



WELLINGTON NEW ZEALAND

PURSUANT to Section 28 of the Civil Aviation Act 1990

I, MAURICE WILLIAMSON, Minister of Transport,

HEREBY MAKE the following ordinary rules.

SIGNED AT Wellington

This *29* day of *March* 1999

by **MAURICE WILLIAMSON**

Minister of Transport

A handwritten signature in black ink, appearing to read 'Maurice Williamson', written over a large, dark, scribbled-out area.

Civil Aviation Rules

Part 121 – Amendment 5

Air Operations - Large Aeroplanes

Docket 98/CAR/1303

Civil Aviation Rules

Part 121

Air Operations - Large Aeroplanes

**RULE OBJECTIVE, EXTENT OF CONSULTATION
AND COMMENCEMENT**

The objective of Part 121, amendment 5 is to bring into force changes that result from amendment 6 to Part 135, the Part 135 Review, and consequential amendments to Parts 1, 12, 19, 61, 66, 93, 119, and 125 of the Civil Aviation Rules. Changes relate to the inclusion of commercial transport operations and the addition of the definition of air operation necessitating the complete reissue of Part 121. Consultation regarding the amendment to Part 121 was conducted as part of the consultation process for the amendment to Part 135.

Part 121 Amendment 5 comes into force 30 April 1999.

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Part 121 Amendment

Part 121 is revoked and the following new Part 121 inserted:

“Subpart A — General

121.1 Purpose

This Part prescribes rules governing air transport operations and commercial transport operations using an aeroplane having a seating configuration of more than 30 seats, excluding any required crew member seat, or a payload capacity of more than 3410 kg.

121.3 Definitions

In this Part—

Air operation means an air transport operation or a commercial transport operation using an aeroplane having a seating configuration of more than 30 seats, excluding any required crew member seat, or a payload capacity of more than 3410 kg;

Air operator certificate means an airline air operator certificate:

Consolidation means the process by which a person, through practice and practical experience, increases proficiency in newly-acquired knowledge and skills:

Curriculum means a portion of an Advanced Qualification Programme that covers at least one of the following programme areas—

- (1) indoctrination; or
- (2) qualification that addresses the required training and qualification activities for a specific make, model, and series or variant of aeroplane and for a specific duty position; or
- (3) continuing qualification that addresses the required training and qualification activities for a specific make, model, and series of aeroplane or variant and for a specific duty position:

Exposition, unless used with reference to another source, means a record of the information required by 119.81 or 119.125:

Evaluator means a qualified flight examiner or person who has completed training and evaluation that qualifies the person to evaluate the performance of crew members, instructors, other evaluators, and other operations personnel, in an AQP:

Line-operating flight time means flight time performed in air operations to which this Part applies:

Net take-off flight path, take-off flight path, take-off distance, and take-off run have the same meaning as prescribed in the rules under which the aeroplane was certificated:

Threshold means that point where a 1:20 obstacle-free approach surface intersects the runway surface.

121.5 *Laws, regulations, and procedures*

Each holder of an air operator certificate issued under Part 119 shall ensure that all persons employed, engaged, or contracted, by the certificate holder are familiar with the appropriate sections of the Act, Civil Aviation Rules, and procedures specified in the certificate holder's exposition.

121.7 *Procedure compliance*

Each person performing an air operation shall conform with the applicable procedures specified in the exposition of the holder of an air operator certificate that authorises the operation.

121.9 *Crew member grace provisions*

If a crew member who is required by Subparts H, I, or J, to take a test or a flight check or be assessed completes the test or flight check within one calendar month of the day on which it is required, that crew member shall be deemed to have completed the test or check on the date it is required to be completed.

121.11 *Flight simulator and other training device approval*

(a) Each holder of an air operator certificate shall ensure that each flight simulator, or training device, on which flight credits may be accrued is specifically approved for—

- (1) use by the certificate holder; and

- (2) the aeroplane type and, if applicable, the particular variant within that type, for which the training or check is being conducted; and
 - (3) the particular manoeuvre, procedure, or crew member function involved.
- (b) The certificate holder shall ensure that each flight simulator or any training device where flight credits may be accrued—
- (1) maintains the performance, functional, and other characteristics that are required for approval; and
 - (2) is modified to conform with any modification to the aeroplane being simulated that results in changes to performance, functional, or other characteristics required for approval; and
 - (3) is given a daily functional pre-flight check before being used and any discrepancy is logged by the appropriate flight crew supervisor or instructor at the end of each training or check flight.
- (c) An approved flight simulator or training device may be used by more than one certificate holder provided it is specifically approved for use by each certificate holder.

121.13 Carriage of firearms

- (a) Except as provided in paragraph (b), each person performing an air operation shall ensure that no person carries a firearm in an aeroplane unless the firearm is—
- (1) disabled; and
 - (2) where possible, stowed in a place that is inaccessible to any person other than a crew member.
- (b) Any person lawfully entitled to carry firearms on their person in the course of their duties may be in possession of a firearm in an aeroplane if that person—
- (1) is in the course of their lawful duties; and

- (2) holds an authorisation issued by the Director in accordance with 19.351.

Subpart B — Flight Operations

121.51 Purpose

This Subpart prescribes the rules governing air operations.

121.53 Aeroplane airworthiness

Each holder of an air operator certificate shall ensure that each aeroplane operated by the holder has a current standard category airworthiness certificate.

121.55 Common language

Each holder of an air operator certificate shall ensure that—

- (1) all crew members can communicate in a common language with at least flight crew members being able to communicate in the English language; and
- (2) all operations personnel are able to understand the language in which the applicable parts of the certificate holder's exposition are written.

121.57 Aeroplane proving flights

(a) Each holder of an air operator certificate that intends to introduce a new aeroplane type shall, prior to that aeroplane type being used in air operations, ensure that a programme of proving flights is conducted, in addition to the aeroplane certification tests, when proving flights acceptable to the Director have not been previously conducted in accordance with the requirements of the State of certification.

(b) The programme required by paragraph (a) shall consist of at least 100 hours of proving flights, including a representative number of flights into en-route aerodromes, and at least 10 hours night flight.

(c) Each holder of an air operator certificate that intends to introduce into its operation an aeroplane type that has been materially altered in design since the last proving flights shall, prior to that aeroplane type being used in

air operations, ensure that a programme comprising at least 50 hours of proving flight is conducted.

(d) For the purpose of paragraph (c), an aeroplane type is considered to be materially altered in design if the alterations include—

- (1) the installation of powerplants of a type dissimilar to those installed at initial certification; or
- (2) alterations to the aeroplane or its components that materially affect flight characteristics.

(e) Each holder of an air operator certificate that carries out an aeroplane proving flight shall restrict the carriage of personnel during the flight to necessary crew members and to personnel who are—

- (1) receiving familiarisation or training; or
- (2) gaining line operating flight time; or
- (3) authorised to represent the Director.

121.59 Flight preparation

(a) Each holder of an air operator certificate shall ensure for each air operation that information is available to the pilot-in-command to complete the preparation for the intended operation.

(b) The certificate holder shall ensure that a flight plan is prepared for each air operation and, if not prepared by the pilot-in-command, the pilot-in-command is advised of its contents before the intended operation.

(c) Where operations personnel prepare an operational flight plan, the certificate holder shall ensure that the personnel—

- (1) are trained and competent to perform the task; and
- (2) are notified as soon as practicable of each change in equipment and operating procedure or facilities.

(d) For the purpose of paragraph (c)(2), notifiable changes include changes to the use of navigation aids, aerodromes, ATC procedures and regulations, local aerodrome traffic control rules, and known hazards to

flight including potentially hazardous meteorological conditions and irregularities in ground and navigation facilities.

(e) The certificate holder shall ensure that a flight plan is submitted to an appropriate ATS prior to each air operation.

(f) Notwithstanding 91.407(a)(1) and 91.307(a), the certificate holder may, instead of the pilot-in-command, submit the flight plan to an appropriate ATS.

121.61 Operational flight plans

(a) When establishing the operational flight plan on which a flight schedule is to be based, each holder of an air operator certificate shall ensure that—

- (1) the aeroplane operating cycle is calculated using data for that aeroplane that is contained in, or derived from, the manufacturer's manuals and that conforms to the parameters contained in the aeroplane's type certificate; and
- (2) the prevailing en-route winds are considered; and
- (3) enough time is allowed for the proper servicing of each aeroplane at intermediate stops.

(b) The certificate holder shall ensure that during any 365 day period at least 80% of its air operations arrive at the planned destination within the parameters of the operational flight plan used to establish the schedule.

121.63 Search and rescue information

Each holder of an air operator certificate shall, for each aeroplane it operates, ensure that all relevant information concerning the search and rescue services in the area over which the aeroplane will be flown is available on board.

121.65 Emergency and survival equipment information

(a) Each holder of an air operator certificate shall have available, for immediate communication to rescue co-ordination centres, information on the emergency and survival equipment carried on board each of its aeroplanes.

(b) For extended over-water operations the information required by paragraph (a) shall include—

- (1) the number, colour, and type of life rafts; and
- (2) whether pyrotechnics are carried; and
- (3) details of emergency medical supplies and water supplies; and
- (4) the type and operating frequencies of any emergency portable radio equipment.

121.67 Ditching certificate

Each holder of an air operator certificate shall ensure that aeroplanes used on extended over-water operations have been certified for ditching.

121.69 Minimum height for VFR flights

Rule 91.311(c) shall not apply to a pilot-in-command performing air operations under this Part.

121.71 Use of aerodromes

(a) Each holder of an air operator certificate shall ensure that any aerodrome to be used in its operations has physical characteristics, obstacle limitation surfaces, and visual aids that meet the requirements of—

- (1) the characteristics of the aeroplane being used; and
- (2) the lowest meteorological minima to be used.

(b) The certificate holder shall ensure that any aerodrome to be used in its operations has—

- (1) rescue fire equipment appropriate to the aeroplane type that is acceptable to the Director; and
- (2) a visual approach slope indicator system for turbojet and turbofan powered aeroplanes.

(c) The certificate holder shall ensure that only aerodromes specified, individually or by groupings, in its exposition are authorised for use in its operations.

(d) The certificate holder shall specify the—

- (1) route or segment of a route; and
- (2) necessary level of flight crew training; and
- (3) minimum flight crew experience; and
- (4) flight crew pairing restrictions; and
- (5) type of authorised flight operations—

relating to each aerodrome or grouping of aerodromes.

(e) Subject to paragraph (f)(1), each aerodrome specified under paragraph (c), that is to be used as an alternate aerodrome by an aeroplane that has a certificated seating capacity of more than 30 passengers and is engaged on domestic air operations, may be a non-certificated aerodrome.

(f) Each aerodrome specified under paragraph (c), that is to be used by an aeroplane that has a certificated seating capacity of more than 30 passengers and is engaged on a regular air transport passenger service, shall be an aerodrome that—

- (1) for New Zealand aerodromes, is associated with a Part 139 certificate; or
- (2) for aerodromes outside New Zealand, is associated with a certificate issued by an ICAO contracting State and is of a standard equivalent to Part 139.

(g) The certificate holder shall maintain a register, as part of the route guide, of aerodromes that are to be used in accordance with paragraph (e) or (f), containing—

- (1) the aerodrome data; and
- (2) procedures for ensuring that the condition of the aerodrome is safe for that operation; and

- (3) procedures for ensuring that the condition of any required equipment, including safety equipment, is safe for that operation; and
 - (4) any limitations on the use of the aerodrome.
- (h) The certificate holder shall ensure that any aeroplane does not land at or take off from a runway unless—
- (1) the runway width is at least that width determined by reference to the aeroplane code number in Table 2 of Appendix C; and
 - (2) the minimum runway strip width for the runway used is determined by reference to Table 3 of Appendix C.
- (i) Notwithstanding paragraph (h), the certificate holder may use a lesser minimum runway width than that prescribed in paragraph (h) for an aeroplane type if—
- (1) a lesser minimum runway width is established by certificated flight testing and is prescribed in the aeroplane's flight manual; or
 - (2) a lesser minimum runway width was prescribed in the certificate holder's air service certificate, issued under regulation 136 of the Civil Aviation Regulations 1953, before 6 January 1993 for the aeroplane.

121.73 Night operations

A person shall not perform an operation at night under VFR.

121.75 Fuel

- (a) Each holder of an air operator certificate shall establish a fuel policy for the purpose of flight planning, and inflight replanning, to ensure that each aeroplane carries sufficient fuel for the planned operation, including reserves to cover deviations from the planned flight.
- (b) The fuel policy shall ensure that the planning of fuel requirements is based upon—

- (1) procedures, tables, and graphs, that are contained in, or derived from, the manufacturer's manuals and that conform to the parameters contained in the aeroplane's type certificate; and
 - (2) the operating conditions under which the flight is to be conducted, including—
 - (i) normal aeroplane fuel consumption data; and
 - (ii) anticipated weights; and
 - (iii) expected meteorological conditions; and
 - (iv) ATS requirements and restrictions; and
 - (v) the geographic location of the destination aerodrome; and
 - (vi) the effect on fuel consumption of identified contingencies.
- (c) Except as provided in paragraph (d), the certificate holder shall ensure that the calculation of usable fuel required for an operation takes into account the following factors—
- (1) taxi fuel; and
 - (2) trip fuel; and
 - (3) reserve fuel, consisting of—
 - (i) contingency fuel; and
 - (ii) alternate fuel, if an alternate aerodrome is required; and
 - (iii) final-reserve fuel; and
 - (iv) additional fuel, if required by the type of operation.
- (d) The certificate holder may vary the factors required to be taken into account in paragraph (c) to accommodate the en-route re-planning procedure if the variation is provided for in the certificate holder's exposition.

121.77 Flight check system

(a) Each holder of an air operator certificate shall ensure that flight crew members have available for use a flight check system that includes—

- (1) instructions and guidelines for the safe and efficient management of the flight deck; and
- (2) methods used to conduct the flight safely.

(b) The certificate holder shall ensure that the system enables safe real-time decision making and aeroplane management by conforming with the principles—

- (1) contained in the aeroplane flight manual; and
- (2) contained in the manufacturer's technical and safety instructions; and
- (3) of crew resource management; and
- (4) of human factors and psychology; and
- (5) of ergonomics.

(c) The certificate holder shall ensure that the system includes—

- (1) an expanded checklist in the operations manual; and
- (2) scan checks; and
- (3) a quick reference handbook; and
- (4) a checklist for procedures, including emergency procedures.

(d) The certificate holder shall ensure that the system contains procedures, available for use at each flight crew member's duty station, to be followed by them—

- (1) prior to and during take-off; and
- (2) in flight; and

- (3) on landing; and
- (4) during normal, non-normal, and emergency situations.

121.79 Emergency light operation.

Each person performing an air operation shall ensure that each emergency light system required by Part 26 Appendix D is armed or turned on during taxiing, takeoff, and landing.

121.81 Passenger safety

Each person performing an air operation shall ensure that—

- (1) passengers are seated where, in the event of an emergency evacuation, they will not hinder evacuation from the aeroplane; and
- (2) any passenger who appears to be under the influence of alcohol or drugs or exhibits behavioural characteristics, to the extent where the safety of the aeroplane or its occupants is likely to be endangered, is refused embarkation or, where appropriate, removed from the aeroplane; and
- (3) disabled passengers are appropriately cared for, including allocation of appropriate seating positions and handling assistance in the event of an emergency; and
- (4) children under the age of 15 years, and adults with an infant, are not seated in any seat row next to an emergency exit; and
- (5) escorted passengers do not constitute a safety hazard to other passengers or to the aeroplane, and that prior arrangements for their carriage have been made in accordance with procedures specified in the certificate holder's exposition; and
- (6) the senior flight attendant, or the pilot-in-command, is notified when a disabled or escorted person is to be carried on board the aeroplane.

