obstacle limitation surface or interfere with the operation of radio navigation aids.
- (e) A road-holding position shall be established at an intersection of a road with a runway.
- (f) The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the centre line of a runway shall be in accordance with table 8 and, in the case of a precision approach runway, such that a holding aircraft or vehicle shall not interfere with the operation of radio navigation aids.
- (g) For a precision instrument approach runway, code numbers 3 and 4, the distance of 90m shall be increased to 107.5m where the code letter is F.

Table 8: Distance between runway centreline and road-holding position or holding bay and runway holding position at a taxiway/runway intersection

<u>Type of Runway</u>	<u>Code Number</u>			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
<u>Non-instrument and Take-off</u>	<u>30m</u>	<u>40m</u>	<u>75m</u>	<u>75m</u>
<u>Non-precision approach</u>	<u>40m</u>	<u>40m</u>	<u>75m</u>	<u>75m</u>
<u>Precision approach category 1</u>	<u>60m</u>	<u>60m</u>	<u>90m</u>	<u>90m</u>
<u>Precision approach categories II and III</u>	-	-	<u>90m</u>	<u>90m</u>

- (h) The location of a runway-holding position established in accordance with paragraph (e) shall be such that a holding aircraft or vehicle shall not infringe the obstacle free zone, approach surface, take-off climb surface or ILS/MLS critical/ sensitive area or interfere with the operation of radio navigation aids.

(18) Aprons

- (a) An apron shall be provided to permit the on- and off-loading of passengers, cargo or mail as well as the servicing of aircraft without interfering with the aerodrome traffic;
- (b) Each part of an apron shall be capable of withstanding the traffic of an aircraft it is intended to serve, due consideration being provided to the fact that some portions of the apron shall be subjected to a higher density of traffic and, as a result of slow moving or stationary aircraft;
- (c) Slopes on an apron, including those on an aircraft stand taxilane, shall be sufficient to prevent accumulation of water on the surface of the apron but shall be kept as level as drainage requirements permit. The maximum slope allowable is 1%; and
- (d) An aircraft stand shall provide the following minimum clearances between an aircraft entering or exiting the stand and any adjacent building, aircraft on another stand and other objects as specified in Table 9.

Table 9: aircraft stand minimum clearance distances

Code letter	Clearance
A	3m
B	3m
C	4.5m
D	7.5m
E	7.5m
F	7.5m

(19) Isolated aircraft parking position

An isolated aircraft parking position shall be designated or the aerodrome control tower shall be advised of an area or areas suitable for the parking of an aircraft which is known or believed to be the subject of unlawful interference, or which for other reasons needs isolation from normal aerodrome activities.

(20) Obstacle limitation surfaces

- (a) The following obstacle limitation surfaces shall be established for a runway-
 - (i) inner horizontal surface;
 - (ii) approach surface;
 - (iii) transitional surfaces; and
 - (iv) conical surface
- (b) The following additional obstacle limitation surfaces shall be established for a precision approach runway category II or III:
 - (i) inner approach surface;
 - (ii) inner transitional surfaces; and
 - (iii) balked landing surface.
- (c) For a non-instrument runway, new objects or extensions of existing objects shall not be permitted above an approach or transitional surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft;
- (d) For a non-precision approach runway, new objects or extensions of existing objects shall not be permitted above an approach surface within 3000m of the inner edge or above a transitional surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft;
- (e) For a precision approach runway fixed objects shall not be permitted above the inner approach surface, the inner transitional surface or the balked landing surface, except for frangible objects which because of their function shall be located on the strip. Mobile objects shall not be permitted above these surfaces during the use of the runway for landing;
- (f) For a precision approach runway, new objects or extensions of existing objects shall not be permitted above an approach surface or a transitional surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft;
- (g) A take-off climb surface shall be established for a runway meant for take-off; and

- (h) New objects or extensions of existing objects shall not be permitted above a take-off climb surface except when the new object or extension shall be shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety or significantly affect the regularity of operations of aircraft.

(21) Visual aids for navigation

Wind direction indicator-

- (a) An aerodrome shall be equipped with at least one wind direction indicator;
- (b) A wind direction indicator shall be located so as to be visible from aircraft in flight or on the movement area and in such a way as to be free from the effects of air disturbances caused by nearby objects;
- (c) The wind direction indicator shall –
- (i) be in the form of a truncated cone made of fabric and shall have a length of not less than 3.6m and a diameter, at the larger end, of not less than 0.9m; and
 - (ii) be constructed so that it gives a clear indication of the direction of the surface wind and a general indication of the wind speed.
- (d) The colour or colours shall be selected to make the wind direction indicator clearly visible and understandable from a height of at least 300m, having regard to background;
- (e) Where practicable, a single colour, preferably white or orange, shall be used.
- (f) The location of at least one wind direction indicator shall be marked by a circular band 15 m in diameter and 1.2m wide and the band shall be centred about the wind direction indicator support and shall be in a colour chosen to give adequate conspicuity, preferably white; and
- (g) Provision shall be made for illuminating at least one wind indicator at an aerodrome intended for use at night.

(22) Signalling devices

Where applicable:

- (a) A signalling lamp shall be provided at a controlled aerodrome in the aerodrome control tower; and
- (b) A signalling lamp shall be capable of producing red, green and white signals, and of:
- (i) being aimed manually at any target as required;
 - (ii) giving a signal in any one colour followed by a signal in either of the two other colours; and
 - (iii) transmitting a message in any one of the three colours by Morse Code up to a speed of at least four words per minute.

(23) Signalling panel and signalling area

- (a) The signal area shall be located so as to be visible for all angles of azimuth above an angle of 10° above the horizontal when viewed from a height of 300m;
- (b) The signal area shall be an even horizontal surface at least 9m square; and
- (c) The colour of the signal area shall be chosen to contrast with the colours of the signal panels used, and it shall be surrounded by a white border not less than 0.3m wide.

(24) Markings

Colour

- (a) Runway markings shall be white;
- (b) Taxiway markings, runway turn pad markings and aircraft stand markings shall be yellow; and
- (c) Apron safety lines shall be of a conspicuous colour which shall contrast with that used for aircraft stand markings.