121.83 Passenger information

(a) Each person performing an air operation shall ensure that the *Fasten Seat Belt* sign is turned on—

- (1) while the aeroplane is moving on the ground; and
 - (2) for each takeoff; and
 - (3) for each landing; and
 - (4) at any other time considered necessary by the pilot-in-command.
- (b) Each person performing an air operation shall ensure that passengers are informed, either by illuminated *No Smoking* signs or by approved *No Smoking* placards, when smoking is prohibited in the aeroplane.
- (c) If illuminated *No Smoking* signs are installed in an aeroplane, they must be lit when smoking is prohibited.

121.85 Flight compartment admission

- (a) Each holder of an air operator certificate shall ensure at least one forward-facing observer's seat is available in the flight compartment, on each aeroplane performing air operations, that is suitable for use while conducting en-route inspections.
- (b) Each person performing an air operation shall ensure that no person, other than the flight crew members assigned to the flight, is admitted to, or carried in, the flight compartment, or occupies a pilot seat, unless that person is permitted by the pilot-in-command, and is—
- (1) a crew member; or
 - (2) an authorised representative of the Director; or
 - (3) permitted by the holder of the air operator certificate in accordance with procedures specified in the certificate holder's exposition.
- (c) Each person performing an air operation shall ensure that all persons admitted to the flight compartment or occupying a pilot seat are familiarised with the appropriate safety procedures specified in the certificate holder's exposition.

121.87 Manipulation of controls

(a) Each holder of an air operator certificate shall ensure that no person is permitted to manipulate the flight controls of its aeroplanes that are performing air operations, unless the person is—

- (1) a flight crew member qualified in accordance with 121.505 and authorised by the certificate holder; or
- (2) an authorised representative of the Director, qualified in accordance with 121.505, who—
 - (i) has the permission of the certificate holder and the pilot-in-command; and
 - (ii) is performing a required duty.

(b) No person shall manipulate the controls of an aeroplane performing an air operation, unless the person is authorised in accordance with paragraph (a)(1) or (2).

121.89 Flight recorder requirements

(a) Each flight crew member shall ensure that—

- (1) the cockpit-voice recorder required by 121.371 is operated continuously from the start of the checklist commenced before engine start until the completion of the final checklist at the termination of flight; and
- (2) if the aeroplane is equipped to record the uninterrupted audio signals received from a boom or a mask microphone, the boom microphone is used below 10 000 feet altitude; and
- (3) if an erasure feature is used in the cockpit-voice recorder, only information recorded more than 30 minutes earlier than the last record is erased or otherwise obliterated.

(b) Each flight crew member shall ensure that—

- (1) the flight data recorder required by 121.373 is operated continuously from the instant the aeroplane begins the take-off until it has completed the landing; and

- (2) all recorded data is kept until the aeroplane has been operated for at least 25 hours after each operating cycle; and
- (3) no more than 1 hour of recorded data is erased for the purpose of testing the flight recorder or the flight recorder system; and
- (4) any erasure made in accordance with paragraph (b)(3) is—
 - (i) of the oldest recorded data accumulated at the time of testing; and
 - (ii) recorded in the appropriate maintenance documentation.

121.91 Refuelling and defuelling operations

- (a) Each holder of an air operator certificate shall ensure that no aeroplane is refuelled or defuelled with Class 3(a) fuel when passengers are embarking, on board, or disembarking the aeroplane, or when one or more propulsion engines are running.
- (b) Each person performing an air operation may permit an aeroplane to be refuelled or defuelled with Class 3(b) fuel when passengers are embarking, on board, or disembarking the aeroplane, provided the person ensures that safety and aeroplane evacuation precautions are taken in accordance with procedures specified in the certificate holder's exposition.
- (c) Each person performing an air operation may permit an aeroplane to be refuelled or defuelled with Class 3(b) fuel with one or more propulsion engines running, provided that—
 - (1) all passengers are disembarked under supervision and clear of the immediate area prior to fuelling commencing; and
 - (2) the pilot-in-command is responsible for all aspects of the fuelling operation.
- (d) Each holder of an air operator certificate shall ensure that fuelling does not take place when any fuel-venting outlet or external fuel hose on the aeroplane or refuelling equipment, is within 15 metres of any third party or the property of a third party, or where undue risk or hazard exists for any third party.

121.93 Fuel spillage

(a) Each person performing an air operation shall ensure that, where fuel is spilled onto an impermeable surface while fuelling an aeroplane and that fuel is likely to endanger persons or property—

- (1) fuelling is stopped; and
- (2) immediate action is taken to cover the fuel with sand, sawdust, dry earth, or an agent such as foam or dry chemical extinguisher powder, to reduce the fire hazard; and
- (3) the aeroplane is then moved clear of the contaminated area before any engine is started.

121.95 Emergency situation action plans

(a) Each holder of an air operator certificate shall ensure action plans are developed for handling in-air and on-ground emergency situations and minimising risk of injury to persons.

(b) The certificate holder's emergency situation action plan shall be based upon data including but not restricted to—

- (1) type and length of routes over which operations are carried out; and
- (2) aerodrome ground facilities; and
- (3) local emergency services; and
- (4) ATC facilities; and
- (5) type, seating configuration, and payload of the aeroplane likely to be involved.

(c) The certificate holder's in-air emergency plan shall include the following—

- (1) if management personnel become aware of an emergency situation arising on an aeroplane during flight that requires immediate decision and action, procedures to be followed by those personnel to ensure that—

- (i) the pilot-in-command is advised of the emergency; and
 - (ii) the decision of the pilot-in-command is ascertained; and
 - (iii) the decision is recorded; and
- (2) if management personnel are unable to communicate with the pilot-in-command in accordance with paragraph (c)(1), procedures to be followed by those personnel to ensure that—
- (i) an emergency is declared; and
 - (ii) any action considered necessary under the circumstances is taken.
- (d) The certificate holder shall ensure appropriate staff are trained and competent to perform during emergencies in accordance with the emergency situation action plan.

121.97 *Restriction or suspension of operations*

Each holder of an air operator certificate shall, on becoming aware of any condition that is a hazard to safe operations, restrict or suspend operations as necessary until the hazard is removed.

Subpart C — Operating Limitations and Weather Requirements

121.151 Purpose

This Subpart prescribes the rules governing VFR and IFR operations, and associated weather requirements.

121.153 Meteorological information

(a) Each person performing an air operation shall plan, perform, and control flights using meteorological information provided for aviation purposes by—

- (1) subject to paragraph (b), for each flight sector originating within New Zealand, the holder of an aviation meteorological service organisation certificate issued under Part 174; or
- (2) for each sector originating from an aerodrome outside New Zealand, an aviation meteorological service organisation that—
 - (i) meets a standard equivalent to that specified by Part 174; and
 - (ii) is authorised by an ICAO contracting State.

(b) A pilot-in-command may, for each flight sector that originates and terminates within New Zealand, use a basic weather report that is provided in accordance with 174.6 to perform an approach and landing.

121.155 Meteorological conditions – VFR flight

(a) Each person performing an air operation shall ensure a VFR flight is not commenced unless current meteorological reports, or a combination of current reports and forecasts, indicate VFR minima prescribed in Part 91 and in paragraph (d) can be complied with along the route, or that part of the route to be flown under VFR.

(b) A person shall not perform an extended over-water operation under VFR.

(c) A pilot-in-command performing VFR air operations outside controlled airspace shall fly—

- (1) in meteorological conditions of not less than a ceiling of 1000 feet AGL and a flight visibility of not less than 5 km; and
- (2) beneath the ceiling, remaining clear of cloud, and in continuous sight of the ground or water; and
- (3) above not more than scattered cloud.

(d) A pilot-in-command shall not carry out an air operation under VFR in a multi-engined aeroplane above more than scattered cloud unless—

- (1) the aeroplane meets the requirements for IFR flight and the required minimum flight crew for IFR operation, holding current instrument rating qualifications, is at the controls; and
- (2) the instruments and equipment, including radio navigation equipment, required for IFR flight are operative; and
- (3) the aeroplane is capable, with one engine inoperative, of maintaining a net flight path that has a positive slope at 1000 feet above the cloud; and
- (4) the aeroplane carries radio navigation equipment enabling it to be navigated by IFR to an aerodrome where an instrument approach procedure may be carried out for landing; and
- (5) the aeroplane carries sufficient fuel and fuel reserves to proceed by IFR to an aerodrome where an instrument approach procedure may be carried out for landing.

121.157 Meteorological conditions – IFR flight

(a) Each pilot-in-command performing an air operation shall ensure an IFR flight is not commenced unless current meteorological reports, or a combination of current reports and forecasts, indicate that conditions will—

- (1) at the estimated time of arrival at the applicable destination aerodrome, be at or above the minimum prescribed under Part 95

for the instrument procedure likely to be used at that aerodrome;
or

- (2) at the estimated time of use, at—
 - (i) one alternate aerodrome, meet the ceiling and visibility that is required by 91.405(a)(2); or
 - (ii) two alternate aerodromes, meet the ceiling and visibility that is required by 91.405(b).

(b) The pilot-in-command shall make provision for at least one alternate aerodrome that meets the ceiling and visibility that is required by 91.405(b), if—

- (1) the departure or destination aerodrome for the operation is outside New Zealand; and
- (2) the destination aerodrome has less than two separate runways suitable for use by the aeroplane being used.

(c) Each person performing ETOPS shall ensure that before the aeroplane is further than one hour from an adequate aerodrome each aerodrome designated as an en-route alternate aerodrome will, at the possible time of use, be at or above the approved weather minima specified in the certificate holder's exposition.

[Until Part 95 comes into force, instrument approach procedures are prescribed under Part 19]

121.159 Aerodrome operating minima – IFR flight

(a) A pilot-in-command shall not continue an instrument approach to an aerodrome past the final approach fix or, where a final approach fix is not used, the final approach segment of the instrument approach procedure if, prior to passing the final approach fix or the final approach segment, current meteorological information indicates the visibility at the aerodrome is less than the visibility prescribed under Part 95 for the instrument approach procedure being used.

- (b) For the purpose of this rule, the final approach segment begins—
- (1) at the final approach fix or facility prescribed in the instrument approach procedure; or
 - (2) when a final approach fix is not prescribed for a procedure that includes a procedure turn, at the point where the procedure turn is completed and the aeroplane is established on the final approach course within the distance prescribed in the procedure.

[Until Part 95 comes into force, instrument approach procedures are prescribed under Part 19]

121.161 IFR departure limitations

Each person performing an air operation shall ensure an IFR flight from an aerodrome is not commenced when weather conditions are at or above take-off minima prescribed under 91.413 and are below authorised IFR landing minima prescribed under 91.413, unless there is an appropriate aerodrome—

- (1) for a two engine aeroplane, within a maximum of one hour flying time, in still air at one engine inoperative cruising speed, of the aerodrome of departure; or
- (2) for an aeroplane having three or more engines, within a maximum of two hours flying time, in still air at one engine inoperative cruising speed, of the aerodrome of departure.

121.163 Reduced take-off minima

- (a) Each holder of an air operator certificate may operate an aircraft at lower take-off minima than that prescribed in 91.413(g) provided the certificate holder ensures that the operation is conducted in accordance with the reduced minima take-off procedure specified in the certificate holder's exposition.
- (b) The reduced take-off minima procedure shall ensure that—
- (1) the pilot-in-command and the second-in-command are qualified for reduced minima take-offs in accordance with 121.515; and

- (2) the runway to be used has centre-line marking or centre-line lighting; and
- (3) Part 95 authorises reduced take-off minima on the runway to be used; and
- (4) if the aeroplane is a two-engine propeller-driven aeroplane, the aeroplane is equipped with an operative auto-feather or auto-course system; and
- (5) the runway visibility is established using RVR; and
- (6) the method for observing and confirming that the required visibility exists for that take-off is acceptable to the Director.

[Until Part 95 comes into force, instrument approach procedures are prescribed under Part 19]

121.165 En-route limitations

- (a) Each holder of an air operator certificate shall ensure that no aeroplane operates further than 1 hour flying time, in still air at one-engine-inoperative cruising speed, from an adequate aerodrome unless—
- (1) the aeroplane is turbine powered with three or more engines; or
 - (2) the operation is conducted in accordance with procedures for ETOPS required by 121.167(2).
- (b) For the purpose of paragraph (a), an adequate aerodrome means an aerodrome that—
- (1) is associated with a Part 139 certificate or meets safety requirements equivalent to such an aerodrome; and
 - (2) has suitable facilities and services available, for the aeroplane type concerned, that includes—
 - (i) ATC or an aerodrome flight information service; and
 - (ii) a meteorological reporting service; and
 - (iii) at least one let down aid; and

- (iv) a visual approach slope indicator system for turbojet and turbofan powered aeroplanes; and
- (v) sufficient lighting.

121.167 ETOPS limitations

Each holder of an air operator certificate shall ensure that ETOPS is not commenced unless—

- (1) ETOPS is permitted in the certificate holder's operations specifications; and
- (2) procedures for ETOPS are specified in the certificate holder's exposition; and
- (3) the operation will be within the limitations placed by the character of the terrain, the kind of operation, and the performance of the aeroplane used; and
- (4) each en-route alternate aerodrome required by the procedures in subparagraph (2) will be available during the possible period of use; and
- (5) the meteorological requirements of Subpart C can be met.

121.169 IFR procedures

(a) Each pilot-in-command shall conduct IFR air operations on routes prescribed under Part 95, except when—

- (1) it is necessary to avoid potentially hazardous conditions; or
- (2) operating under radar control from an ATS; or
- (3) operating under an off-route clearance obtained from the appropriate ATC unit; or
- (4) otherwise specified in the exposition of the holder of the air operator certificate that authorises the operation.

(b) Unless a clearance has been obtained from the appropriate ATC unit, in controlled airspace, each pilot-in-command shall comply with any IFR

departure and approach procedures prescribed under Part 95 for the appropriate aerodrome.

(c) In uncontrolled airspace each pilot-in-command shall comply with any IFR departure and approach procedures prescribed under Part 95 for the appropriate aerodrome.

[Until Part 95 comes into force, instrument approach procedures are prescribed under Part 19]

Subpart D — Performance

121.201 Purpose

(a) This Subpart prescribes aeroplane performance operating limitations applicable to—

- (1) aeroplanes used in air operations; and
- (2) aeroplanes, used in operations performed under Part 125 or Part 135, certificated to FAR Part 25 airworthiness standards, or equivalent airworthiness standards, that are—
 - (i) propeller-powered aeroplanes with a seating configuration of 20 seats or more; or
 - (ii) multi-engine turbojet or turboprop powered aeroplanes.

(b) Aeroplanes that cannot fully comply with the requirements of this Subpart may be approved to operate under alternative performance operating limitations.

121.203 Reserved

121.205 General performance

Each holder of an air operator certificate shall ensure that, for each aeroplane it operates—

- (1) the take-off weight at the start of its take-off is not greater than the weight permitted under this Subpart for the flight to be undertaken allowing for—
 - (i) expected reductions in weight as the flight proceeds; and

- (ii) such fuel jettisoning as is provided for under this Subpart; and
- (2) the performance data used to determine compliance with the performance requirements of this Subpart is—
 - (i) contained in the aeroplane flight manual; or
 - (ii) in the case of contaminated runway landing distance data, provided by the aeroplane manufacturer and acceptable to the Director.

121.207 Take-off distance

(a) Each holder of an air operator certificate shall ensure that, for each aeroplane it operates, the take-off weight does not exceed the maximum take-off weight specified in the aeroplane flight manual.

(b) When calculating the maximum take-off weight to determine compliance with paragraph (a), the certificate holder shall, assuming that the critical engine fails at V_{EF} and using a single V_1 , ensure that—

- (1) the accelerate-stop distance required does not exceed the accelerate-stop distance available; and
- (2) the take-off distance required does not exceed the take-off distance available; and
- (3) any clearway forming part of the take-off distance available shall not exceed half the length of the take-off run available; and
- (4) in the case of a wet or contaminated runway, the take-off distance is calculated to the point at which the aircraft reaches a height of 15 feet above the take-off surface using a reduced V_1 ; and
- (5) the take-off run required does not exceed the take-off run available using V_1 for the rejected and continued take-off; and
- (6) on a wet or contaminated runway, the take-off weight does not exceed that permitted for a take-off on a dry runway under the same conditions.