(25) Runway markings

- (a) A runway designation marking, centre line marking and threshold marking shall be provided on all paved runways;
- (b) At an intersection of 2 or more runways the markings of the primary runway, except for the runway side stripe marking, shall be displayed and the markings of the other runway(s) shall be interrupted. The runway side stripe marking of the primary runway may be either continued across the intersection or interrupted;
- (c) At an intersection of a runway and taxiway the markings of the runway shall be displayed and the markings of the taxiway interrupted, except that runway side stripe markings may be interrupted;
- (d) Where a runway threshold is displaced from the extremity of a paved runway or where the extremity of a paved runway is not square with the runway centre line, a transverse stripe shall be added to the threshold marking. The transverse stripe shall be 1.8m wide and shall be located 6m from the threshold markings;
- (e) Where a paved runway threshold is permanently displaced, arrows shall be provided on the portion of the runway before the displaced threshold;
- (f) An aiming point marking shall be provided at each approach end of a paved instrument runway where the aerodrome reference code number is 2, 3 or 4. The location and dimension of the aiming point markings shall be in accordance with Table 10;

Table 10: threshold stripes

Runway Width	Number of stripes
18m	4
23m	6
30m	8
45m	12
60m	16

- (g) A touchdown zone marking shall be provided in the touchdown zone of a paved precision approach runway where the aerodrome reference code number is 2, 3 or 4;

Table 11: Location and dimensions of aiming point marking

<u>Location and dimensions</u>	<u>Landing distance available</u>			
	<u>Less than 800m</u>	<u>800m up to but not including 1 200m</u>	<u>1 200m up to but not including 2 400m</u>	<u>2 400m and above</u>
<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>	<u>(5)</u>
<u>Distance from threshold to beginning of marking</u>	<u>150m</u>	<u>250m</u>	<u>300m</u>	<u>400m</u>
<u>Length of stripe^a</u>	<u>30–45m</u>	<u>30–45m</u>	<u>45–60m</u>	<u>45–60m</u>
<u>Width of stripe</u>	<u>4m</u>	<u>6m</u>	<u>6–10m^b</u>	<u>6–10m^b</u>
<u>Lateral spacing between inner sides of stripes</u>	<u>6m^c</u>	<u>9m^c</u>	<u>18–22.5m</u>	<u>18–22.5m</u>
a) <u>The greater dimensions of the specified ranges are intended to be used where increased conspicuity is required.</u>				
b) <u>The lateral spacing may be varied within these limits to minimize the contamination of the marking by rubber deposits.</u>				
c) <u>These figures were deduced by reference to the outer main gear wheel span which is element 2 of the aerodrome reference code.</u>				

- (h) A touchdown zone marking shall consist of pairs of rectangular markings symmetrically disposed about the runway centre line with the number of such pairs related to the landing distance available and, where the marking is to be displayed at both the approach directions of a runway, the distance between the thresholds, as provided in Table 12;

Table 12: Touchdown zone markings

<u>Landing distance available or the distance between thresholds</u>	<u>Pairs of markings</u>
<u>less than 900m</u>	<u>1</u>
<u>900m up to but not including 1 200m</u>	<u>2</u>
<u>1 200m up to but not including 1 500m</u>	<u>3</u>
<u>1 500m up to but not including 2 400m</u>	<u>4</u>
<u>2400m or more</u>	<u>6</u>

- (i) A runway side stripe marking shall be provided between the thresholds of a paved runway where there is a lack of contrast between the runway edges and the shoulders or the surrounding terrain;
- (j) Where a paved runway turn pad is provided, a runway turn pad marking shall be provided for continuous guidance to enable the aircraft to complete a 180 degree turn and align with the runway centre line; and
- (k) On a paved runway or taxiway, a runway-holding position marking shall be displayed along a runway-holding position.

(26) Taxiway centre line marking

- (a) Taxiway centre line marking shall be provided on a paved taxiway and apron where the aerodrome reference code number is 3 or 4, in such a way as to provide continuous guidance between the runway centre line and aircraft stands;
- (b) Taxiway centre line marking shall be provided on a paved runway when the runway is part of a standard taxi-route where:
 - (i) there is no runway centre line marking; or
 - (ii) the taxiway centre line is not coincident with the runway centre line.
- (c) Where provided, enhanced taxiway centre line marking shall be installed at each taxiway and runway intersection;
- (d) An enhanced taxiway centre line marking shall extend from the runway-holding position Pattern A to a distance of up to 47m in the direction of travel away from the runway;
- (e) If the enhanced taxiway centre line marking intersects another runway-holding position marking, such as for a precision approach category II or III runway, which is located within 47m of the first runway-holding position marking, the enhanced taxiway centre line marking shall be interrupted 0.9 m prior to and after the intersected runway-holding position marking; and
- (f) The enhanced taxiway centre line marking shall continue beyond the intersected runway-holding position marking for at least three dashed line segments or 47m from start to finish, whichever is greater.

(27) VOR aerodrome check-point marking

When a VOR aerodrome check-point is established, it shall be indicated by a VOR aerodrome check-point marking.

(28) Road-holding position marking

A road-holding position marking shall be provided at all paved road entrances to a runway.

(29) Mandatory instruction marking

Where it is impracticable to install a mandatory instruction sign, a mandatory marking shall be provided on the surface of the pavement.

(30) Information marking

Where an information sign shall normally be installed and it is impracticable to install, information marking shall be displayed on the surface of the pavement.

(31) Lights

(a) Elevated approach lights

(i) Elevated approach lights and their supporting structures shall be frangible except that, in that portion of the approach lighting system beyond 300m from the threshold:

(aa) where the height of a supporting structure exceeds 12m, the frangibility requirement shall apply to the top 12m only; and

(bb) where a supporting structure is surrounded by non-frangible objects, only that part of the structure that extends above the surrounding objects shall be frangible.

(b) When an approach light fixture or supporting structure is not in itself sufficiently conspicuous, it shall be suitably marked.

(32) Elevated lights

Elevated runway and taxiway lights shall be frangible and their height shall be sufficiently low to preserve clearance for propellers and for the engine pods of jet aircraft.

(33) Surface lights

Light fixtures inserted in the surface of runways, taxiways, and aprons shall be so designed and fitted as to withstand being run over by the wheels of an aircraft without damage either to the aircraft or to the lights themselves.

(34) Light intensity and control

- (a) The intensity of runway lighting shall be adequate for the minimum conditions of visibility and ambient light in which use of the runway is intended, and compatible with that of the nearest section of the approach lighting system when provided;
- (b) A suitable intensity control shall be incorporated to allow for adjustment of the light intensity to meet the prevailing conditions; and
- (c) Separate intensity controls other suitable methods shall be provided to ensure that the following systems, when installed, can be operated at compatible intensities –
 - (i) approach lighting system;
 - (ii) runway edge lights;
 - (iii) runway threshold lights;
 - (iv) runway end lights;
 - (v) runway centre line lights;
 - (vi) runway touchdown zone lights; and
 - (vii) taxiway centre line lights.

(35) Aerodrome beacon

- (a) An aerodrome beacon shall be provided at an aerodrome intended for use at night if one or more of the following conditions exist –
 - (i) aircraft navigate predominantly by visual means;
 - (ii) reduced visibilities are frequent;
 - (iii) it is difficult to locate the aerodrome from the air due to surrounding lights or terrain; and
 - (iv) where aerodromes are in close proximity, to avoid confusion, coordination needs to be effected to distinguish between the various aerodromes.

(36) Approach lighting systems

- (a) Where physically practicable, a simple approach lighting system shall be provided to serve a non-precision approach runway, except when the runway is used only in conditions of good visibility or sufficient guidance is provided by other visual aids;
- (b) Where physically practicable, a precision approach category I lighting system shall be provided to serve a precision approach runway category I; and

- (c) A precision approach category II and III lighting system shall be provided to serve a precision approach runway category II or III.