(c) When calculating the maximum take-off weight in accordance with paragraph (b), the certificate holder shall take account of—

- (1) aerodrome elevation; and
- (2) the pressure altitude of the aerodrome when the atmospheric pressure varies by more than 1% from the International Standard Atmosphere; and
- (3) ambient temperature at the aerodrome; and
- (4) the type of runway surface and the runway surface condition ; and
- (5) the runway slope in the direction of take-off; and
- (6) not more than 50% of the reported headwind component or not less than 150% of the reported tailwind component.

121.209 Runway surface correction factors

Each holder of an air operator certificate shall ensure that, unless performance data is available, the take-off distance calculated for a runway surface type under 121.207(c)(4) and the landing distance calculated under 121.221(c)(3), are corrected for use of other runway surface types by applying the factors in Table 1.

Table 1

Surface Type	Take-off Distance Factor	Accelerate Stop Distance Factor	Landing Distance Factor
Paved	x 1.00	x 1.00	x 1.00
Coral	x 1.00	x 1.03	x 1.05
Metal	x 1.05	x 1.06	x 1.08
Rolled earth	x 1.08	x 1.14	x 1.16
Grass	x 1.14	x 1.20	x 1.18

121.211 Net take-off flight path

(a) Each holder of an air operator certificate shall ensure that, for each aeroplane it operates, assuming the critical engine is inoperative, all obstacles within the net take-off flight path are cleared vertically by at least—

- (1) 35 feet in the case of a take-off performed by an aeroplane that is intended to use a bank angle not exceeding 15°; and
- (2) 15 feet in the case of a take-off that is—
 - (i) performed by an aeroplane that is intended to use a bank angle not exceeding 15°; and
 - (ii) conducted in compliance with 121.207(b)(4); and
- (3) 50 feet in the case of a take-off performed by an aeroplane that is intended to use a bank angle exceeding 15°; and
- (4) 30 feet in the case of a take-off that is—
 - (i) performed by an aeroplane that is intended to use a bank angle exceeding 15°; and
 - (ii) conducted in compliance with 121.207(b)(4).

(b) For the purpose of paragraph (a), an obstacle shall be deemed to be within the net take-off flight path if the lateral distance from the obstacle to the intended line of flight does not exceed—

- (1) where the intended flight path does not require a track change exceeding 15°—
 - (i) 75 m plus 0.125D, to a maximum of 600 m or, if the certificate holder has established visual or radio navigation track guidance procedures for the pilot, to a maximum of 300 m; or
 - (ii) for day operations in VMC by aeroplanes not exceeding 22 700 kg MCTOW, 45 m plus 0.125D, to a maximum of 600 m or, if the certificate holder has established visual or

radio navigation track guidance procedures for the pilot, to a maximum of 300 m; or

- (2) where the intended flight path requires a track change exceeding 15° —
- (i) 75 m plus $0.125D$, to a maximum of 900 m or, if the certificate holder has established visual or radio navigation track guidance procedures for the pilot, to a maximum of 600 m;
 - (ii) for day operations in VMC by aeroplanes not exceeding 22 700 kg MCTOW, 45 m plus $0.125D$, to a maximum of 900 m or, if the certificate holder has established visual or radio navigation track guidance procedures for the pilot, to a maximum of 600 m.

(c) For the purpose of paragraph (b), D is the horizontal distance the aeroplane will travel from the end of the take-off distance available.

(d) When calculating the net take-off flight path in accordance with paragraph (a), the certificate holder shall ensure that—

- (1) the following factors are taken into account—
- (i) take-off weight at the commencement of the take-off run; and
 - (ii) aerodrome elevation; and
 - (iii) pressure altitude at the aerodrome when the atmospheric pressure varies by more than 1% from the International Standard Atmosphere; and
 - (iv) ambient temperature at the aerodrome; and
 - (v) not more than 50% of the reported head-wind component or not less than 150% of the reported tail-wind component; and
- (2) a track change exceeding 15° is not made before a height of 50 feet above the take-off surface has been achieved; and

- (3) unless otherwise authorised by the Director—
 - (i) a bank angle exceeding 15° is not made before a height of 50 feet above the take-off surface has been achieved; and
 - (ii) the bank angle up to and including a height of 400 feet above the take-off surface does not exceed 20°; and
 - (iii) the bank angle above a height of 400 feet above the take-off surface does not exceed 25°; and
- (4) allowance is made for—
 - (i) the effect of the bank angle on operating speeds and flight path; and
 - (ii) distance increments resulting from increased operating speeds; and
 - (iii) retention of stall margin and loss of climb gradient in accordance with 121.213.
- (e) The certificate holder shall establish contingency procedures to—
 - (1) satisfy the requirements of this Part; and
 - (2) provide a safe route avoiding obstacles; and
 - (3) enable the aeroplane to land safely at the aerodrome of departure, or at an alternate aerodrome required by 121.161.

121.213 Engine inoperative – gradient and stall corrections

Each holder of an air operator certificate shall, unless performance data is available, for compliance with 121.211(d)(4)(iii), retain stall margin and calculate loss of climb gradient by applying the factors in Table 2.

Table 2

Bank angle	Speed correction	Gradient correction
15° to 19°	V_2	1 x Aeroplane flight manual 15° gradient loss
20° to 24°	$V_2 + 5$ knots	2 x Aeroplane flight manual 15° gradient loss
25°	$V_2 + 19$ knots	3 x Aeroplane flight manual 15° gradient loss

121.215 En-route critical engine inoperative

(a) Each holder of an air operator certificate shall ensure that, for each aeroplane it operates, using the one engine inoperative en-route net flight path data—

- (1) the flight path has a positive slope at an altitude of at least 1000 feet above all terrain and obstructions within, except as otherwise provided in paragraph (b), 10 nm of the intended track to be flown and at 1500 feet above the aerodrome where the landing is assumed to be made after engine failure; and
- (2) the net flight path clears all terrain and obstructions within, except as otherwise provided in paragraph (b), 10 nm of the intended track by at least 2000 feet vertically; and
- (3) the net flight path permits the aeroplane to continue flight from the cruising altitude to an aerodrome where a landing can be made in accordance with 121.221 or 121.223 as appropriate, taking account of—
 - (i) engine failure at the most critical point along the route; and
 - (ii) the effect of the icing protection systems if the meteorological conditions require their operation; and
 - (iii) the forecast ambient temperature; and

- (iv) the effects of forecast wind on the flight path; and
 - (v) fuel jettisoning to an extent consistent with reaching the aerodrome with the required fuel reserves; and
- (4) the aerodrome where the aeroplane is assumed to land after engine failure meets the following criteria—
- (i) the performance requirements at the expected landing weight are met; and
 - (ii) weather reports and forecasts, or any combination thereof, and aerodrome condition reports indicate that a safe landing can be accomplished at the time of the intended landing.

(b) If the pilot is able, by the use of radio navigation aids, to maintain the intended track by a margin of 5 nm the distance of 10 nm required by paragraphs (a)(1) and (2) may be reduced to 5 nm.

121.217 En-route – 90 minute limitation

(a) Except as provided in paragraph (b), each holder of an air operator certificate shall ensure that each aeroplane it operates with three or more engines is not more than 90 minutes away from an aerodrome at which the performance requirements specified in the aeroplane flight manual applicable at the expected landing weight are met.

(b) The certificate holder may operate an aircraft with three or more engines more than 90 minutes away from an aerodrome at which the performance requirements specified in the aeroplane flight manual applicable at the expected landing weight are met, provided that—

- (1) the two engine inoperative en-route flight path data permits the aeroplane to continue the flight, in the expected meteorological conditions, from the point where two engines are assumed to fail simultaneously, to an aerodrome at which it is possible to land using the prescribed procedure for a landing with two engines inoperative; and
- (2) the net flight path, taking into account the effect of icing protection systems if the meteorological conditions require their

operation has a positive slope clearing at an altitude of at least 2000 feet above all terrain and obstructions within, except as provided in paragraph (c), 10 nm of the intended track to be flown; and

- (3) the net flight path has a positive slope at an altitude of 1500 feet above the aerodrome where the landing is assumed to be made after the failure of two engines; and
- (4) the expected weight of the aeroplane at the point where the two engines are assumed to fail shall be not less than that which would include sufficient fuel to proceed to an aerodrome where the landing is assumed to be made, and to arrive there at an altitude of at least 1500 feet directly over the aerodrome and thereafter to fly level for at least 15 minutes.

(c) If the pilot is able, by the use of radio navigation aids, to maintain the intended track by a margin of 5 nm the distance of 10 nm required by paragraph (b)(2) may be reduced to 5 nm.

(d) When calculating compliance with paragraph (b), the certificate holder shall assume the two engines fail at the most critical point of that portion of the route where the aeroplane is more than 90 minutes, at the all-engines long-range cruising speed at standard temperature and still air, away from an aerodrome at which the performance requirements applicable at the calculated landing weight are met.

121.219 Landing-climb – destination and alternate aerodromes

Each holder of an air operator certificate shall ensure that, for each aeroplane it operates—

- (1) the landing weight of the aeroplane does not exceed the maximum approach and landing-climb weight, taking into account the altitude and the ambient temperature expected for the estimated time of landing at a destination and alternate aerodrome; and
- (2) for instrument approaches with decision heights below 200 feet, the approach weight of the aeroplane, taking into account the take-off weight and the fuel expected to be consumed in flight,

allows a missed approach net-climb-gradient assuming that the critical engine is inoperative in the approach configuration of—

- (i) at least 2.5%; or
- (ii) at least the net-climb gradient required to clear any obstacles in the missed approach flight path in accordance with 121.211.

121.221 Landing distance – dry runways

(a) Each holder of an air operator certificate shall ensure that, for each aeroplane it operates, the landing weight for the estimated time of landing will not exceed the landing weight specified in the aeroplane flight manual.

(b) Each holder of an air operator certificate shall ensure that, for each aeroplane it operates, the landing weight for the estimated time of landing at the destination aerodrome and at any alternate aerodrome allows a full stop landing on a dry runway from a point 50 feet above the threshold within—

- (1) 60% of the landing distance available at the destination and at any alternate aerodrome for a turbojet or turbofan powered aeroplane; and
- (2) 70% of the landing distance available at the destination aerodrome and at any alternate aerodrome for a propeller powered aeroplane; and

(c) When calculating the landing weight in accordance with paragraph (b), the certificate holder shall take account of—

- (1) aerodrome elevation; and
- (2) ambient temperature at the aerodrome; and
- (3) the type of runway surface and the runway surface condition; and
- (4) the runway slope in the direction of landing; and
- (5) not more than 50% of the reported headwind component or not less than 150% of the reported tailwind component.

(d) The certificate holder shall, for dispatch of an aeroplane to land in accordance with paragraphs (b) and (c), assume that the aeroplane will land on the most favourable runway taking into account—

- (1) the forecast meteorological conditions; and
- (2) surrounding terrain; and
- (3) approach and landing aids; and
- (4) obstacles within the missed approach flight path.

(e) If the certificate holder is unable to comply with paragraph (d) for the destination aerodrome, the certificate holder may dispatch an aeroplane if an alternate aerodrome is designated that permits compliance with paragraphs (a), (b), and (c).

121.223 Landing distance – wet and contaminated runways

(a) Each holder of an air operator certificate shall ensure that, for each aeroplane it operates—

- (1) when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be wet, the landing distance available is at least 115% of the landing distance required by 121.221; and
- (2) when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be contaminated, the landing distance available is at least—
 - (i) 115% of the landing distance required by 121.221; or
 - (ii) the landing distance determined in accordance with contaminated-landing-distance data.

(b) A landing distance on a wet runway shorter than that required by paragraph (a), but not less than that required by 121.221, may be used if performance data allows a shorter landing distance on wet runways.

121.225 Steep approach and short landing techniques

Each holder of an air operator certificate may perform steep approach procedures using approach slope angles of 4.5°, or more, and with screen heights of less than 50 feet but not less than 35 feet, providing—

- (1) the aeroplane flight manual states the maximum approved approach slope angle, any other limitations, procedures, including emergency procedures, for the steep approach, as well as amendments for the field length data when using steep approach criteria; and
- (2) for IFR operations, an approach slope indicator system comprising of at least a visual approach slope indicating system is available at each aerodrome at which steep approach procedures are to be conducted; and
- (3) for IFR operations, weather minima are specified and approved for each runway to be used with a steep approach; and
- (4) for IFR operations, consideration is given to—
 - (i) obstacles; and
 - (ii) the type of approach slope indicator reference and runway guidance such as visual aids, MLS, GPS, ILS, LLZ, VOR, or NDB; and
 - (iii) the minimum visual reference to be required at DH and MDA; and
 - (iv) usable airborne equipment; and
 - (v) pilot qualification and special aerodrome familiarisation; and
 - (vi) aeroplane flight manual limitation and procedures; and
 - (vii) missed approach criteria.

Subpart E — Weight and Balance

121.301 Purpose

This Subpart prescribes the rules governing the control of loading and weight and balance on an aeroplane.

121.303 Goods, passenger, and baggage weights

(a) Each holder of an air operator certificate shall establish the actual weights of goods and the weights of passengers and their carry-on and checked baggage.

(b) The certificate holder shall establish the actual weights of goods and checked baggage.

(c) The certificate holder shall establish the weights of passengers and their carry-on baggage, by using their—

- (1) actual weights; or
- (2) standard weights established in accordance with a programme specified in the certificate holder's exposition—

except that the use of actual weights and the use of standard weights, in accordance with paragraph (c), shall not occur on the same air operation.

121.305 Aeroplane load limitations

Each holder of an air operator certificate shall ensure that—

- (1) the limitations contained in the aeroplane flight manual, or other approved document, relating to the weight and balance of an aeroplane are complied with; and
- (2) maximum allowable weights are not exceeded for zero fuel, manoeuvre, takeoff, and landing; and
- (3) the aeroplane's centre of gravity is within the limits referred to in subparagraph (1) at departure, and will remain within those limits throughout the operating cycle.

121.307 Load manifest

Each holder of an air operator certificate shall ensure that—

- (1) a load manifest has been completed prior to each air operation; and
- (2) the load manifest is certified by the pilot-in-command; and
- (3) the following details are recorded on the load manifest—
 - (i) name of pilot-in-command, except where this is recorded by the certificate holder in another document; and
 - (ii) date of the operation; and
 - (iii) aeroplane type and registration; and
 - (iv) aerodromes of departure and destination; and
 - (v) flight number or estimated time of departure; and
 - (vi) surnames and initial of all crew and passengers, except where this is recorded by the certificate holder in another document; and
 - (vii) the total of the aeroplane empty weight, the weight of any removable equipment, consumables, unusable oil, unusable fuel, and the weight of crew; and
 - (viii) the weights of passengers, goods, baggage, usable oil, and usable fuel; and
 - (ix) loaded aeroplane weight; and
 - (x) evidence that the centre of gravity is within the specified limits, except where this is recorded by the certificate holder in another document; and
 - (xi) the maximum allowable weights for the operation, including zero fuel weight, take-off weight, and landing weight for the operation.

Subpart F — Instruments and Equipment

121.351 Purpose

This Subpart prescribes the instruments and equipment required.

121.353 General

Each holder of an air operator certificate shall ensure that an air operation does not commence unless—

- (1) the aeroplane is equipped—
 - (i) with the type of instruments and equipment required by Part 91 and this Subpart; and
 - (ii) with the number of instruments and equipment to ensure that the failure of any independent system required for either communication or navigation purposes, or both, will not result in the inability to communicate and navigate safely as required for the route being flown; and
- (2) the instruments and equipment installed in the aeroplane comply with the specifications and airworthiness design standards listed in—
 - (i) Appendix B to this Part; or
 - (ii) Appendix C to Part 21; or
 - (iii) Part 26; or
 - (iv) alternative specifications or standards acceptable to the Director; and
- (3) the instruments and equipment have been installed in accordance with the aeroplane manufacturer's instructions or other instructions acceptable to the Director; and
- (4) except as may be provided by a MEL approved under 91.539 for use for that aeroplane, the instruments and equipment installed in the aeroplane are in operable condition.

121.355 Additional instruments

Each holder of an air operator certificate shall ensure that each of its aeroplanes is equipped with—

- (1) the powerplant instruments required by the airworthiness design standards in paragraph (a)(1)(ii) of Appendix C of Part 21; and
- (2) a means of indicating for each reversible propeller, actuated by the propeller blade angle or directly responsive to it, that the propeller is in beta range or reverse pitch.

121.357 Additional equipment

Each holder of an air operator certificate shall ensure that each of its aeroplanes is equipped with—

- (1) a windshield wiper or equivalent for each pilot station; and
- (2) a door between the passenger and flight crew compartments, with a means of locking that prevents passengers from opening it without the flight crew's permission; and
- (3) for each door that separates a passenger compartment from another compartment that has emergency exit provisions—
 - (i) a key, readily available for each crew member; and
 - (ii) a placard that indicates the door must be open during takeoff and landing.

121.359 Night flight

Each holder of an air operator certificate shall ensure that each of its aeroplanes operated at night is equipped with—

- (1) a landing light; and
- (2) a light in each passenger compartment.

121.361 Instrument flight rules

(a) Each holder of an air operator certificate shall ensure that each of its aeroplanes operated under IFR flight is equipped with—

- (1) additional, and independent, means of indicating—
 - (i) airspeed, calibrated in knots, with a means of preventing malfunctioning due to either condensation or icing; and
 - (ii) sensitive pressure altitude, calibrated in feet; and
- (2) spare bulbs for flight compartment instrument illumination; and
- (3) spare fuses.

(b) Notwithstanding paragraph (a)(1)(i), the certificate holder may fit an additional attitude indicator powered by a separate power source.

121.363 Flights over-water

Each holder of an air operator certificate shall ensure that each of its aeroplanes operated on extended over-water operations is equipped with sufficient liferafts with buoyancy and rated capacity to accommodate all occupants of the aeroplane in the event of a loss of one raft of the largest rated capacity.

121.365 Emergency equipment

(a) Each holder of an air operator certificate shall ensure that—

- (1) notwithstanding the seat breaks in 91.523(a) and (b), each of its aeroplanes is equipped with the emergency equipment referred to in 91.523; and
- (2) the requirements in 91.523(d) and (e) are met for the equipment required by paragraph (a)(1).

(b) Each holder of an air operator certificate shall ensure that each of its aeroplanes operated on flights of more than 120 minutes duration is equipped with an emergency medical kit, suitable for use by qualified medical personnel, that contains items that provide for the treatment of injuries and medical emergencies.

121.367 Protective breathing equipment

Each holder of an air operator certificate shall ensure that each of its aeroplanes is equipped with protective breathing equipment that—

- (1) is conveniently located and easily accessible to each—
 - (i) flight crew member at their normally seated position; and
 - (ii) crew member for immediate use; and
- (2) is installed—
 - (i) in each Class A, B, and E cargo compartment; and
 - (ii) on the flight deck; and
 - (iii) in each passenger compartment within 1 m of each required hand held fire extinguisher or other such approved distance; and
 - (iv) in galleys that contain hand held fire extinguishers.

121.369 Public address and crew member intercom systems

Each holder of an air operator certificate shall ensure that each of its aeroplanes is equipped with—

- (1) a public address system; and
- (2) a crew member intercom system.

121.371 Cockpit voice recorder

(a) Each holder of an air operator certificate shall ensure each of its aeroplanes is equipped with a cockpit voice recorder.

(b) The commencement of paragraph (a) is suspended until it is applied by notice in the Gazette, such application being no sooner than 1 April 1999.

121.373 Flight data recorder

(a) Each holder of an air operator certificate shall ensure that each of its aeroplanes is equipped with a flight data recorder.

(b) The commencement of paragraph (a) is suspended until it is applied by notice in the Gazette, such application being no sooner than 1 April 1999.

121.375 Additional attitude indicator

Each holder of an air operator certificate shall ensure that each of its turbojet or turbofan powered aeroplanes is equipped with a third presentation of attitude.

121.377 Weather radar

Each holder of an air operator certificate shall ensure that each of its turbine powered aeroplanes operating under IFR is equipped with a weather radar.

121.379 Ground proximity warning system

(a) Each holder of an air operator certificate shall ensure that each of its turbine powered aeroplanes is equipped with a GPWS if that aircraft has—

- (1) a MCTOW in excess of 15 000 kg; or
- (2) a certificated seating capacity, excluding any pilot seat, of 30 seats or more.

(b) Each holder of an air operator certificate shall ensure that each of its turbine powered aircraft operating under IFR is equipped with a GPWS no later than 1 January 2000.

Subpart G — Maintenance**121.401 Purpose**

This Subpart prescribes rules for aeroplane maintenance for each holder of an air operator certificate.

121.403 Responsibility for airworthiness

(a) Each holder of an air operator certificate is responsible for the airworthiness of its aeroplanes, including airframes, aircraft engines, propellers, appliances, emergency equipment, and parts.

(b) The certificate holder shall have a maintenance programme for each aeroplane, aircraft engine, propeller, appliance, emergency equipment item, and part.

(c) The maintenance programme required by paragraph (b) shall contain standards at least equivalent to Part 91, Subpart G and the manufacturer's maintenance programme.

(d) The certificate holder shall ensure that any maintenance that is performed by the certificate holder, or by any other organisation with whom the certificate holder arranges for the performance of that maintenance, is performed in accordance with its maintenance programme.

121.405 Condition monitored maintenance

Each holder of an air operator certificate utilising condition monitored maintenance in its maintenance programme shall provide the Director with a maintenance reliability report each calendar month that contains details of—

- (1) aircraft utilisation; and
- (2) pilot reports; and
- (3) aircraft mechanical delays and cancellations; and
- (4) engine unscheduled shutdowns; and
- (5) engine unscheduled removals; and
- (6) component unscheduled removals; and
- (7) component confirmed failures; and
- (8) incidents; and
- (9) MEL usage.

121.407 Maintenance organisation

Each holder of an air operator certificate shall—

- (1) be certificated under Part 145 and perform the maintenance of its aeroplanes, including airframe, aircraft engines, propellers, appliances, emergency equipment items, and parts, in accordance with the Part 145 exposition and this Part; or
- (2) contract with another organisation certificated under Part 145 for the performance of maintenance.

121.409 Training and information programme

Each holder of an air operator certificate that performs any of its own maintenance, and each other organisation with whom each certificate holder arranges for the performance of that maintenance, shall have a training and information programme that ensures each person who certifies a release to service—

- (1) is fully informed about procedures, techniques, and new equipment in use; and
- (2) is competent to perform that certification.

121.411 Persons certifying maintenance

The holder of an air operator certificate shall only use a person appropriately trained, qualified, and authorised to certify a release to service.

121.413 Supervising personnel

Each holder of an air operator certificate that performs any of its own maintenance, and each other organisation with whom each certificate holder arranges for the performance of that maintenance, shall ensure that each person who is supervising maintenance, or making decisions on rectification action, is authorised by the maintenance organisation certificate holder in accordance with the Part 145 exposition.

121.415 Maintenance personnel duty time limitations

Each holder of an air operator certificate that performs any of its own maintenance, and each other organisation with whom each certificate holder

arranges for the performance of that maintenance, shall relieve each person certifying releases to service from duty for—

- (1) if the person certifying the release to service is scheduled for more than 16 hours of duty in 24 consecutive hours, a period of at least 8 hours at or before the end of the 16 hours of duty; and
- (2) a period of at least 24 consecutive hours during any seven consecutive days or the equivalent thereof within any one calendar month.

121.417 Maintenance review

(a) Each holder of an air operator certificate shall ensure that—

- (1) it does not operate an aeroplane unless a maintenance review of the aeroplane has been carried out within the previous 12 months; and
- (2) each maintenance review that is carried out is certified as having been carried out.

(b) The certificate holder shall, before certifying that a maintenance review for an aeroplane has been carried out, ensure that—

- (1) all maintenance specified in the maintenance programme for the aeroplane has been completed within the time periods specified; and
- (2) all applicable airworthiness directives have been complied with; and
- (3) all defects entered in the maintenance records required by Part 43 have been rectified or properly deferred in accordance with the procedures in the certificate holder's exposition; and
- (4) all certifications of release to service required by Part 43.103 have been made in accordance with Part 43.

(c) The certificate holder may certify a maintenance review on the basis of continuing compliance with an internal quality assurance programme acceptable to the Director provided—

- (1) the programme samples all the requirements of paragraph (b) during the review period; and
- (2) the maintenance review is individually certified for each of the certificate holder's aeroplanes.

(d) The certificate holder shall ensure that the maintenance review—

- (1) is certified by an authorised person with experience in respect of that type of aeroplane, that is at least equal to the experience required for the grant of an aircraft maintenance engineer licence rating; and
- (2) contains the certifying person's signature, authorisation number, and the date of entry; and
- (3) contains the following statement:

The maintenance review of this aeroplane and such of its equipment as is necessary for its continued airworthiness has been carried out in accordance with the requirements of the Civil Aviation Rules for the time being in force.

Subpart H — Crew Member Requirements

121.501 Purpose

This Subpart prescribes the rules governing the use of flight crew members, flight attendants, and other crew members.

121.503 General

- (a) Each holder of an air operator certificate shall ensure that each crew member involved in an air operation is currently qualified in accordance with the requirements of Subpart I or Subpart M
- (b) The certificate holder shall, for each aeroplane type operated, assign in writing, to all operating crew members, the operational and safety functions they are to perform.

- (c) The certificate holder shall not require any crew member to perform any duties during critical phases of flight except those duties required for the safe operation of the aeroplane.
- (d) The critical phases of flight referred to in paragraph (c) include—
- (1) for flight crew members, all operations involving push back, taxi, take-off, approach and landing, and all other air operations conducted below 10 000 feet, except in cruise flight; and
 - (2) for crew members, all ground operations after leaving the apron area to join a main taxiway, take-off until passing 1000 feet on climb, and all flight below 5000 feet on the landing approach phase of the flight.

121.505 Flight crew duty assignment

- (a) Each holder of an air operator certificate shall ensure that any person carrying out functions as a flight crew member on an air operation—
- (1) holds a current licence and rating that are appropriate to the task assigned; and
 - (2) meets all requirements for the assigned flight-crew duty; and
 - (3) meets all route and aerodrome qualification requirements for the operation intended.
- (b) The certificate holder shall designate, for each period of an air operation—
- (1) a pilot-in-command; and
 - (2) a second-in-command when more than two pilots are required; and
 - (3) any other flight crew member that may be required by the type of operation to be performed to augment the minimum crew specified in the aeroplane flight manual.

121.507 Pilot-in-command experience requirements

Each holder of an air operator certificate shall ensure that each person designated as pilot-in-command of an aeroplane has acquired, prior to commencing the training specified in Subpart I or Subpart M for pilot-in-command, at least—

- (1) 1500 hours of flight time as a pilot, including—
 - (i) 500 hours in the type of operations to which this Part applies; and
 - (ii) 100 hours of instrument time at least 50 hours of which is acquired in actual flight; and
- (2) 100 hours of night-flight time for operations to be conducted by the person at night.

121.509 Second-in-command experience

Each holder of an air operator certificate shall ensure that any person designated as second-in-command of an air operation—

- (1) is suitably trained and qualified on the aeroplane type; and
- (2) is capable, in the event of the pilot-in-command being incapacitated—
 - (i) of operating the aeroplane safely under the prevailing and anticipated forecast weather conditions; and
 - (ii) of deputising for the pilot-in-command; and
 - (iii) of landing the aeroplane at the intended destination or a suitable alternate.

121.511 Pilot experience

The certificate holder shall ensure that each person acting as a pilot, other than as pilot-in-command, of an aeroplane, prior to commencing the training specified in Subpart I or Subpart M—

- (1) has acquired at least 500 hours of flight time as a pilot, including at least 100 hours of flight time in air operations; and
- (2) has acquired at least 25 hours of night flight experience; and
- (3) holds a current instrument rating.

121.513 Pilot operating limitations

(a) Each holder of an air operator certificate shall ensure that, subject to paragraph (b), the pilot-in-command conducts each take-off and each landing.

(b) A second-in-command of an aeroplane performing an air operation may conduct the take-off and landing if—

- (1) the pilot-in-command meets the appropriate requirements of 121.583, 121.585, or 121.587; or
- (2) the second-in-command has completed the requirements of 121.571 and then accumulated at least 100 hours of flight time, or 75 operating cycles, in air operations, in the aeroplane type being flown; or
- (3) the certificate holder has nominated the aerodrome as a general-category aerodrome in its exposition, and the appropriate take-off or landing report provided to the flight crew indicates that—
 - (i) the prevailing ceiling or visibility is better than the ceiling and visibility minima for that aerodrome when considered as an alternate; and
 - (ii) the runway to be used is clear of water, snow, slush, rubber accumulation, or similar conditions, that could adversely affect aeroplane performance; and

- (iii) the crosswind component for the runway to be used is less than 50% of the demonstrated flight manual limit; and
- (iv) windshear has not been reported in the vicinity of the aerodrome.

121.515 Category II or III approaches and reduced take-off minima experience

- (a) Each holder of an air operator certificate shall ensure that Category II or III precision approaches, and departures with reduced take-off minima, are conducted with both the pilot-in-command and second-in-command qualified for such approaches and departures.
- (b) For the purpose of paragraph (a)—
 - (1) where the pilot-in-command is qualified only as the pilot flying, the pilot-in-command shall conduct all Category II and III precision approaches and departures as the pilot flying; and
 - (2) where the second-in-command is qualified only as the pilot non-flying, the pilot-in-command shall conduct all Category II and III precision approaches and departures as the pilot flying.

121.517 Flight crew member pairing limitations

- (a) Each holder of an air operator certificate shall, after the applicable training requirements of Subpart I or Subpart M are completed, ensure that for each air operation no more than one member of an operating flight crew has, in the aeroplane type used—
 - (1) accumulated less than an additional 75 hours in the type of operations to which this Part applies; or
 - (2) completed less than 75 operating cycles in the type of operations to which this Part applies.

(b) The Director may, upon application by the certificate holder, authorise deviations from the requirements of paragraph (a), by an appropriate amendment to the operations specifications, in any of the following circumstances—

- (1) a newly certificated certificate holder does not employ any pilots who meet the minimum requirements prescribed in paragraph (a); or
- (2) an existing certificate holder acquires a aeroplane type not before proven for use in its operations; or
- (3) an existing certificate holder establishes a new domicile to which it assigns pilots who will be required to become qualified on the aeroplanes operated from that domicile.

121.519 *Flight attendants duty assignment*

(a) Each holder of an air operator certificate shall ensure its aeroplanes are operated with at least the minimum number of flight attendants carried as crew members—

- (1) specified by the manufacturer's recommended emergency evacuation procedures for the aeroplane configuration being used; and
- (2) specified by the certified design criteria for the aeroplane; and
- (3) that will ensure at least one flight attendant is present in each occupied compartment; and
- (4) in accordance with the minimum number specified in Table 3.

Table 3. Required flight attendants

Acroplane Passenger Capacity:	Flight Attendants required
15 through 50	1
51 through 100	2
101 through 150	3
151 through 200	4
201 through 250	6
251 through 300	7
301 through 350	9
351 through 400	10
401 through 450	11
451 through 500	12
for each further 50 passengers	1

- (b) The certificate holder shall designate—
- (1) for each air operation requiring two or more flight attendants, a senior flight-attendant responsible to the pilot-in-command for the operational and safety functions of each flight attendant; and
 - (2) for each air operation requiring six or more flight attendants, a deputy senior flight-attendant.
- (c) Notwithstanding the requirements of paragraph (a)(4), one less flight attendant than that specified in Table 3 may be carried to allow the continuation of an air operation in the event a required flight attendant becomes unfit because of sickness or injury during their duty period, provided—
- (1) the requirements of paragraphs (a)(1), (2), and (3) can be met; and
 - (2) the remaining flight attendants are trained and competent to operate safely with the reduced number of flight attendants in accordance with the procedures specified in the certificate holder's exposition; and

- (3) numbers are restored to comply with the requirements of paragraph (a)(4) at the first aerodrome of landing where a replacement would normally be expected to be available.