(37) Visual approach slope indicator systems

A visual approach slope indicator system shall be provided to serve the approach to a runway whether or not the runway is served by other visual approach aids or by non-visual aids, where one or more of the following conditions exist –

- (a) the runway is used by turbojet, turbofan, or other aircraft with similar approach guidance requirements;
- (b) the pilot of any type of aircraft may have difficulty in judging the approach due to:
 - (i) inadequate visual guidance such as is experienced during an approach over water or featureless terrain by day or in the absence of sufficient extraneous lights in the approach area by night; or
 - (ii) misleading information produced by deceptive surrounding terrain or runway slopes
- (c) The presence of objects in the approach area may involve serious hazard if an aircraft descends below the normal approach path, particularly if there are no non-visual or other visual aids to give warning of such objects.
- (d) Physical conditions at either end of the runway present a serious hazard in the event of an aircraft undershooting or overrunning the runway.
- (e) Terrain or prevalent meteorological conditions are such that the aircraft may be subjected to unusual turbulence during approach.
- (f) PAPI, T-VASIS or AT-VASIS shall be provided where the aerodrome reference code number is 3 or 4; when 1 or more of the conditions specified in paragraphs (a) to (e) exist.
- (g) PAPI or APAPI shall be provided where an aerodrome reference code number is 1 or 2; when one or more of the conditions specified in paragraphs (a) to (e) exist.

(38) Obstacle protection surface

- (a) An obstacle protection surface shall be established when it is intended to provide a visual approach slope indicator system;
- (b) New objects or extensions of existing objects shall not be permitted above an obstacle protection surface except when the new object or extension shall be shielded by an existing immovable object;
- (c) Existing objects above an obstacle protection surface shall be removed except when the object is shielded by an existing immovable object, or an aeronautical study determines that the object shall not adversely affect the safety of operations of an aircraft; and

(d) Where an aeronautical study indicates that an existing object extending above an obstacle protection surface could adversely affect the safety of operations of aircraft one or more of the following measures shall be taken –

- (i) suitably raise the approach slope of the visual approach slope indicator system;
- (ii) reduce the azimuth spread of the visual approach slope indicator system so that the object is outside the confines of the beam;
- (iii) displace the axis of the visual approach slope indicator system and its associated obstacle protection surface by no more than 5 degrees;
- (iv) suitably displace the runway threshold; and
- (v) where paragraph (d) is found to be impracticable, suitably displace the visual approach slope indicator system upwind of the runway threshold to provide an increase in threshold crossing height equal to the height of the object penetration.

(39) Runway edge lights and runway end lights

Runway edge lights and runway end lights shall be provided for a runway intended for use at night or for a precision approach runway intended for use by day or night.

(40) Runway threshold and wing bar lights

- (a) Runway threshold lights shall be provided for a runway equipped with runway edge lights, except on a non-instrument or non-precision approach runway where the threshold is displaced and wing bar lights are provided; and
- (b) Wing bar lights shall be provided on a non-instrument or non-precision approach runway where the threshold is displaced and runway threshold lights are required, but are not provided.

(41) Runway centre line lights

- (a) Runway centre line lights shall be provided on a precision approach runway category II or III; and
- (b) Runway centre line lights shall be provided on a runway intended to be used for take-off with an operating minimum below a runway visual range of 400m.

(42) Runway touchdown zone lights

Touchdown zone lights shall be provided in the touchdown zone of a precision approach runway category II or III.

(43) Taxiway centre line lights

- (a) Taxiway centre line lights shall be provided on an exit taxiway, taxiway and apron intended for use in runway visual range conditions of less than 350m in such a manner as to provide continuous guidance between the runway centre line and aircraft stands, except that these lights need not be provided where the traffic density is light and centre line marking provides adequate guidance; and
- (b) Taxiway centre line lights shall be provided on a runway forming part of a standard taxi-route and intended for taxiing in runway visual range conditions of less than 350m, except that these lights need not be provided where the traffic density is light and centre line marking provides adequate guidance.

(44) Taxiway edge lights

- (a) Taxiway edge lights shall be provided at the edges of a holding bay, apron and other similar areas intended for use at night and on a taxiway not provided with taxiway centre line lights and intended for use at night except that taxiway edge lights need not be provided where, considering the nature of the operations, adequate guidance can be achieved by surface illumination or other means; and
- (b) Taxiway edge lights shall be provided on a runway forming part of a standard taxi-route and intended for taxiing at night where the runway is not provided with taxiway centre line lights.

(45) Runway turn pad lights

Runway turn pad lights shall be provided for continuous guidance on a runway turn pad intended for use in runway visual range conditions of less than 350m, to enable an aircraft to complete a 180 degree turn and align with the runway centre line.

(46) Stop bars

- (a) A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway shall be used in runway visual range conditions of less than 550m, except where –

 - (i) appropriate aids and procedures are available to assist in preventing inadvertent incursions of traffic onto the runway; or
 - (ii) operational procedures exist to limit, in runway visual range conditions of less than 550m, the number of—

 - (aa) aircraft on the manoeuvring area to 1 at a time; and
 - (bb) vehicles on the manoeuvring area to the essential minimum.

- (iii) where there is more than 1 stop bar associated with a taxiway or runway intersection, only one shall be illuminated at any provided time.

(47) Intermediate holding position lights

Except where a stop bar has been installed, intermediate holding position in runway visual range conditions of less than 350m.

(48) Runway guard lights

- (a) Runway guard lights shall be provided at each intersection of a taxiway with a runway intended for use in—
 - (i) runway visual range conditions of less than 550m where a stop bar is not installed; and
 - (ii) runway visual range conditions between 550m and 1200m where the traffic density is heavy.

(49) Visual docking guidance system

A visual docking guidance system shall be provided when it is intended to indicate, by a visual aid, the precise positioning of an aircraft on an aircraft stand and other alternative means, such as marshaller, are not practicable.

(50) Signs

Signs shall be provided to convey a mandatory instruction, information on a specific location or destination on a movement area or to provide other information to meet the requirements of a surface movement guidance and control system.

(51) Lighting

- (a) Signs shall be illuminated when intended for use—
 - (i) in runway visual range conditions of less than 800m; or
 - (ii) at night in association with an instrument runway; or
 - (iii) at night in association with a non-instrument runway where the code number is 3 or 4.

(52) Mandatory instruction signs

- (a) A mandatory instruction sign shown on Diagram 1 shall be provided at a controlled aerodrome to identify a location beyond which an aircraft taxiing or vehicle shall not proceed unless authorised by the aerodrome control tower; and

- (b) Mandatory instruction signs shall include runway designation signs, category I, II or III holding position signs, runway-holding position signs, road-holding position signs and 'NO ENTRY' signs.