Subpart I — Training

121.551 Purpose

This Subpart prescribes rules governing the establishment and operation of a training programme for crew members.

121.553 General

(a) Each holder of an air operator certificate shall establish a training programme in accordance with this Subpart to qualify each of its crew members not participating in an advanced qualification programme under Subpart M.

(b) The certificate holder shall establish a training programme to ensure that each assigned crew member is trained and competent to perform their assigned duties.

(c) The certificate holder shall ensure that the training programme is conducted safely and without unacceptable risk to the equipment and personnel, or third parties.

(d) The certificate holder shall ensure the training programme contains segments for—

- (1) introduction training; and
- (2) transition training; and
- (3) upgrade training; and
- (4) recurrent training.

(e) The certificate holder shall ensure that each segment required by paragraph (d) includes a syllabus that is acceptable to the Director.

(f) The certificate holder shall ensure that its syllabus provides for consolidation in accordance with 121.567.

- (g) The certificate holder shall ensure that the person responsible for its training programme holds a flight examiner rating.
- (h) The certificate holder shall ensure that its training programme is controlled by the certificate holder.
- (i) The certificate holder may—
 - (1) conduct the training programme; or
 - (2) contract with the holder of an aviation training organisation certificate issued under Part 141, to conduct the training programme where the Part 141 certificate authorises the holder to conduct that training; or
 - (3) for a training programme conducted outside New Zealand, contract with an organisation that meets an equivalent standard specified by Part 141.
- (j) The certificate holder shall record each separate crew member qualification and inform the crew member involved in writing of the qualification gained.

121.555 Training equipment

- (a) Each holder of an air operators certificate shall ensure that the crew member training programme for flight crew includes both ground and flight instruction using—
 - (1) training devices; and
 - (2) a flight simulator in accordance with paragraph (d).
- (b) The certificate holder shall ensure that each flight simulator and each training device that is used in its training programme is specified in the certificate holder's exposition.

(c) When conducting training that requires equipment or resources that are not used solely for training, the certificate holder shall ensure that sufficient access is available to the equipment or resources to enable the training to be completed—

- (1) without unplanned interruption; and
- (2) in an environment that is conducive to the objective and safety of the task.

(d) The certificate holder shall ensure that for each aeroplane type operated by it, a flight simulator for that type is used in the training programme required by 121.553 or 121.903 for flight crew.

121.557 Crew member training programme

(a) Each holder of an air operator certificate shall establish a crew member training programme.

(b) The certificate holder shall ensure that each crew member programme segment includes training applicable to—

- (1) the aeroplane type to be used, including special equipment fitted for the intended operation; and
- (2) the routes and aerodromes appropriate to the intended operation; and
- (3) crew member assignments, functions, and responsibilities; and
- (4) location and operation of emergency equipment available for use by crew members; and
- (5) location and use of oxygen equipment; and
- (6) location and use of all normal and emergency exits, including evacuation slides and escape ropes; and
- (7) the certificate holder's policies and procedures appropriate to its air operations.

(c) The certificate holder may include in the crew member training programme for flight crew, the use of an aeroplane for manoeuvres and training that are acceptable to the Director.

(d) If the certificate holder is unable to present or sustain the aircraft flight or systems operations functions of the training programme to comply with 121.553(c) the Director shall require the holder to use a flight simulator for all or part of the training programme.

121.559 Crew member introduction segment

(a) Each holder of an air operator certificate shall ensure that each crew member who is not qualified and currently serving as a crew member in an operation authorised by the certificate holder's certificate, completes the introduction segment of its training programme—

- (1) in a structured manner; and
- (2) in accordance with the syllabus required by 121.553(e).

(b) The certificate holder may vary the syllabus required by 121.553(e) for individual crew members if—

- (1) the varied training is recorded in the crew member's record of training; and
- (2) the certificate holder certifies the variation made and the reasons for the variation in the crew member's record of training.

121.561 Crew member transition segment

(a) Each holder of an air operator certificate shall ensure that personnel already qualified and serving as crew members on an air operation authorised by the certificate holder's certificate, completes the transition segment of its training programme in accordance with the syllabus required by 121.553(e) if—

- (1) the crew member is changing from one aeroplane type or variant to another type or variant; or
- (2) new procedures or equipment are introduced on an existing aeroplane type or variant.

- (b) The transition segment shall address—
- (1) the use of all safety and emergency equipment and procedures applicable to the aeroplane type or variant; and
 - (2) new procedures or equipment introduced on the existing aeroplane type or variant.

121.563 Crew member upgrade segment

(a) Each holder of an air operator certificate shall ensure that each of its crew members completes the upgrade segment of its training programme in accordance with the syllabus required by 121.553(e), if the crew member is changing from one crew position to a more responsible crew position on the same aeroplane type or variant.

(b) The certificate holder shall ensure its upgrade segment addresses the use of all safety and emergency equipment and procedures applicable to the crew position on the aeroplane for which the upgrade is sought and shall—

- (1) include training on human factors, and crew resource management, with particular emphasis on the changes brought about by the different crew position; and
- (2) include training in supervisory skills.

121.565 Crew member recurrent segment

(a) Each holder of an air operator certificate shall ensure that each of its crew members are adequately trained, current, and proficient for each aeroplane, crew member position, and type of operation, in which the crew member serves.

(b) Each holder of an air operator certificate shall ensure that each crew member completes the recurrent segment of its training programme—

- (1) in a structured manner; and
- (2) in accordance with the syllabus required by 121.553(e).

121.567 Consolidation

Each holder of an air operator certificate shall ensure, after each crew member completes an introduction, transition, or upgrade, segment of its

training programme the crew member undergoes consolidation by acquiring—

- (1) the appropriate operating experience—
 - (i) for a pilot, required by 121.569; and
 - (ii) for a flight attendant, required by 121.577; and
- (2) the appropriate line-operating flight time—
 - (i) for a pilot, required by 121.571; and
 - (ii) for a flight engineer, required by 121.573.

121.569 Pilot operating experience

(a) Each holder of an air operator certificate shall ensure that each person performing the functions of a pilot holds the licences and ratings required to be held under Part 61 and has completed, on the make and basic model aeroplane and in the crew member position that the person will serve in, the following operating experience as applicable:

- (1) **for the introduction segment—**
 - (i) for multi-engine, turbine powered aeroplanes – 20 hours and 10 takeoffs and landings; and
 - (ii) for turbojet and turboprop powered aeroplanes – 25 hours and 10 takeoffs and landings; and
 - (iii) for all aeroplanes, including those referred to in paragraphs (a)(1)(i) and (ii) – four operating cycles of which at least two must be as the pilot flying:
- (2) **for the transition or upgrade segment—**
 - (i) for multi-engine, turbine powered aeroplanes – 12 hours and 8 takeoffs and landings; and
 - (ii) for turbojet and turboprop powered aeroplanes – 20 hours and 10 takeoffs and landings for pilot-in-command, or 10

hours and 8 takeoffs and landings for second-in-command; and

- (iii) for all aeroplanes, including those referred to in paragraphs (a)(2)(i) and (ii) – four operating cycles of which at least two must be as the pilot flying.

(b) The operating experience required by paragraph (a) shall be acquired on the appropriate aeroplane type as follows—

- (1) after satisfactory completion of the appropriate ground and flight training for the aeroplane type and crew member position in accordance with Part 61; and
- (2) under the supervision of an instructor who meets the requirements in 121.585; and
- (3) under air operations—
 - (i) simulated in a flight simulator for the aeroplane type; or
 - (ii) conducted in the aeroplane type.

(c) Any time accrued in a flight simulator under paragraph (b)(3)(i) may be multiplied by 1.30 for the purpose of calculating the total time required to satisfy paragraph (a), provided that—

- (1) any procedures and manoeuvres not approved for completion in the simulator have been conducted in the appropriate aeroplane; and
- (2) the pilot has demonstrated proficiency in all procedures, including emergency procedures, and manoeuvres specified by the training programme; and
- (3) the pilot has satisfactorily completed the appropriate training phases for that aeroplane and crew member position.

(d) For the purpose of paragraph (b)(3)(ii) the instructor shall—

- (1) act as pilot-in-command at all times; and

- (2) occupy a pilot station when supervising a pilot acquiring the experience necessary for a pilot-in-command position, until the qualifying pilot has—
 - (i) made at least two take-offs and landings in the aeroplane type for which the pilot-in-command qualification is required; and
 - (ii) demonstrated to the instructor the ability to perform the duties of a pilot-in-command for that aeroplane type; and
 - (iii) if the qualifying pilot-in-command is completing introduction or upgrade training, demonstrated to a flight examiner the ability to satisfactorily perform the prescribed duties during at least one complete operating cycle.

(e) The instructor may occupy the observer's seat upon the requirements of paragraph (d)(2) being met.

121.571 Pilot line-operating flight time

(a) Each holder of an air operator certificate shall ensure that after each pilot completes an introduction or transition segment of its training programme, the pilot completes the line-operating flight time required by paragraph (b) under the supervision of an airline instructor who meets the requirements in 121.587.

(b) The combined total of line-operating flight time and the operating experience required by 121.567 shall be—

- (1) at least 100 hours of flight time, or 75 operating cycles, for consolidation; and
- (2) completed within 120 days from completing the introduction or transition segment, with a maximum extension of 30 days if the pilot—
 - (i) continues to meet all other requirements of the training programme; and

- (ii) satisfactorily completes and passes either a refresher course acceptable to the Director, or a supervised line-operating flight, conducted by an instructor or flight examiner, on or before the 120th day.
- (c) The pilot shall operate exclusively on the appropriate aeroplane type while completing line-operating flight time experience unless refresher training that is acceptable to the Director is provided and satisfactorily passed.

121.573 Flight engineer line-operating flight time

- (a) Each holder of an air operator certificate shall ensure that each person performing the functions of a cadet flight engineer, flight engineer, flight engineer instructor, or flight engineer examiner—holds the licences and ratings required to be held under Part 63.
- (b) The certificate holder shall ensure that, within 120 days of a cadet flight engineer being rated, for consolidation, that flight engineer completes at least 100 hours of flight time or 75 operating cycles performing the functions of a flight engineer.
- (c) The consolidation required by paragraph (b) may be extended by 30 days if the flight engineer satisfactorily completes and passes either a refresher course acceptable to the Director, or a supervised line-operating flight, conducted by an flight engineer instructor or flight engineer examiner, on or before the 120th day.
- (d) The flight engineer shall operate exclusively on the appropriate aeroplane type while completing line-operating flight time experience unless refresher training that is acceptable to the Director is provided and satisfactorily passed.

121.575 Flight attendant training

- (a) Each holder of an air operator certificate shall ensure that each person performing the functions of a flight attendant on an air operation has satisfactorily completed the appropriate ground and flight training for the aeroplane type and crew member position.

(b) Each holder of an air operator certificate shall ensure that the crew member training for flight attendants addresses, as appropriate—

- (1) the authority structure of the aeroplane crew; and
- (2) procedures for passenger handling, including emergency procedures and procedures to be followed in dealing with special classes of passengers according to the certificate holder's exposition; and
- (3) briefing of passengers; and
- (4) proper use of cabin equipment and controls; and
- (5) Civil Aviation Rules and supporting documentation; and
- (6) the certificate holder's documentation and procedures.

121.577 *Flight attendant operating experience*

(a) Each holder of an air operator certificate shall ensure that each person performing the functions of a flight attendant—

- (1) has completed the crew member training for flight attendants required by 121.575; and
- (2) has completed, on the make and basic model aeroplane, and in the crew member position that the person will serve in, for the introduction or transition training segment of its training programme, five hours line-operating flight time including at least two operating cycles.

(b) For the purpose of paragraph (a)(2), up to 2.5 hours of the required line-operating flight time may be conducted in a full scale, type-specific, cabin training device.

(c) The operating experience required by paragraph (a) shall be acquired—

- (1) after satisfactory completion of the appropriate ground training for the aeroplane and crew member position in accordance with a syllabus acceptable to the Director; and

- (2) under the supervision of an appropriately qualified trainer of flight attendants who has experience acceptable to the Director.

121.579 *Manoeuvres requiring a flight simulator*

Each holder of an air operator certificate shall ensure a flight simulator is used where a non-normal or emergency manoeuvre is to be conducted during training, practice, or a competency check that—

- (1) if mishandled, would create an unacceptable risk to the aeroplane, crew members, or third parties; or
- (2) is carried out in close proximity to the ground or water; or
- (3) involves the need to fail any system for training that cannot be readily failed in the aeroplane without an unacceptable risk to the aeroplane, crew members, or third parties; or
- (4) involves actions necessary to complete any procedures required by 121.77(d)(4) that cannot be realistically carried out in an aeroplane.

121.581 *Crew members training records*

Each holder of an air operator certificate shall maintain records of all required training and consolidation undertaken by its crew members.

121.583 *Pilot flight examiner experience requirements*

Each holder of an air operator certificate shall ensure that each person performing the functions of an aeroplane or simulator flight-examiner, for an aeroplane type, in an operational competency assessment programme that is established under this Part—

- (1) has satisfactorily completed the appropriate competency checks required to serve as pilot-in-command in air operations in the aeroplane type; and
- (2) holds a current airline instructor rating; and
- (3) holds a current airline flight examiner rating; and

- (4) has acquired—
 - (i) 200 hours exercising the privileges of an airline instructor for the particular aeroplane type involved; or
 - (ii) 100 hours exercising the privileges of an airline flight examiner rating on another aeroplane type to which this Part applies; and
- (5) completes introduction and recurrent training requirements under this Subpart, or indoctrination and continuing qualification requirements under Subpart M, applicable to the testing to be carried out.

121.585 Pilot instructor experience requirements

Each holder of an air operator certificate shall ensure that each person performing the functions of an aeroplane or simulator instructor in a pilot training programme that is established under this Part—

- (1) has satisfactorily completed the appropriate training required to serve as pilot-in-command in air operations in the aeroplane type; and
- (2) holds a current airline instructor rating; and
- (3) has acquired at least 3000 hours of flight time as a pilot, including—
 - (i) 500 hours line-operating flight time experience for the particular aeroplane type involved; or
 - (ii) 100 hours exercising the privileges of an airline instructor rating instructing pilots on another aeroplane type to which this Subpart applies; and
- (4) completes introduction and recurrent training requirements under this Subpart, or indoctrination and continuing qualification requirements under Subpart M, applicable to the instruction to be carried out.

121.587 Pilot instructor supervisor experience requirements

(a) Each holder of an air operator certificate shall ensure that supervisory functions in a pilot training programme established under this Part are performed by an aeroplane or simulator instructor.

(b) The certificate holder shall ensure that each instructor performing supervisory functions—

- (1) has satisfactorily completed the appropriate training required to serve as pilot-in-command in air operations; and
- (2) has acquired at least 2000 hours of flight time as a pilot including—
 - (i) 200 hours line-operating flight time experience for the particular aeroplane type involved; or
 - (ii) 100 hours exercising the privileges of an airline instructor rating supervising pilots on another aeroplane type under this Subpart or Subpart M; and
- (3) holds a current airline instructor rating; and
- (4) completes introduction and recurrent training requirements under this Subpart, or indoctrination and continuing qualification requirements under Subpart M, applicable to the instruction to be carried out.

121.589 Simulator instructor and examiner requirements

(a) Each holder of an air operator certificate shall ensure that, where instruction or competency checks are carried out in a flight simulator, the person performing the functions of an instructor, or flight examiner—

- (1) meets the appropriate requirements of 121.583 or 121.585; and
- (2) continues to demonstrate competency as pilot-in-command in the simulator to the standard and frequency required by Subpart J; and
- (3) has received proficiency training in the operation of the training equipment.

(b) Where an instructor or flight examiner does not hold a current medical certificate, airline instructor rating, or flight examiner rating the requirements under paragraph 121.583 (4) or 121.585(3) may be met in a flight simulator by—

- (1) acting as a crew member—
 - (i) during simulated line operating flight time in a flight simulator for the aeroplane type; or
 - (ii) for flight crew members under training who are undertaking the programmes required by 121.553(c); and
- (2) completing the training requirements which would have been necessary to maintain the currency of, or be issued with, an airline instructor rating, or flight examiner rating, under Part 61 or Part 63, and Part 121.

Subpart J — Crew Member Competency Requirements

121.601 Purpose

This Subpart prescribes the rules governing the operational competency assessment of flight crew members, flight attendants, and other crew members, who are trained under the provisions of Subpart I.

121.603 General

(a) Each holder of an air operator certificate shall establish an operational competency assessment programme in accordance with this Subpart that is—

- (1) acceptable to the Director; and
- (2) controlled by the certificate holder.

(b) The certificate holder may—

- (1) conduct the operational competency assessment programme; or
- (2) contract with the holder of an aviation training organisation certificate issued under Part 141, to conduct the operational competency assessment programme where the Part 141 certificate authorises the holder to conduct that training; or

- (3) for an operational competency assessment programme conducted outside New Zealand, contract with an organisation that meets an equivalent standard specified by Part 141.
- (c) The certificate holder shall ensure that the person responsible for its operational competency assessment programme holds a flight examiner rating.

121.605 Operational competency assessment programme responsibilities

- (a) Each holder of an air operator certificate shall be ultimately responsible for its operational competency assessment programme.
- (b) The certificate holder shall ensure that each crew member that is subject to an operational competency assessment is assessed in accordance with the programme.
- (c) The certificate holder shall ensure that each crew member released to conduct an air operation is properly trained and competent to perform the operation.

121.607 Flight crew competency checks

Each holder of an air operator certificate shall ensure—

- (1) for each pilot acting as pilot-in-command, within the immediately preceding 12 months, the pilot has passed a check of route and aerodrome proficiency, administered by a flight examiner, that—
- (i) consists of at least one flight over one route segment and one or more landings at aerodromes representative of the operations to be flown; and
 - (ii) establishes that the pilot can satisfactorily perform the duties and responsibilities of a pilot-in-command in operations appropriate to this Part; and
- (2) for each pilot conducting VFR operations, within the immediately preceding 12 months, the pilot has successfully completed a competency check, administered by a flight examiner, that shall cover procedures, including emergency

procedures, of the pilot's flying skill in an aeroplane type normally used by the pilot in the operation; and

- (3) **for each pilot conducting IFR operations**, within the immediately preceding 6 months, the pilot, if acting as a flight crew member of an aeroplane under IFR, has passed a check, administered by a flight examiner, that—
 - (i) covers procedures, including emergency procedures, appropriate to the equipment fitted to the aeroplane and to the type of operations to which the pilot is assigned by the certificate holder; and
 - (ii) is conducted in the same aeroplane type used by the pilot in the operation or a flight simulator of the same aeroplane type; and
- (4) **for each pilot**, within the immediately preceding 12 months, the pilot has successfully completed a written or oral test of the pilot's knowledge in—
 - (i) the provisions of the appropriate Civil Aviation Rules and the certificate holder's operations specifications and exposition; and
 - (ii) for each aeroplane type normally flown by the pilot, the aeroplane systems, performance, and operating procedures, and the content of the approved flight manual; and
 - (iii) navigation, ATC, and meteorology; and
 - (iv) special flight operations as appropriate to the type of operation normally conducted by the pilot; and
 - (v) new equipment, procedures, and techniques; and

- (5) **for each flight engineer**, within the immediately preceding 12 months, the flight engineer has passed a check, administered by a flight engineer examiner, that—
- (i) covers procedures, including emergency procedures, appropriate to the equipment fitted to the aeroplane and to the type of operations to which the flight engineer is assigned by the certificate holder; and
 - (ii) is conducted in the same aeroplane type, or a flight simulator of the same aeroplane type, used by the flight engineer in the operation; and
- (6) **for each flight engineer**, within the immediately preceding 12 months, the flight engineer has successfully completed a written or oral test of the flight engineer's knowledge in—
- (i) the provisions of the appropriate Civil Aviation Rules, the certificate holder's operations specifications and exposition; and
 - (ii) for each aeroplane type normally flown by the flight engineer, the aeroplane systems, performance, and operating procedures, and the content of the approved flight manual; and
 - (iii) special flight operations as appropriate to the type of operation normally conducted by the flight engineer; and
 - (iv) new equipment, procedures, and techniques; and
- (7) an entry is made, and certified, by—
- (i) for the checks and tests under subparagraphs (1), (2), (3), and (4), the flight examiner in the pilot training record for each check carried out, whether satisfactorily or otherwise; and
 - (ii) for the checks and tests under subparagraphs (5) and (6), the flight engineer examiner in the flight engineer

training record for each check carried out, whether satisfactorily or otherwise.

121.609 *Flight-instructor competency checks*

Each holder of an air operator certificate shall ensure that each supervisory instructor or flight examiner receives instruction and maintains proficiency as appropriate in—

- (1) the methods of imparting instruction on how to operate, and how to ensure the safe operation of, a particular make and series aeroplane, or variant; and
- (2) the methods of recovery from mishandled, non-normal, and emergency manoeuvres; and
- (3) the operation of the aeroplane, equipment, or flight simulator used and, in operational flight, procedures and manoeuvres under normal, non-normal, and emergency conditions.

121.611 *Flight attendant crew member competency requirement*

A holder of an air operator certificate shall not use a flight attendant, and a person shall not serve as a flight attendant unless, within the immediately preceding 12 months, the certificate holder has determined by appropriate introduction and recurrent assessment and flight check that the person has adequate knowledge and is competent in the following areas as appropriate to assigned duties and responsibilities—

- (1) authority of the pilot-in-command; and
- (2) passenger handling, including procedures to be followed in handling persons whose conduct might jeopardise safety; and
- (3) crew member assignments, functions, and responsibilities during emergencies, including evacuation of persons who may need assistance; and
- (4) briefing of passengers; and
- (5) use of cabin equipment and controls; and
- (6) location and operation of items of emergency equipment; and

- (7) location and operation of oxygen equipment; and
- (8) location and operation of all normal and emergency exits, including evacuation chutes and escape ropes; and
- (9) seating of persons who may need assistance; and
- (10) first aid; and
- (11) for senior flight attendants and their deputies, ability to supervise other flight attendants carrying out their duties.

121.613 Competency and testing records

Each holder of an air operator certificate shall maintain records of all competency assessments and testing of its crew members.

Subpart K – Fatigue of Flight Crew

121.801 Purpose

This Subpart prescribes flight time limitations and other rules to minimise fatigue in flight crew members of aeroplanes engaged in air operations.

121.803 Operator responsibilities

- (a) The operator of an aeroplane shall not cause or permit that aeroplane to perform an air operation unless—
 - (1) a scheme has been established for the regulation of flight and duty times for every person flying in that aeroplane as a flight crew member; and
 - (2) the scheme addresses the following factors where appropriate to the operator's type of operation:
 - (i) rest periods prior to flight:
 - (ii) acclimatisation:
 - (iii) time zones:
 - (iv) night operations:

- (v) maximum number of sectors:
- (vi) single pilot operations:
- (vii) two pilot operations:
- (viii) two pilots plus additional flight crew members:
- (ix) flight crew members' qualifications:
- (x) mixed duties:
- (xi) dead-head transportation:
- (xii) reserve or standby periods:
- (xiii) flight duty period:
- (xiv) in-flight relief:
- (xv) type of operation:
- (xvi) cumulative duty time:
- (xvii) cumulative flight time:
- (xviii) discretionary increases in flight time limitations or flight duty limitations or both:
- (xix) circadian rhythm:
- (xx) days off:
- (xxi) record-keeping; and

(3) the scheme is acceptable to the Director.

(b) The operator of an aeroplane performing an air operation shall not cause or permit any person to fly in the aeroplane as a flight crew member if the operator knows or has reason to believe that the person is suffering from, or, having regard to the circumstances of the flight to be undertaken, is likely to suffer from, such fatigue while they are so flying as may endanger the safety of the aeroplane or its occupants.

- (c) The operator of an aeroplane performing air operations shall—
- (1) keep an accurate record of the flight times of each flight crew member flying in the aeroplane; and
 - (2) retain the flight time record required by paragraph (c)(1) for a period of 12 months from the date on which it was made.

121.805 Flight Crew responsibilities

(a) A person shall not act as a flight crew member of an aircraft performing an air operation if that person knows or suspects that they are suffering from, or, having regard to the circumstances of the flight to be undertaken, are likely to suffer from, such fatigue as may endanger the safety of the aircraft or its occupants.

(b) A flight crew member shall not perform other hire or reward flight duties while employed, engaged, or contracted by an air operator when such flying in addition to that in air operations will exceed the flight time limitations prescribed in the scheme required by 121.803(a)(1) relating to that flight crew member.

(c) A person shall not act as a flight crew member of an aircraft performing an air operation unless that person has ensured that the limitations prescribed in the scheme required by 121.803(a)(1) relating to that person are not exceeded.

(d) A person shall not act as a flight crew member of an aircraft performing an air operation if, at the beginning of the flight, the aggregate of all that person's previous and planned flight times on air operations—

- (1) during the period of 28 consecutive days expiring at the end of the day on which the flight begins — exceeds 100 hours; or
- (2) during the period of 365 consecutive days expiring at the end of the day on which the flight begins — exceeds 1000 hours.

Subpart L — Manuals, Logs, and Records

121.851 Purpose

This Subpart prescribes the rules governing the use and retention of the manuals, logs and records required for air operations performed.

121.853 Operating information

- (a) Each holder of an air operator certificate shall ensure that the parts of the certificate holder's exposition relevant to the duties of a crew member are current and are accessible to the crew member for pre-flight planning, and in-flight.
- (b) The certificate holder shall ensure that information provided for the compliance of its operations personnel, in place of the AIP, has been reproduced accurately and is current.
- (c) Each holder of an air operator certificate that elects to use non-State charts and similar in-flight documentation shall ensure that this non-State material is identical in substance to the applicable State documentation.
- (d) Each person performing an air operation shall ensure that any amendments issued to them are properly actioned and documents remain current.

121.855 Documents to be carried

- (a) Each holder of an air operator certificate shall ensure that the following documents are carried on each individual air operation—
- (1) details of the operational flight plan; and
 - (2) NOTAM and aeronautical information service briefing documentation appropriate to the operation; and
 - (3) meteorological information appropriate to the operation; and
 - (4) the load manifest; and
 - (5) notification of dangerous goods; and
 - (6) copies of the relevant flight guide charts and plates; and
 - (7) in the case of a regular air transport service, a route guide covering each route flown and alternate aerodromes that may be used.

(b) The holder of an air operator certificate shall ensure that separate copies of the documents referred to in paragraph (a)(7) are available for each pilot performing flight crew duties on the flight.

121.857 Operation record

(a) Each holder of an air operator certificate shall for each air operation that it conducts, record—

- (1) the planned aspects of the operation; and
- (2) the actual accomplishment of the operation.

(b) The record shall be of a permanent nature.

121.859 Retention period

(a) Each holder of an air operator certificate shall ensure that the following information is retained for 12 months from the date it was completed:

- (1) operational records;
- (2) load manifest;
- (3) notification of dangerous goods.

(b) The certificate holder shall ensure that its flight crew records of flight and duty time is retained for 12 months from the date of entry of the record.

(c) The certificate holder shall ensure that its records of training, checking, and qualifications of any crew member is retained until 12 months after the individual has left the certificate holder's employment.

Subpart M — Advance Qualification Programme

121.901 Purpose

This Subpart prescribes rules governing the establishment and operation of an advanced qualification programme for qualifying, training, certifying, and otherwise ensuring competency of crew members and other personnel.

121.903 General

- (a) Each holder of an air operator certificate shall establish an advanced qualification programme under this Subpart, or a training programme in accordance with Subpart I.
- (b) The certificate holder shall, when establishing a programme under this Subpart, include a proposed plan for transition from its present training to the advanced qualification programme.
- (c) The certificate holder shall ensure that the programme is conducted safely and without unacceptable risk to the equipment and personnel, or third parties.
- (d) The certificate holder shall ensure that the person responsible for its programme holds a flight examiner rating.
- (e) The certificate holder shall ensure that its programme is controlled by the certificate holder.
- (f) The certificate holder shall ensure that each person to whom this Subpart applies complies with all requirements of the programme.
- (g) The certificate holder shall ensure that the advanced qualification programme covers all positions for—
- (1) flight crew members; and
 - (2) instructors; and
 - (3) flight examiners; and
 - (4) evaluators.
- (h) The certificate holder shall ensure that, when categories not referred to in paragraph (g), such as flight attendants and other operations personnel, are included within an advanced qualification programme, all positions of that category are covered by the programme.

121.905 Programme revisions

(a) Each holder of an air operator certificate that establishes or revises an advanced qualification curriculum, shall comply with Subpart H, Subpart I, and Subpart J until the curriculum is acceptable to the Director.

(b) If the Director finds that a certificate holder is not conforming to its programme the Director may require the certificate holder to—

- (1) revise its programme in a manner acceptable to the Director; or
- (2) replace its advanced qualification programme with a training programme that complies with Subpart I and Subpart J.

(c) If the provisions of paragraph (b) are exercised, the Director may require the certificate holder to provide a plan, acceptable to the Director, to enable transition from its advanced qualification programme to its replacement programme.

121.907 Programme curriculum

(a) Each holder of an air operator certificate that establishes an advanced qualification programme shall ensure that the programme contains curricula—

- (1) required by this Subpart; and
- (2) that are acceptable to the Director.

(b) The certificate holder shall ensure that each curriculum in the programme—

- (1) indicates the requirements in Part 61 or Part 121 Subpart I and Subpart J, as applicable, that would be replaced by the curriculum; and
- (2) shows how the curriculum will provide an equivalent level of safety for each requirement of Part 61, or Part 121 Subpart I and Subpart J, that would be replaced by the curriculum; and
- (3) includes each applicable requirement of Part 61, or Part 121 Subpart I and Subpart J, that is not specifically addressed in the curriculum; and

- (4) specifies—
- (i) the make, model, and aeroplane type, or variant; and
 - (ii) each crew member position, and other positions, to be covered by the curriculum.

121.909 Required curricula

(a) Each holder of an air operator certificate shall ensure that its advanced qualification programme has separate curricula for indoctrination, for qualification, and for continuing qualification.

(b) The indoctrination curriculum shall be designed to ensure that each person who is not qualified and currently serving in a position authorised by the certificate holder's certificate is indoctrinated in—

- (1) the policies and operating practices of the certificate holder; and
- (2) general operational knowledge; and
- (3) any specific general information or general aeronautical knowledge necessary for the position the person will occupy.

(c) The qualification curriculum shall be designed to ensure that each person not qualified and currently serving in a position authorised by the certificate holder's certificate receives the technical training, evaluation, and certification necessary to perform assigned duties to the required standard.

(d) The continuing qualification curriculum shall be based on a qualification cycle designed to ensure that each person already qualified and currently serving in a position authorised by the certificate holder's certificate receives regular training for their position, and continues to perform any assigned duties to the required standard.