(53) Information signs

- (a) An information sign as shown on Diagram 2 and 3, shall be provided where there is an operational need to identify by a sign, a specific location, or routing (direction or destination) information;
- (b) Information signs shall include:
- (i) direction signs;
 - (ii) location signs;
 - (iii) destination signs, and
 - (iv) runway exit signs, runway vacated signs and intersection take-off signs.
- (c) A runway exit sign shall be provided where there is an operational need to identify a runway exit;
- (d) A runway vacated sign shall be provided where the exit taxiway is not provided with taxiway centre line lights and there is a need to indicate to a pilot leaving a runway the perimeter of the ILS/MLS critical/sensitive area or the lower edge of the inner transitional surface, whichever is farther from the runway centre line;
- (e) A combined location and direction sign shall be provided when it is intended to indicate routing information prior to a taxiway intersection;
- (f) A direction sign shall be provided when there is an operational need to identify the designation and direction of taxiways at an intersection;
- (g) A location sign shall be provided in conjunction with a runway designation sign except at a runway/runway intersection;
- (h) A location sign shall be provided in conjunction with a direction sign, except that it may be omitted where an aeronautical study indicates that it is not needed;
- (i) Information signs shall, wherever practicable, be located on the left-hand side of the taxiway;
- (j) At a taxiway intersection, information signs shall be located prior to the intersection and in line with the intermediate holding position marking. Where there is no intermediate holding position marking, the signs shall be installed at least 60m from the centre line of the intersecting taxiway where the code number is 3 or 4, and at least 40m where the code number is 1 or 2;
- (k) A runway exit sign shall be located on the same side of the runway as the exit is located (i.e. left or right);
- (l) A runway exit sign shall be located prior to the runway exit point in line with a position at least 60m prior to the point of tangency where the code number is 3 or 4, and at least 30m where the code number is 1 or 2;

- (m) A runway vacated sign shall be located at least on one side of the taxiway located at the holding position;
- (n) Where provided in conjunction with a runway vacated sign, the taxiway location sign shall be positioned outboard of the runway vacated sign;
- (o) An information sign other than a location sign shall consist of an inscription in black on a yellow background;
- (p) A location sign shall consist of an inscription in yellow on a black background and where it is a stand-alone sign shall have a yellow border;
- (q) The inscription on a runway exit sign shall consist of the designator of the exit taxiway and an arrow indicating the direction to follow;
- (r) The inscription on a runway vacated sign shall depict the pattern A runway-holding position marking; and
- (s) Where a location sign and direction sign as shown on Diagram 2, are used in combination –

 - (i) all direction signs related to left turns shall be placed on the left side of the location sign, and all direction signs related to right turns shall be placed on the right side of the location sign, except that where the junction consists of one intersecting taxiway, the location sign may alternatively be placed on the left-hand side;
 - (ii) the direction signs shall be placed such that the direction of the arrows departs increasingly from the vertical with increasing deviation of the corresponding taxiway;
 - (iii) an appropriate direction sign shall be placed next to the location sign where the direction of the location taxiway changes significantly beyond the intersection; and
 - (iv) adjacent direction signs shall be delineated by a vertical black line.

Diagram 1: Mandatory instruction sign










Runway designation of a runway extremity (Example)		Indicates a runway-holding position at a runway extremity
Runway designation of both extremities of a runway (Example)		Indicates a runway-holding position located at taxiway/runway intersection other than runway extremity
Category I hold position (Example)		Indicates a category I runway-holding position at the threshold of runway 25
Category II hold position (Example)		Indicates a category II runway-holding position at the threshold of runway 25
Category III hold position (Example)		Indicates a category III runway-holding position at the threshold of runway 25
Category II and III hold position (Example)		Indicates a joint category II and III runway-holding position at the threshold of runway 25
Category I, II and III hold position (Example)		Indicates a joint category I, II and III runway-holding position at the threshold of runway 25
NO ENTRY		Indicates that entry to an area is prohibited
Runway-holding position (Example)		Indicates a runway-holding position (in accordance with 3.12.3)

Diagram 2: Information sign

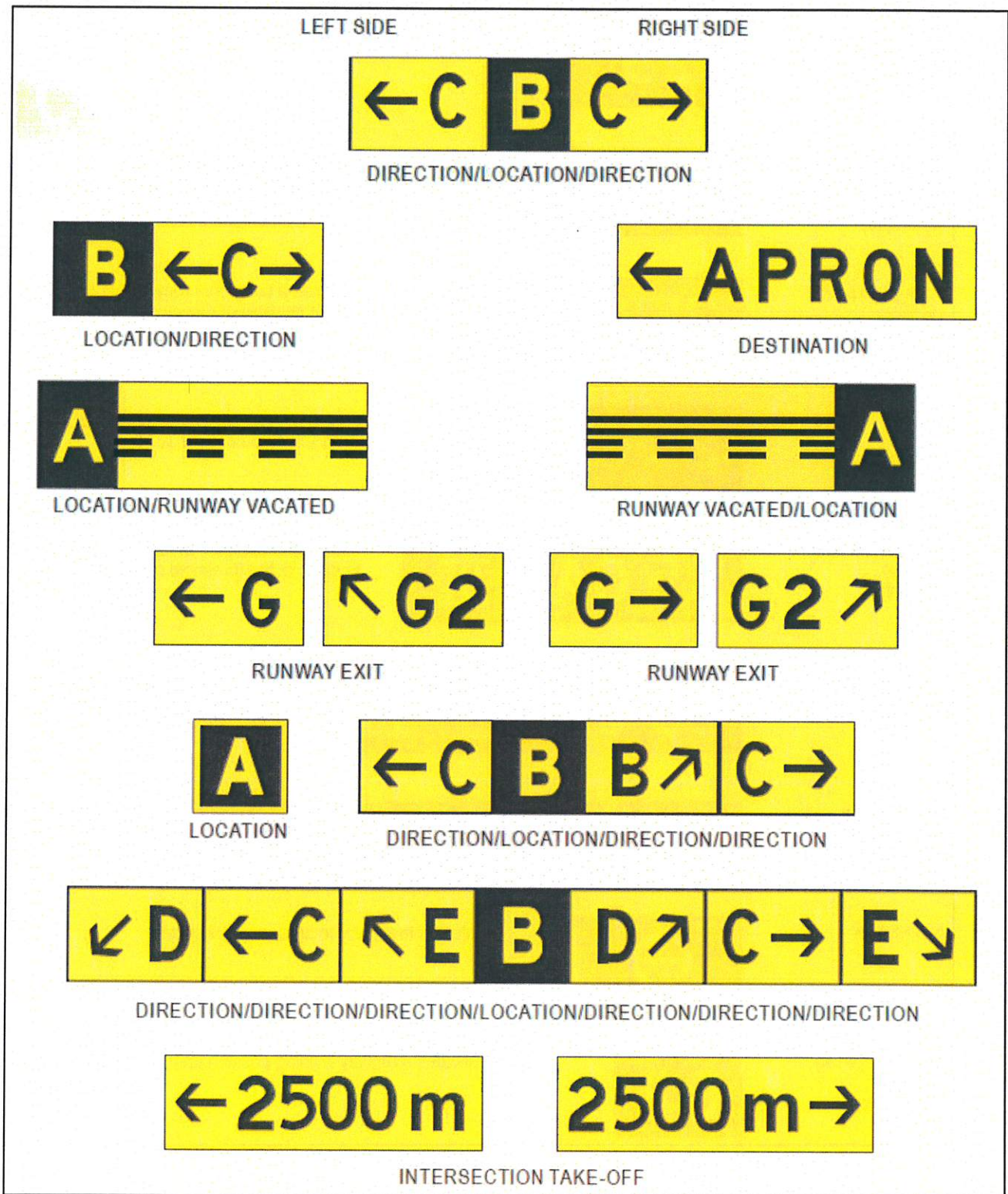
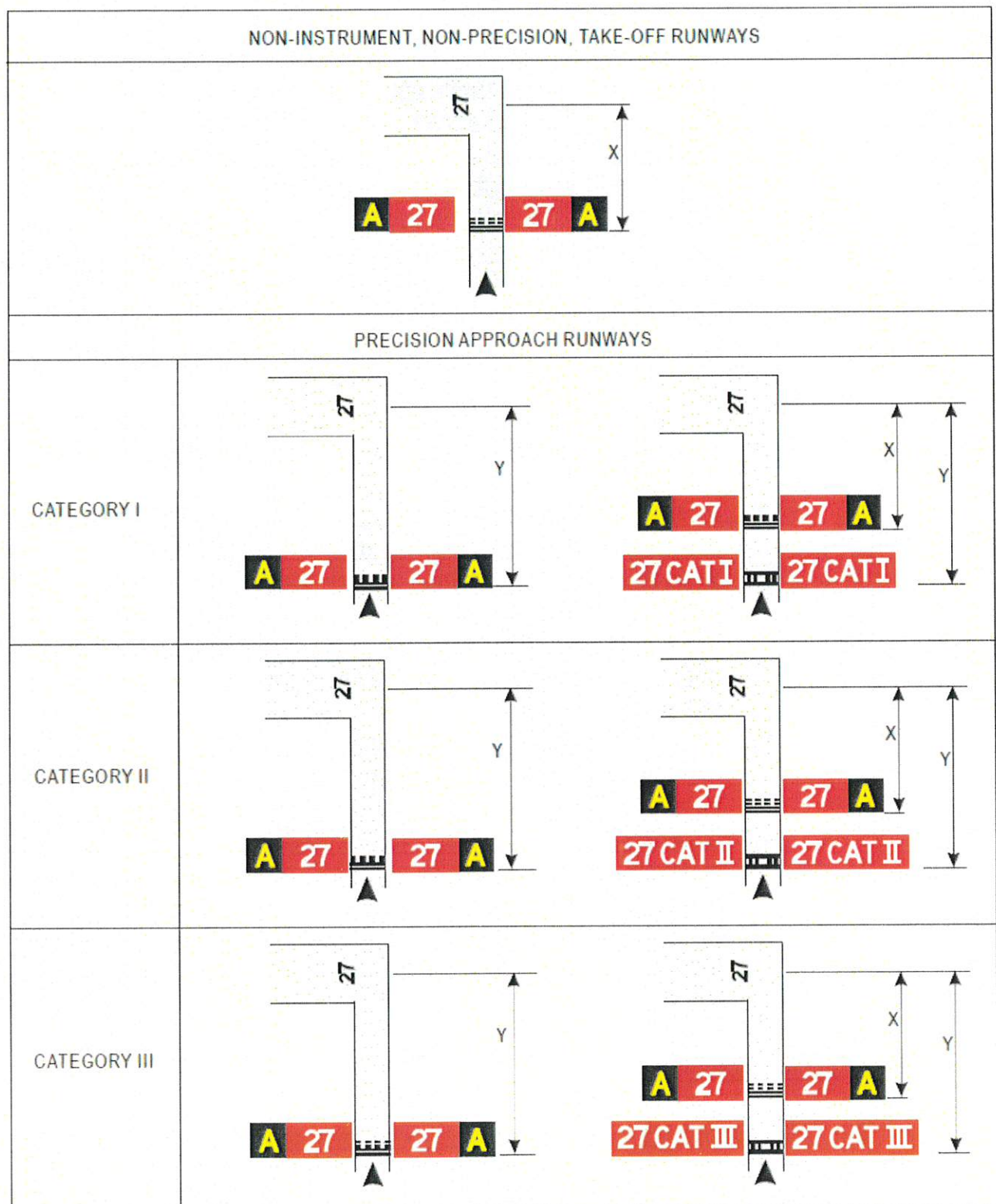


Diagram 3: Signs for location of positions at runways/takeways



(54) Visual Aids for Denoting Obstacles

(a) Objects to be marked and/or lighted-

- (i) A fixed obstacle that extends above an approach surface within 3000m of the inner edge or above a transitional surface shall be marked and, if the runway is used at night, lighted, except that –
 - (aa) such marking and lighting may be omitted when the obstacle is shielded by another fixed obstacle; or
 - (bb) the marking may be omitted when the obstacle is lighted by medium-intensity obstacle lights, Type A, by day and its height above the level of the surrounding ground does not exceed 150m; or
 - (cc) the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day; or
 - (dd) the lighting may be omitted where the obstacle is a lighthouse and an aeronautical study indicates the lighthouse light to be sufficient.
- (ii) a fixed object that extends above an obstacle protection surface shall be marked and, if the runway is used at night, lighted;
- (iv) vehicles and other mobile objects, excluding aircraft and aircraft servicing equipment and vehicles used only on aprons, on the movement area of an aerodrome are obstacles and shall be marked and, if the vehicles and aerodrome are used at night or in conditions of low visibility, lighted;
- (v) elevated aeronautical ground lights within the movement area shall be marked so as to be conspicuous by day. Obstacle lights shall not be installed on elevated ground lights or signs in the movement area; and
- (vi) all obstacles within the distance specified in Table 6 (Taxiway minimum separation which provides a distance between taxiway centre line and runway centre line), from the centre line of a taxiway, an apron taxiway, or aircraft stand taxilane shall be marked and, if the taxiway, apron taxiway, or aircraft stand taxilane is used at night, lighted.

(55) Marking of objects

- (a) All fixed objects to be marked shall, whenever practicable, be coloured, but if this is not practicable, markers or flags shall be displayed on or above them, except that objects that are sufficiently conspicuous by their shape, size, or colour need not be otherwise marked; and
- (b) All mobile objects to be marked shall be coloured or marked with display flags.

(56) Use of markers

- (a) Markers displayed on or adjacent to objects shall be located in conspicuous positions so as to retain the general definition of the object and shall be recognizable in clear weather from a distance of at least 1000m for an object to be viewed from the air and 300m for an object to be viewed from the ground in all directions in which an aircraft is likely to approach the object; and
- (b) The shape of markers shall be distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information, and they shall be such that the hazard presented by the object they mark is not increased.

(57) Lighting of objects

- (a) The presence of objects which shall be lighted, as specified in Table 6, shall be indicated by low-, medium- or high-intensity obstacle lights, or a combination of such lights;
- (b) Type C low-intensity obstacle lights shall be displayed on vehicles and other mobile objects excluding aircraft; and
- (c) Type D low-intensity obstacle lights shall be displayed on follow-me Vehicles.

(58) Visual aids for denoting restricted use areas

Closed runways and taxiways

a closed marking shall be displayed on a runway or taxiway, or portion thereof, which is permanently closed to the use of all aircraft.