121.911 Indoctrination curriculum

Each holder of an air operator certificate shall ensure that each indoctrination curriculum includes—

- (1) for each person participating in this part of the programme, certificate holder policies, operating practices, and general operational knowledge; and

- (2) for each flight crew member and operations personnel participating in this part of the programme, in addition to subparagraph (1), general aeronautical knowledge; and
- (3) for each instructor participating in this part of the programme, in addition to subparagraph (1), the—
 - (i) fundamental principles of the teaching and learning process; and
 - (ii) methods and theories of instruction; and
 - (iii) knowledge necessary to use aeroplanes, flight training devices, flight simulators, and other training equipment in advanced qualification curricula; and
- (4) for each flight examiner and evaluator participating in this part of the programme, in addition to subparagraph (1), the—
 - (i) evaluation requirements specified in each approved curriculum; and
 - (ii) methods of evaluating crew members and operations personnel; and
 - (iii) policies and practices used to conduct the kinds of evaluations particular to an advanced qualification programme curriculum.

121.913 Qualification curriculum

(a) Each holder of an air operator certificate shall ensure that each qualification curriculum includes—

- (1) for each person participating in this part of the programme—
 - (i) the certificate holder's planned hours of training, evaluation, and supervised operating experience; and
 - (ii) a list of the training, qualification, and certification activities, as applicable to each person's specific position; and

- (iii) text describing the training, qualification, and certification activities, as applicable to each person's specific position; and
- (2) for each crew member, and other operations personnel, participating in this part of the programme, in addition to paragraph (a)(1), the certificate holder shall list and describe in detail—
- (i) training, evaluation, and certification activities that are aeroplane and equipment specific to qualify the person for a particular duty position on, or duties related to, the operation of a specific make, model, and series aeroplane or variant; and
 - (ii) the knowledge requirements, subject materials, job skills, and each manoeuvre and procedure to be trained and evaluated; and
 - (iii) the practical test requirements in addition to, or in place of, the requirements of Part 61, and a list of, and text describing, supervised operating experience; and
- (3) for each instructor participating in this part of the programme, in addition to paragraph (a)(1), the certificate holder shall list and describe in detail the training and evaluation used to qualify the person to impart instruction on how to operate, and on how to ensure the safe operation of, a particular make, model, and series aeroplane or variant; and
- (4) for each flight examiner and evaluator participating in this part of the programme, in addition to paragraph (a)(1), the certificate holder shall list and describe in detail the training, evaluation, and certification activities that are aeroplane and equipment specific to qualify the person to evaluate the performance of personnel who operate, or who ensure the safe operation of, a particular make, model, and series aeroplane or variant.

121.915 Continuing qualification curriculum**Qualification cycles**

(a) Each holder of an air operator certificate shall ensure that each continuing qualification curriculum is based on a qualification cycle that ensures—

- (1) during each cycle, each person participating in this part of the programme will receive a balanced mix of training and evaluation on all events and subjects necessary for original qualification; and
- (2) each person participating in this part of the programme maintains the minimum proficiency, level of knowledge, skills, and attitudes required for original qualification; and
- (3) each flight crew member participating in this part of the programme complies with the recent experience requirements prescribed in 61.37.

(b) The certificate holder shall ensure that the duration of the continuing qualification cycle, does not initially exceed 26 calendar months, thereafter, if acceptable to the Director, the continuing qualification cycle may be extended if—

- (1) the certificate holder demonstrates that an extension is warranted; and
- (2) extensions do not exceed increments of three calendar months; and
- (3) the continuing qualification cycle does not exceed a maximum of 39 calendar months.

(c) The certificate holder shall ensure that each continuing qualification curriculum includes requirements for requalifying a crew member, an aeroplane dispatcher, or any other operations personnel, who have not maintained continuing qualification.

Continuing qualification evaluation period

(d) The certificate holder shall ensure that each continuing qualification cycle includes an evaluation period, during which each person qualified under an advanced qualification programme will receive at least one training session and a proficiency evaluation at a training facility.

(e) The certificate holder shall ensure that the duration of the evaluation period required by paragraph (d) does not initially exceed 13 calendar months, thereafter, if acceptable to the Director, the continuing qualification cycle may be extended if—

- (1) the certificate holder demonstrates that an extension is warranted; and
- (2) extensions do not exceed increments of three calendar months; and
- (3) the evaluation period does not exceed a maximum of 26 calendar months.

Evaluation period training session

(f) The certificate holder shall ensure that each evaluation period required by paragraph (d) includes training sessions, the number and frequency of which, must be acceptable to the Director.

(g) A training session, including any proficiency evaluation completed at that session, that occurs any time during the two calendar months before the last date for completion of an evaluation period can be considered by the certificate holder to be completed in the last calendar month.

(h) The certificate holder shall ensure that during each training session each person participating in this part of the programme receives—

- (1) for pilots-in-command, seconds-in-command, flight engineers, instructors, and evaluators, training in all events and major subjects required for original qualification that includes—
 - (i) ground training including a general review of knowledge and skills covered in qualification training; and

- (ii) updated information on newly developed procedures, and safety information; and
- (2) for crew members, aeroplane dispatchers, instructors, evaluators, and other operation personnel who conduct their duties in flight, training in all events and major subjects required for original qualification that includes proficiency training in an aeroplane, a flight training device, or a flight simulator on procedures, including emergency flight procedures and manoeuvres; and
- (3) for instructors and evaluators, who are limited to conducting their duties in flight simulators, training in all events and major subjects required for original qualification that includes—
 - (i) proficiency training in a flight simulator regarding operation of the training equipment; and
 - (ii) in operational flight, procedures and manoeuvres under normal, non-normal, and emergency conditions; and
- (4) for instructors and evaluators who are limited to conducting their duties in flight training devices, training in all events and major subjects required for original qualification that includes—
 - (i) proficiency training in a flight training device regarding operation of the training equipment; and
 - (ii) in operational flight, procedures and manoeuvres under normal, non-normal, and emergency conditions.

Evaluation period proficiency evaluation sessions

- (i) The certificate holder shall ensure that each evaluation period includes a proficiency evaluation conducted during each training session that each person participating in this part of the programme shall successfully complete.

(j) The certificate holder shall ensure that each training session includes—

- (1) for each person participating in this part of the programme, proficiency evaluation in all events and major subjects required for original qualification; and
- (2) for each pilot-in-command and other eligible flight crew member participating in this part of the programme, line-operating flight time evaluations.

(k) The certificate holder shall ensure each proficiency evaluation is conducted—

- (1) for each pilot-in-command, second-in-command, and flight engineer, participating in this part of the programme, in an aeroplane, flight simulator, or flight training device, or any combination of these, in accordance with the certificate holder's curriculum; and
- (2) for any other persons participating in this part of the programme, a means to evaluate their proficiency in the performance of their duties in their assigned tasks in an operational setting.

Evaluation period line-operating flight time evaluation sessions

(l) The certificate holder shall ensure that each pilot-in-command participating in this part of the programme successfully completes a line-operating flight time evaluation once during each evaluation period that—

- (1) is conducted in an aeroplane performing air operations, or ferry flights or proving flights in an aeroplane used to perform air operations; and
- (2) is completed in the calendar month that includes the midpoint of the evaluation period; and
- (3) is satisfactorily completed on the due date.

(m) The certificate holder shall ensure that during line operating flight time evaluations each person performing duties as a pilot-in-command,

second-in-command, or flight engineer for that flight, is individually evaluated to determine whether the person—

- (1) remains adequately trained and currently proficient with respect to the particular aeroplane, crew position, and type of operation in which the person serves; and
 - (2) has sufficient knowledge and skills to operate effectively as part of a crew.
- (n) For the purpose of paragraph (l)(3), a line operating flight time evaluation completed within one calendar month of the day on which it is required shall be deemed to be completed on the due date.
- (o) The certificate holder shall ensure each pilot-in-command and second-in-command, and, if the certificate holder elects, flight engineer, meets the recent experience requirements prescribed in 61.37 or 63.157 as appropriate.

121.917 Crew resource management requirements

(a) Each holder of an air operator certificate shall ensure each indoctrination, qualification, and continuing qualification curriculum includes—

- (1) crew resource management training applicable to each position for which training is provided; and
 - (2) training in the use of each crew member's crew resource management skills, and evaluation of the skills and proficiency of each person being trained; and
 - (3) training and evaluation of each flight crew member's piloting, or other technical skills, in actual or simulated line-operating flight time.
- (b) For flight crew members this training and evaluation shall be conducted in a flight training device or flight simulator.

121.919 Data collection requirements

Each holder of an air operator certificate shall ensure information is collected from its crew members, instructors, and evaluators, that will

enable the Authority to determine whether the training and evaluations are working to accomplish the overall objectives of the programme.

121.921 Certification

A person enrolled in a programme is eligible to receive a commercial or airline transport pilot, flight engineer, or appropriate rating, based on the successful completion of training and evaluation events accomplished under the programme, if—

- (1) training and evaluation of required knowledge and skills under the programme meets minimum certification and rating criteria established in Part 61 or Part 63; and
- (2) the applicant satisfactorily completes the appropriate qualification curriculum; and
- (3) the applicant shows competence in exercises that test both the required technical knowledge and skills, and crew resource management knowledge and skills, together; and
- (4) the applicant is otherwise eligible under the applicable requirements of Part 61 or Part 63.

121.923 Approval of a person providing training by arrangement

(a) Each holder of an air operator certificate may contract with the holder of an aviation training organisation certificate issued under Part 141, where the Part 141 certificate authorises the holder to conduct advanced qualification programme training, qualification, or evaluation functions, to carry out those functions provided the programme meets the requirements of this Subpart.

(b) The holder of an air operator certificate that elects to contract a Part 141 certificated organisation in accordance with paragraph (a) shall ensure that—

- (1) each instructor or evaluator, used by the Part 141 certificated organisation, meets all of the qualification and continuing qualification requirements that apply to employees of the holder of an air operator certificate that has arranged for the training, including knowledge of the certificate holder's operations; and

- (2) each contracted Part 141 certificated organisation establishes and maintains records in sufficient detail of the training, qualification, and certification, of each person qualified under an advanced qualification programme in accordance with the training, qualification, and certification requirements of this Subpart.

Appendix A – Transitional Arrangements

(a) Subject to paragraphs (b) and (c), the rules contained in 121.555(d), and 121.579 shall not come into force until 1 January 2005.

(b) Each certificate holder shall use a flight simulator for an aeroplane type in its training programme if the certificate holder is—

- (1) currently using a flight simulator in its training programme for that aeroplane type; or
- (2) introducing that aeroplane type to its operations; or
- (3) training to qualify flight crew on the aeroplane type, in which case the certificate holder shall use a flight simulator for—
 - (i) training under 121.553(d)(1) or (2); or
 - (ii) gaining experience for consolidation under 121.569(a)(1) or (2)—

but is not required to use a simulator for both.

(c) Each certificate holder that is using a flight simulator for any aeroplane type in its training programme shall conduct the manoeuvres referred to in 121.579 in the flight simulator.

(d) A certificate holder that is using a flight simulator for any aeroplane type in its training programme at the time this rule comes into effect may change from simulator to aeroplane based training for that aeroplane type if the certificate holder submits a plan that is acceptable to the Director and that—

- (1) outlines the requirement for the change from simulator to aeroplane based training; and
- (2) details how the transition between simulator based training and aeroplane based training will be accomplished; and
- (3) complies with 121.555(d) and 121.579 by 1 January 2005.

Appendix B - Instruments and Equipment Airworthiness Design Standards

Instruments and equipment required by Subpart F shall meet the following specifications and requirements:

B.1 Protective breathing equipment

- (a) Protective breathing equipment shall—
- (1) meet the requirements of the TSO C99 series or the TSO C116 series; and
 - (2) provide a breathing gas system that is free from hazards in—
 - (i) itself; and
 - (ii) its method of operation; and
 - (iii) its effect upon other components; and
 - (3) provide protection for the eyes without unduly restricting vision; and
 - (4) allow any crew member to—
 - (i) determine during flight the quantity of breathing gas available in each source of supply unless the gas system uses chemical oxygen generators; and
 - (ii) use corrective glasses without undue impairment of vision, or loss of protection; and
 - (iii) communicate using the crew member intercom system; and
 - (5) allow the flight crew members to communicate using the aeroplane radios; and
 - (6) supply breathing gas for 15 minutes at a pressure altitude of 8 000 feet.

(b) Protective breathing equipment may also be used to meet the supplemental oxygen requirements of Part 91 provided it meets the oxygen equipment standards.

B.2 *Emergency medical kit*

Emergency medical kits shall—

- (1) be located and secured such that—
 - (i) the possibility of damage or loss as the result of an accident is minimised; and
 - (ii) there is no danger to the occupants of the aeroplane; and
- (2) have its location marked on the outside of any compartment containing the kit; and
- (3) be marked for use by qualified medical personnel only; and
- (4) when containing narcotics, be installed in an aeroplane that—
 - (i) meets the requirements of the Misuse of Drugs Regulations 1977; and
 - (ii) when not in use can be locked, or placed in a lockable hangar, or have the first aid kit containing narcotics removed to a safe and secure location.

B.3 *Public address system*

(a) A public address system shall—

- (1) except for handsets, headsets, microphones, selector switches, and signalling devices, be capable of operation independent of the crew member intercom system required by 121.369(2); and
- (2) be accessible for immediate use from each of two flight crew member stations in the flight crew compartment; and
- (3) for each required floor-level passenger emergency exit that has an adjacent flight attendant seat, have a microphone which is readily accessible to the seated flight attendant; and

- (4) be capable of operation within 10 seconds by a flight attendant at each of those stations in the passenger compartment from which its use is accessible; and
 - (5) be understandably audible at all times at all passenger seats, lavatories, flight attendant seats, and work stations.
- (b) For the purposes of paragraph (a)(3) one microphone may serve more than one exit, provided the proximity of the exits allows unassisted verbal communication between seated flight attendants.

B.4 Crew member intercom system

A crew-member intercom system shall—

- (1) except for handsets, headsets, microphones, selector switches, and signalling devices, be capable of operation independent of the public address system required by 121.369(1); and
- (2) provide a means of two-way communication between all members of the flight crew; and
- (3) provide a means of two-way communication between the flight crew compartment and each passenger compartment; and
- (4) be accessible for immediate use from each of two flight crew member stations in the flight crew compartment; and
- (5) be accessible for use from at least one normal flight-attendant station in each passenger compartment; and
- (6) be capable of operation within 10 seconds by a flight attendant at each of those stations in each passenger compartment from which its use is accessible; and
- (7) be accessible for use at enough flight attendant stations so that all floor-level emergency exits in each passenger compartment are observable from a station so equipped; and

- (8) have an alerting system that—
 - (i) incorporates aural or visual signals for use by any crew member; and
 - (ii) has a means for the recipient of a call to determine whether it is a normal call or an emergency call; and
- (9) provide a means of two-way communication between ground personnel and any two flight crew members in the flight crew compartment—
 - (i) when the aeroplane is on the ground; and
 - (ii) from a location that avoids visible detection from within the aeroplane during the operation of the ground personnel intercom system station.

B.5 Cockpit voice recorder

Cockpit voice recorders shall—

- (1) meet the requirements of the TSO C84 series or the TSO C123 series; and
- (2) be fitted with an underwater locating device that meets the requirements of the TSO C121 series; and
- (3) have a minimum capacity of 30 minutes continuous recording time before any erasure.

B.6 Flight data recorder

Flight data recorders shall—

- (1) meet the requirements of the TSO C124 series; and
- (2) be fitted with an underwater locating device that meets the requirements of the TSO C121 series; and
- (3) be of a non-ejectable type and capable of recording and storing 25 hours of data in a digital form; and

- (4) record the parameters as detailed in—
 - (i) Figure 1; and
 - (ii) as applicable, Table 1 and Table 2—
of Appendix B.