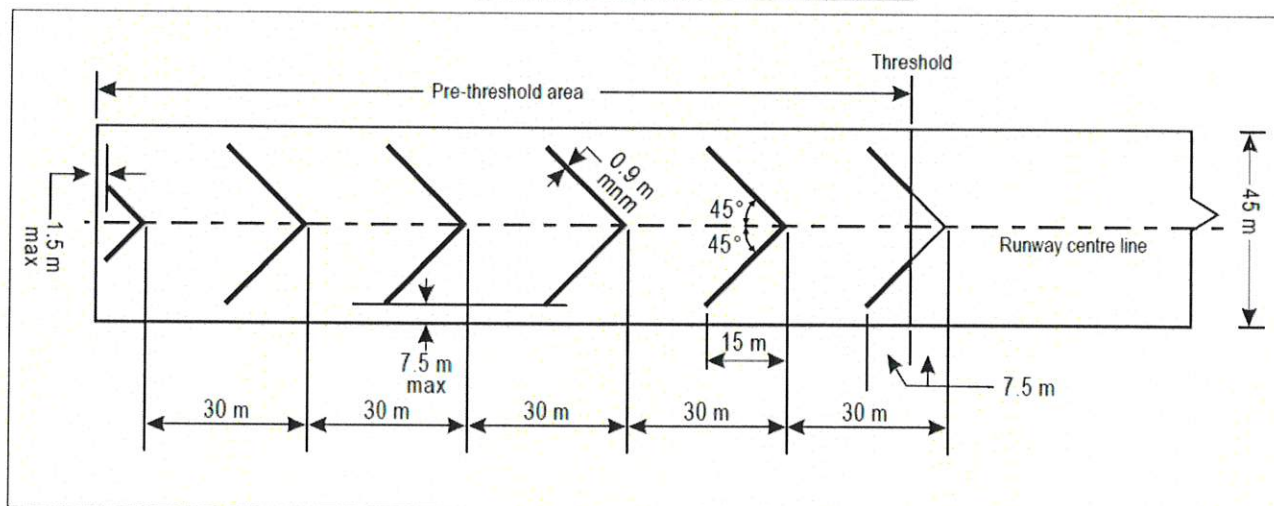
(59) Non-load-bearing surfaces

Shoulders for taxiways, holding bays and aprons and other non-load-bearing surfaces which cannot readily be distinguished from load-bearing surfaces and which, if used by aircraft, might result in damage to the aircraft, shall have the boundary between such areas and the load-bearing surface marked by a side stripe marking.

(60) Pre-threshold area

- (a) When the surface before a threshold is paved and exceeds 60m in length and is not suitable for normal use by aircraft, the entire length before the threshold shall be marked with a chevron marking;
- (b) A chevron marking shall point in the direction of the runway and be placed as shown in Diagram 4; and
- (c) A chevron marking shall be of conspicuous colour and contrast with the colour used for the runway markings; it shall preferably be yellow. It shall have an overall width of at least 0.9m.

Diagram 4: Chevron marking



(61) Unserviceable areas

Unserviceability markers shall be displayed wherever any portion of a taxiway, apron or holding bay is unfit for the movement of aircraft but it is still possible for aircraft to bypass the area safely. On a movement area used at night, unserviceability lights shall not be used.

(62) Electrical Systems

- (a) Power supply systems for air navigation facilities;
- (b) Adequate primary power supply shall be available at aerodromes for the safe functioning of air navigation facilities; and
- (c) For aerodromes that are referred to in regulation 139.02.1(1), the design and provision of electrical power systems for the aerodrome visual and radio navigation aids shall be such that an equipment failure shall not leave pilots with inadequate visual and non-visual guidance or misleading information.

(63) Visual aids

- (a) For a precision approach runway, a secondary power supply capable of meeting the requirements specified in Table 13 for the appropriate category of precision approach runway shall be provided. Electric power supply connections to those facilities for which secondary power is required shall be so arranged that the facilities are automatically connected to the secondary power supply on failure of the primary source of power; and
- (b) For a runway meant for take-off in runway visual range conditions of less than 800 m, a secondary power supply capable of meeting the relevant requirements of Table 13 shall be provided

(64) System design

- (a) For a runway meant for use in runway visual range conditions of less than 550m, the electrical systems for the power supply, lighting and control of the lighting systems included in Table 13 shall be so designed that an equipment failure shall not leave the pilot with inadequate visual guidance or misleading information;
- (b) Where the secondary power supply of an aerodrome is provided by the use of duplicate feeders, such supplies shall be physically and electrically separate so as to ensure the required level of availability and independence; and
- (c) Where a runway forming part of a standard taxi-route is provided with runway lighting and taxiway lighting, the lighting systems shall be interlocked to preclude the possibility of simultaneous operation of both forms of lighting.

(65) Monitoring

- (a) Where lighting systems are used for aircraft control purposes, such systems shall be monitored automatically so as to provide an indication of any fault which may affect the control functions. This information shall be automatically relayed to the air traffic service unit; and
- (b) The electrical power supply for lighting and control of aerodrome lighting systems shall be so designed and arranged that it operates in both local modes; which is a manual operation done by a person and remote control mode which is controlled from the power supply in the electrical vault to the ATC control mimic panel.

(66) Secondary power supply requirements

Secondary power supply requirements are as shown in Table 13.

Table 13: Secondary power supply requirements

<u>Runway Classification</u>	<u>Lighting</u>		<u>Radio Aids</u>	
	<u>Visual Aids requiring power</u>	<u>Maximum switch-over time</u>	<u>Radio Aids Requiring Power</u>	<u>Max Switch-Over time</u>
<u>Non-Instrument</u>	<u>Visual Approach Slope Indicator</u> <u>Runway Edge</u> <u>Runway Threshold</u> <u>Runway End</u> <u>Obstacle</u>	<u>2 minutes</u> <u>2 minutes</u> <u>2 minutes</u> <u>2 minutes</u> <u>2 minutes</u>		

<u>Non-precision</u>	<u>Approach Lighting System</u> <u>Visual Approach Slope Indicator</u> <u>Runway Edge</u> <u>Runway Threshold</u> <u>Runway End</u> <u>Obstacle</u>	<u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u>	<u>SRE</u> <u>VOR</u> <u>NDB</u> <u>D/Facility</u>	<u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u>
<u>Precision approach category I</u>	<u>Approach Lighting System</u> <u>Runway Edge</u> <u>Runway Threshold</u> <u>Runway End</u> <u>Obstacle</u>	<u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u> <u>15 seconds</u>	<u>ILS</u> <u>localizer</u> <u>ILS glide path</u> <u>ILS middle marker</u> <u>ILS outer marker</u> <u>PAR</u>	<u>10 seconds</u> <u>10 seconds</u> <u>10 seconds</u> <u>10 seconds</u> <u>10 seconds</u> <u>10 seconds</u>
<u>Precision approach category II</u>	<u>Approach Lighting System</u> <u>Runway Edge</u> <u>Runway Threshold</u> <u>Runway End</u> <u>Runway Centre Line</u> <u>Runway Touchdown Zone</u> <u>Stop Bars at Taxi- Holding Positions</u> <u>Essential Taxiway Including Stop Bars other than those at Taxi-Holding Positions</u> <u>Obstacles</u>	<u>1 second</u> <u>15 seconds</u> <u>1 second</u> <u>1 second</u> <u>1 second</u> <u>1 second</u> <u>1 second</u> <u>15 seconds</u> <u>15 seconds</u>	<u>ILS</u> <u>localizer</u> <u>ILS glide path</u> <u>ILS inner marker</u> <u>ILS middle marker</u> <u>ILS outer marker</u>	
<u>Precision approach category III</u>	<u>(Same As Category II Except all Stop Bars- 1 second)</u>		<u>Same as Category II</u>	

(67) Pavement bearing strength

- (a) The load-bearing qualities shall be sufficient to support the aircraft it is intended to serve without causing structural damage to the aircraft;
- (b) The bearing strength shall be reported using the ACN/PCN method;
- (c) Details of the five elements of the code and an examples are as specified in Table 14;

Table 14: Elements of the code and example

56 (a)	F (b)	B (c)	X (d)	T (e)
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(d) The PCN number. Refer to aircraft manufacturer for individual aircraft requirements. The PCN shall not be less than the highest ACN; and

(e) Pavement type for ACN-PCN determination: Code:

R - Rigid pavement

F - Flexible pavement

(f) Sub-grade strength category: Code

A - High strength: Characterized by $K=150 \text{ Nm/m}^3$ and representing all K values above 120 Nm/m^3 for rigid pavements, and by $\text{CBR} = 15$ and representing all CBR values above 13 for flexible pavements.

B - Medium strength; Characterized by $K = 80 \text{ Nm/m}^3$ and representing a range in K of 60 to 120 Nm/m^3 for rigid pavements, and by $\text{CBR} = 10$ and representing a range in CBR of 8 to 13 for flexible pavements.

C - Low strength: Characterized by $K=40 \text{ Nm/m}^3$ and representing a range in K of 25 to 60 Nm/m^3 for rigid pavements, and by $\text{CBR} = 6$ and representing a range in CBR of 4 to 8 for flexible pavements.

D - Low strength: Characterized by $K=20 \text{ Nm/m}^3$ and representing all K values below 25 Nm/m^3 for rigid pavements, and by $\text{CBR} = 3$ and representing all CBR values below 4 for flexible pavements.

(g) Maximum allowable tyre pressure category: Code

W - High: no pressure limit

X - Medium: pressure limited to 1, 50 MPa

Y - Low: pressure limited to 1, 00 MPa

Z - Very low: pressure limited to 0, 50 MPa

(h) Evaluation method: Code

T - Technical evaluation: representing a specific study of the pavement characteristics and application of pavement behaviour technology.

U - Using aircraft experience: representing a knowledge of the specific type and mass of aircraft satisfactorily being supported under regular use.

- (e) the insertion in Technical Standard 139.02 23 after section 8 of the following sections:

“9. Aeronautical study and Risk Assessment

(1). The Director may exempt, in writing, an aerodrome operator from complying with Subpart 1 and 2 provisions of Part 139 regulations as follows:

- (a) When a holder of the aerodrome licence does not meet a requirement specified in Part 139 regulation, an aeronautical study or risk assessment shall be conducted to assess the impact of deviations from Subpart 1 and 2 of Part 139 regulation, to present alternative means of ensuring the safety of aircraft operations, to estimate the effectiveness of each alternative and to recommend procedures to compensate for the deviation;
- (b) An exemption shall be subject to the aerodrome operator complying with the conditions specified by the Director in the aerodrome license as being necessary in the interest of safety;
- (c) Before the Director decides to exempt the aerodrome operator, the Director shall take into account all safety related aspects;
- (d) The Director may determine, after consideration of aeronautical studies or risk assessment, only if and where permitted by the regulation, the conditions and procedures that are necessary to ensure a level of safety equivalent to that established by the relevant regulation;
- (e) Deviation from a requirement specified in Part 139 regulation, the Director shall endorse the conditions for the type of use of the aerodrome when granting the aerodrome licence; and
- (f) The Director shall publish approved deviations from the regulation in the appropriate Aeronautical Information Service (AIS) publications.

10. Precision approach Path Indicator Flight Checks

Checking the precision approach path indicator elevation settings, vertical angle and flight checks shall be carried out annually by aerodromes with precision approach runways.

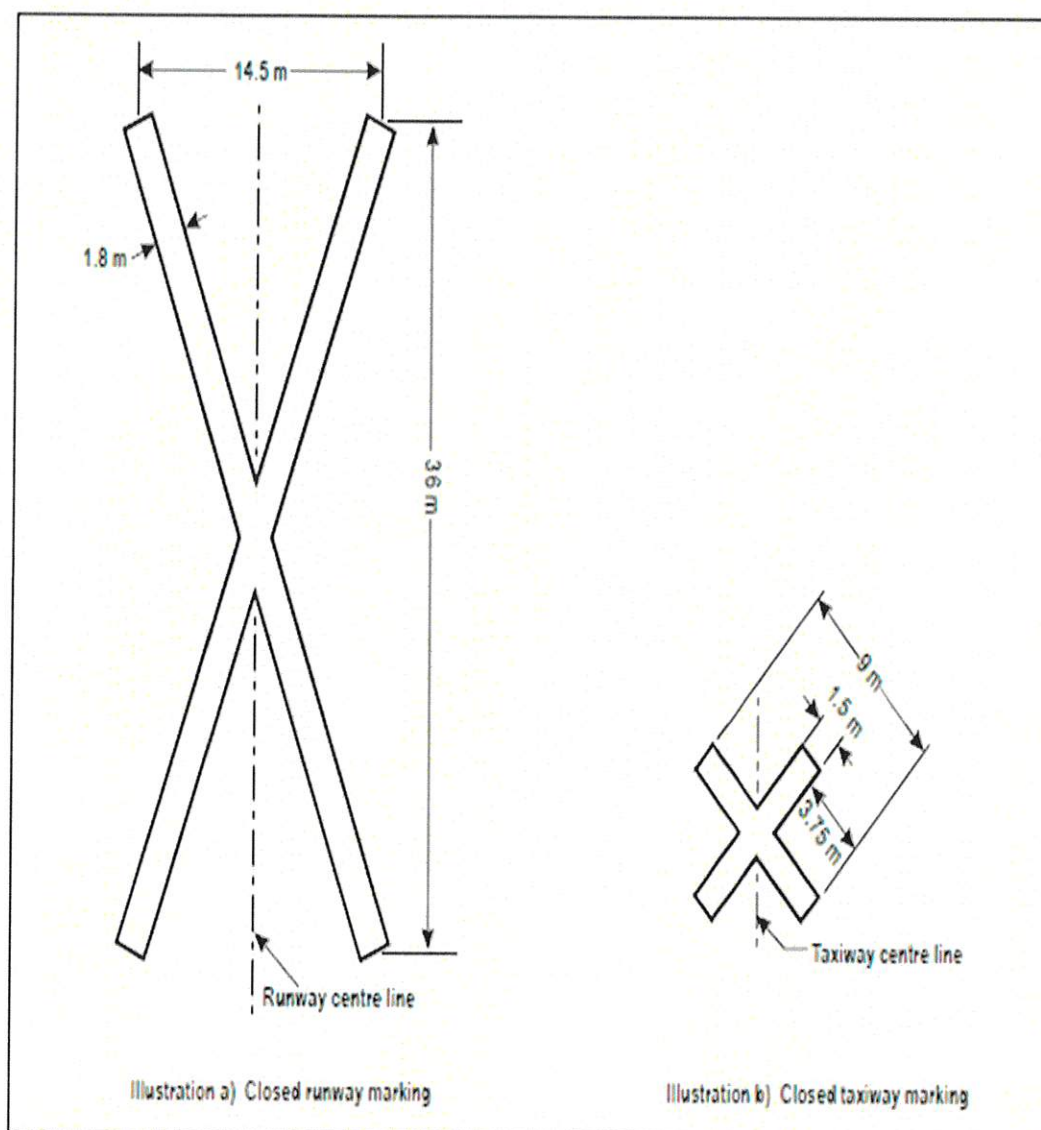
11. Precision approach Path Indicator Ground Checks

- (1) The maintenance personnel shall ensure that the area surrounding the PAPI and the Base Station position is clear and that the grass is cut short. The ground personnel shall prepare the following:
- (a) ensure that all lamps are operating.
 - (b) check the lamps for blackening and the lenses for cleanliness
 - (c) check the setting of each unit to determine proper angular adjustment.
 - (d) ensure that the brightness is at 100% before the start of the calibration flight check during the day and 10% at night.

12 Closed runways and taxiways, or parts thereof

- (1) An aerodrome license holder shall develop and maintain a procedure to prevent an aircraft entering temporary or permanently closed runways and taxiways-
- (a) with closed marking shall be displayed on a runway or taxiway or portion thereof which is temporary/permanently closed to the use of all aircraft;
 - (b) on a runway a closed marking shall be placed at each end of the runway, or portion thereof, declared closed, and additional markings shall be so placed that the maximum interval between markings does not exceed 300 m; and
 - (c) on a taxiway a closed marking shall be placed at least at each end of the taxiway or portion there of closed.
- (2) The closed marking shall be of the form and proportion detailed in Diagram 1 when displayed on a runway and on a taxiway.
- (3) The marking shall be white when displayed on a runway and shall be yellow when displayed on a taxiway.
- (4) When a runway or taxiway or portion thereof is permanently closed, all normal runway and taxiway markings shall be obliterated.
- (5) Lighting on a closed runway or taxiway or portion thereof shall not be operated, except as required for maintenance purposes.
- (6) In addition to closed markings, when the runway or taxiway or portion thereof closed is intercepted by a usable runway or taxiway which is used at night, unserviceability lights shall be placed across the entrance to the closed area at intervals not exceeding 3m".

Diagram 1: Closed runway and taxiway markings



AMENDMENT OF TECHNICAL STANDARD 171

9. Technical Standard 171 is hereby amended by the substitution of Technical Standard 171.03.8 with the following technical standard:

“171.03.8 SPECIFICATIONS REGARDING COMMUNICATION PROCEDURES

1. **Specifications outlined in the following ICAO Annexure 10 Volume II chapters:**
 - (a) Chapter 2: Administrative Provisions relating to the International Aeronautical Telecommunication Service;
 - (b) Chapter 3: General Procedures for the International Telecommunication Service;
 - (c) Chapter 4: Aeronautical Fixed Service (AFS);

- (d) Chapter 5: Aeronautical Mobile Service – Voice Communication; and
- (e) Chapter 6: Aeronautical Radio Navigation Service.

2. Requirements for flight and ground inspection of VHF Direction Finding (VDF) Systems

(1) Safety objective:

The VDF equipment shall provide indications of known accuracy to ATC of the magnetic bearing to or from the VDF site of an aircraft transmitting on associated aerodrome communication frequencies.

(2) Functional requirements:

- (a) Introduction;
- (b) To achieve the safety objective, the accuracy and useful service area of the VDF installation shall be demonstrated by Flight Inspection;
- (c) VDF Flight Inspection shall be undertaken on commissioning of new equipment, replacement of aerial system, relocation of equipment or other major adjustment or modification that may cause the accuracy of the equipment to be compromised, or at any other time as required by an authorised Inspector; and
- (d) Use may be made of any suitable method, provided that the positioning accuracy of the aircraft is better than the required accuracy of the VDF by a factor of 2, i.e. $\text{Class A} / 2 = \pm 1^\circ$ aircraft positioning accuracy.

(3) Required procedures

- (a) The following activities shall be carried out during the commissioning of the VDF.
- (b) Ground checks
 - (i) Checks to confirm the bearing accuracy shall be carried out using suitable test oscillator(s) or portable radio equipment, at previously surveyed ground points around the VDF antenna.

NOTE: Establishment of accurate test points is necessary in order to provide confidence that the alignment of the VDF is correct prior and subsequent to, flight inspection.

- (ii) Unless otherwise advised by the VDF manufacturer, ground test points shall be located every 10 degrees around the VDF antenna if practicable.
 - (iii) Periodic confirmation of the bearing accuracy, using ground checks, shall be undertaken in accordance with the equipment manufacturer's recommendations, but shall be at least annually.
- (c) Checks using aircraft:

- (i) The flight calibration aircraft shall complete an orbit of the VDF, measuring the actual magnetic bearing from the VDF, which shall be compared with those indicated by the direction finder display. Any suitably equipped aircraft may be used.

Note: It may be necessary to complete orbit flights in both directions in order to eliminate any 'lag error'.

- (ii) The height and radius for the flight inspection is dependent on the required operational coverage for the VDF. The flight check shall take place at the limit of the required operational coverage and be at an altitude, which shall maintain radio line of site, whilst observing any minimum safe altitude criteria.
- (iii) Where the operational coverage is not specified then the limits of the VDF, with its associated communications equipment, shall be established.

Note: Ground and Air checks may need to be repeated if the equipment is adjusted in order to eliminate errors.

- (iv) Areas where out of tolerance errors cannot be corrected or where VHF communication was not of sufficient quality shall be subject to further investigation. Any subsequent limitations to coverage shall be published in the Authority website AIP.

(d) Approach procedures:

VDF is intended as a positional awareness aid to ATC in the absence of surveillance facilities and is not intended to support approach procedures.

(e) Frequencies"

- (i) Tests shall be carried out on the primary VDF frequency.
- (ii) Bearing accuracy spot checks shall be carried out on all other communication frequencies associated with the VDF.
- (iii) Standby power checks at the ground check points shall be repeated using the standby power source, if installed.

(4) The results shall be assessed for categorisation using the following criteria in terms of ICAO Annex 10 Volume II Chapter 6.

- (a) Category Range of Bearing Error
- (b) Class A – accurate within plus or minus 2 degrees
- (c) Class B – accurate within plus or minus 5 degrees
- (d) Class C - accurate within plus or minus 10 degrees.

(5) The results and supporting evidence shall then be submitted to the Authority for acceptance and approval of the facility.

- (a) Chapter 7: Aeronautical Broadcast Service

AMENDMENT OF TECHNICAL STANDARD 172

10. Technical Standard 172.03.14 is hereby amended by the substitution of subsection (2) of the following subsection:

“(2) **[air traffic control instructions manual]** Standards and procedures manual”.”