B.7 Additional attitude indicator

The third presentation of attitude shall be—

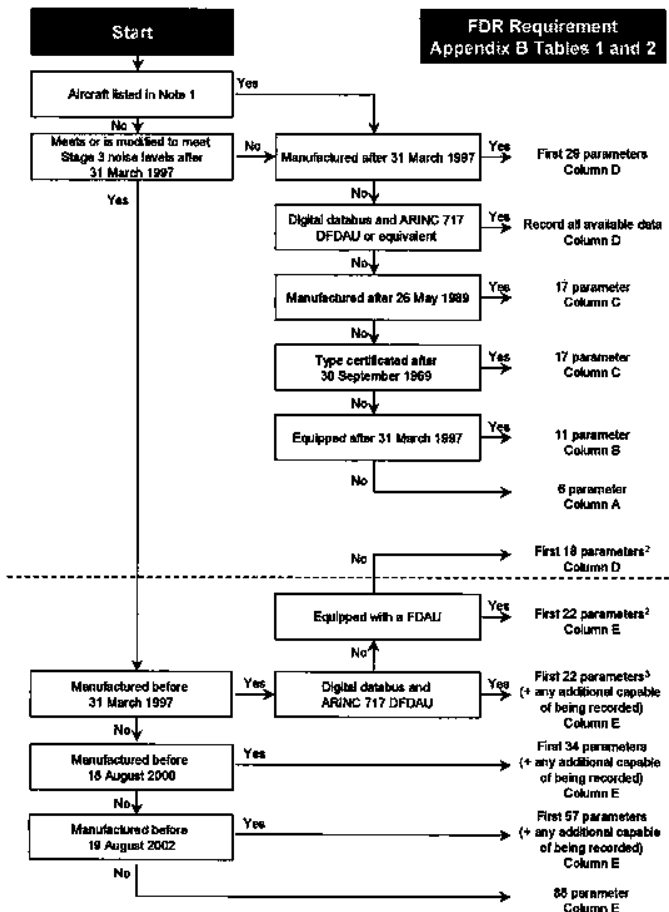
- (1) operated independently of any other attitude indicating system;
and
- (2) powered from a source independent of the electrical generating system; and
- (3) capable of continuous reliable operation for 30 minutes after total failure of the electrical generating system; and
- (4) operative without selection after total failure of the electrical generating system; and
- (5) appropriately lighted during all phases of operation.

B.8 Weather radar

Weather radar shall meet the requirements of the TSO C63 series.

B.9 Ground proximity warning system

GPWS shall meet the requirements of the TSO C92 series.



Notes

1. *General Dynamics Convair 580, 600, 640, deHavilland Aircraft Company Ltd. DHC-7, Fairchild Industries FH 227, Fokker F-27 (except Mark 50), F-28 Mark 1000 and Mark 4000, Gulfstream Aerospace G-159, Lockheed Aircraft Corporation Electra 10-A, 10-B, 10-E, L-188, Maryland Air Industries, Inc. F27, Mitsubishi Heavy Industries, Ltd. YS-11, Short Bros. Limited SD3-30, SD3-60.*
2. *Parameters 12 through 17 may be recorded from a single source.*
3. *Parameters 12 through 14 may be recorded from a single source.*

Figure 1. Flight Data Recorder Decision Chart

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter. This table refers to the FDR requirements of 121.373.

Parameters * if installed	(A)	(B)	(C)	(D)	(E)
	6 Parameter	11 Parameter	17 Parameter	44 Parameter	88 Parameter
1	Time	Time	Time	Time	Time or Relative time counts
2	Altitude	Altitude	Altitude	Altitude	Pressure Altitude
3	Airspeed	Airspeed	Airspeed	Airspeed	Indicated airspeed or Calibrated airspeed
4	Vertical acceleration	Vertical acceleration	Vertical acceleration	Heading	Heading (primary flight crew reference)
5	Heading	Heading	Heading	Vertical acceleration	Normal acceleration (vertical)
6	Time of radio transmission to/from ATC	Time of radio transmission to/from ATC	Time of radio transmission to/from ATC	Pitch attitude	Pitch attitude
7		Pitch attitude	Pitch attitude	Roll attitude	Roll attitude
8		Roll attitude	Roll attitude	Radio transmitter keying	Manual radio transmitter keying or CVR/DFDR synchronisation reference
9		Longitudinal acceleration	Longitudinal acceleration	Thrust/power on each engine	Thrust/power on each engine (primary flight crew reference)
10		Control column OR pitch control surface position	Pitch trim position	Trailing edge flap OR cockpit control selection	Autopilot engagement

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter. This table refers to the FDR requirements of 121.373.

Parameters * if installed	(A)	(B)	(C)	(D)	(E)
	6 Parameter	11 Parameter	17 Parameter	44 Parameter	88 Parameter
11		Thrust of each engine	Control column OR pitch control surface position	Leading edge flap OR cockpit control selection	Longitudinal acceleration
12			Control wheel OR lateral control surface position	Thrust reverser position	Pitch control(s) position (non fly- by-wire systems)
					Pitch control(s) position (fly-by- wire systems)
13			Rudder pedal OR yaw control surface position	Ground spoiler position/speed brake selection	Lateral control(s) position (non fly- by-wire systems)
					Lateral control(s) position (fly-by- wire systems)
14			Thrust of each engine	Marker beacon passage	Yaw control(s) position (non fly- by-wire systems)
					Yaw control(s) position (fly-by- wire systems)
15			Position of each thrust reverser	Autopilot engagement	Pitch control surface(s) position
16			Trailing edge flap OR cockpit flap control position	Longitudinal acceleration	Lateral control surface(s) position
17			Leading edge flap OR cockpit flap control position	Pilot input and/or surface position - primary controls	Yaw control surface(s) position
18				Lateral acceleration	Lateral acceleration

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter. This table refers to the FDR requirements of 121.373.

Parameters * if installed	(A)	(B)	(C)	(D)	(E)
	6 Parameter	11 Parameter	17 Parameter	44 Parameter	88 Parameter
28				Hydraulics, each system, low pressure	Glideslope deviation or MLS elevation
29				Groundspeed	Marker beacon passage
30				Drift angle	Master warning
31				Wind speed and direction	Air/ground sensor (primary aeroplane sensor, nose or main gear)
32 *				Latitude and longitude	Angle of attack (if measure directly)
33				Brake pressure/pedal position	Hydraulic pressure low, each system
34 *				Additional engine parameters: EPR, N ₁ , N ₂	Groundspeed
35				Exhaust Gas Temperature	GPWS
36				Throttle lever position	Landing gear position or landing gear cockpit control selection
37 *				Fuel flow	Drift angle
38 *				TCAS - TA	Wind speed and direction

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter. This table refers to the FDR requirements of 121.373.

Parameters * if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 44 Parameter	(E) 88 Parameter
39 *				TCAS - RA	Latitude and longitude
40 *				TCAS - Sensitivity level	Stick shaker and pusher activation
41 *				Ground Proximity Warning System	Windshear detection
42				Landing gear or gear selector position	Throttle/power lever position
43				DME 1 and 2 distance	Additional engine parameters
44				Nav 1 and 2 frequency selection	TCAS
45					DME 1 and 2 distances
46					Nav 1 and 2 selected frequency
47 *					Selected barometric setting
48 *					Selected altitude
49 *					Selected speed
50 *					Selected Mach
51 *					Selected vertical speed
52 *					Selected heading
53 *					Selected flight path

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter. This table refers to the FDR requirements of 121.373.

Parameters * if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 44 Parameter	(E) 88 Parameter
54 *					Selected decision height
55					EFIS display format
56					Multi-function/engine alerts display format
57 *					Thrust command
58 *					Thrust target
59 *					Fuel quantity in CG trim tank
60					Primary navigation system reference
61 *					Ice detection
62 *					Engine warning each engine - vibration
63 *					Engine warning each engine - over temp
64 *					Engine warning each engine - oil pressure low
65 *					Engine warning each engine - over speed
66					Yaw trim surface position

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter. This table refers to the FDR requirements of 121.373.

Parameters * if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 44 Parameter	(E) 88 Parameter
67					Roll trim surface position
68					Brake pressure - left and right
69					Brake pedal application - left and right
70 *					Yaw and side-slip angle
71 *					Engine bleed valve position
72 *					De-icing or anti-icing system selection
73 *					Computed centre of gravity
74					AC electrical bus status
75					DC electrical bus status
76 *					APU bleed valve position
77					Hydraulic pressure each system
78					Loss of cabin pressure
79					Computer failure - critical flight and engine control systems
80 *					HUD

Table 1. Part 121 - Flight Data Recorder Parameter Requirements

When reading the parameter specifications from Table 2 the corresponding shaded specification should be chosen for each parameter. This table refers to the FDR requirements of 121.373.

Parameters * if installed	(A) 6 Parameter	(B) 11 Parameter	(C) 17 Parameter	(D) 44 Parameter	(E) 88 Parameter
81*					Para-visual display
82					Cockpit trim control input position - pitch
83					Cockpit trim control input position - roll
84					Cockpit trim control input position - yaw
85					Trailing edge flap and cockpit flap control position
86					Leading edge flap and cockpit flap control position
87					Ground spoiler position and speed brake selection
88					All cockpit flight control input forces - control wheel, control column, rudder pedal

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Time or Relative time counts	24 hours 0 to 4095	$\pm 0.125\%$ per hour	4	1s	UTC time preferred when available. Counter increments each four seconds of system operation.
Pressure Altitude	-1000' to maximum certified altitude -1000' to maximum certified altitude +5000'	$\pm 100'$ to $\pm 700'$ (refer TSO C124a, C51a)	1	5' to 35'	Data should be obtained from the air data computer when practicable
Indicated airspeed or Calibrated airspeed	50 KIAS or minimum value to Max V_{so} and V_{so} to $1.2V_0$	$\pm 5\%$ and $\pm 3\%$	1	1kt	Data should be obtained from the air data computer when practicable
Heading (primary flight crew reference)	0 - 360° 0 - 360° and discrete 'true' or 'mag'	$\pm 2^\circ$	1	0.5°	When true or magnetic heading can be selected as the primary heading reference, a discrete indicating selection must be recorded
Normal acceleration (vertical)	-3g to +6g	$\pm 1\%$ maximum range excluding datum error of $\pm 5\%$	0.125	0.01g	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Pitch attitude	$\pm 75^\circ$	$\pm 2^\circ$	1 or 0.5 for aeroplanes manufactured after 2002	0.5°	A sampling rate of 0.25 is recommended
Roll attitude	$\pm 180^\circ$	$\pm 2^\circ$	1 or 0.5 for aeroplanes manufactured after 2002	0.5°	A sampling rate of 0.5 is recommended
Manual radio transmitter keying or CVR/DFDR synchronisation reference	Discrete - 'on' or 'off'		1		Preferably each crew member but one discrete acceptable for all transmission provided the CVR/DFDR system complies with TSO C124a CVR synchronisation requirements
Thrust/power on each engine (primary flight crew reference)	Full range forward	$\pm 2\%$	1 per engine	0.2% of full range	Sufficient parameters (e.g. EPR, N_1 or Torque, N_p) as appropriate to the particular engine be recorded to determine power in forward and reverse thrust, including potential overspeed conditions
Autopilot engagement	Discrete - 'on' or 'off'		1		
Longitudinal acceleration	$\pm 1g$	$\pm 1.5\%$ maximum range excluding datum error of $\pm 5\%$	0.25	0.01g	
Pitch control(s) position (non fly-by-wire)	Full range	$\pm 2^\circ$	1 or 0.5	0.2% of full range	For aeroplanes that have a flight control break away capability

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
systems) ¹			0.25 for aeroplanes manufactured after 2002		that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5 or 0.25, as applicable
Pitch control(s) position (fly-by-wire systems)	Full range	±2°	0.5 or 0.25 for aeroplanes manufactured after 2002	0.2% of full range	
Lateral control(s) position (non fly-by-wire systems) ¹	Full range	±2°	0.5 or 0.25 for aeroplanes manufactured after 2002	0.2% of full range	For aeroplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5 or 0.25, as applicable

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Lateral control(s) position (fly-by-wire systems)	Full range	$\pm 2^\circ$	1 0.5 or 0.25 aeroplanes manufactured after 2002	0.2% of full range	
Yaw control(s) position (non fly-by-wire systems) ¹	Full range	$\pm 2^\circ$	1 0.5	0.2% of full range	For aeroplanes that have a flight control break away capability that allows either pilot to operate the controls independently, record both control inputs. The control inputs may be sampled alternately once per second to produce the sampling interval of 0.5
Yaw control(s) position (fly-by-wire systems)	Full range	$\pm 2^\circ$	1 0.5	0.2% of full range	
Pitch control surface(s) position ¹	Full range	$\pm 2^\circ$	1 0.5 or 0.25 aeroplanes manufactured after 2002	0.2% of full range	For aeroplanes fitted with multiple or split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5 or 0.25

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Lateral control surface(s) position ¹	Full range	$\pm 2^\circ$	0.5 or 0.25 for aeroplanes manufactured after 2002	0.2% of full range	For aeroplanes fitted with multiple or split surfaces, a suitable combination of surface position sensors is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5 or 0.25
Yaw control surface(s) position ¹	Full range	$\pm 2^\circ$	1 or 0.5	0.2% of full range	For aeroplanes fitted with multiple or split surfaces, a suitable combination of surface position sensors is acceptable in lieu of recording each surface separately. The control surfaces may be sampled alternately to produce the sampling interval of 0.5
Lateral acceleration	$\pm 1g$	$\pm 1.5\%$ maximum range excluding datum error of $\pm 5\%$	0.25	0.01g	Twin engine aircraft only
Pitch trim surface position	Full range	$\pm 3\%$	1	0.3% of full range	
Trailing edge flap or cockpit control position	Full range or discrete each position	$\pm 3^\circ$ or pilot's indicator	2	0.5% of full range	Flap position and cockpit control may each be sampled alternately at four second intervals, to give a data point every two seconds

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Leading edge flap or cockpit control position	Full range or discrete each position	$\pm 3^\circ$ or pilot's indicator	2	0.5% of full range	Left and right sides, or flap position and cockpit control may each be sampled at four second intervals, so as to give a data point each two seconds
Each thrust reverser position or equivalent for propeller aeroplane	Discrete - 'stowed', 'in transit', 'reverse'		1 per engine		Turbo-jet - two discretises enable the three states to be determined Turbo-prop - one discrete
Ground spoiler position or speed brake position	Full range or discrete each position	$\pm 2^\circ$	1 or 0.5 for aeroplanes manufactured after 2002	0.2% of full range	
Outside air temperature or total air temperature	-50°C to $+90^\circ\text{C}$	$\pm 2^\circ\text{C}$	2	0.3°C	
Autopilot/autothrottle/AFCS mode and engagement status	Discretises - suitable combination		1		Discretises should show which systems are engaged and which primary modes are controlling the flight path and speed of the aircraft

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Radio altitude	-20' to +2 500'	$\pm 2'$ or $\pm 3\%$ whichever is the greater below 500' and $\pm 5\%$ above 500'	1	1' $\pm 5\%$ above 500'	For autoland/category III operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second.
Localiser deviation or MLS azimuth	± 400 microamps or available sensor range as installed $\pm 62^\circ$	As installed - $\pm 3\%$ recommended	1	0.3+ of full range	For autoland/category III operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second. It is not necessary to record ILS and MLS at the same time, only the approach aid in use need be recorded
Glideslope deviation or MLS elevation	± 400 microamps or available sensor range as installed $+0.9^\circ$ to $+30^\circ$	As installed - $\pm 3\%$ recommended	1	0.3% of full range	For autoland/category III operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second. It is not necessary to record ILS and MLS at the same time, only the approach aid in use need be recorded
Marker beacon passage	Discrete - 'on' or 'off'		1		A single discrete is acceptable for all markers

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Master warning	Discrete		1		Record the master warning and record each 'red' warning that cannot be determined from other parameters or from the cockpit voice recorder
Air/ground sensor (primary aeroplane sensor, nose or main gear)	Discrete - 'air' or 'ground'		1 (0.25 recommended)		
Angle of attack (if measure directly)	As installed	As installed	2 or 0.5 for aeroplanes manufactured after 2002	0.3% of full range	If left and right sensors are available, each may be recorded at four second intervals so as to give a data point each 0.5 second
Hydraulic pressure low, each system	Discrete - 'low' or 'normal' or available sensor range	±5%	2	0.5% of full range	
Groundspeed	As installed	Most accurate system installed	1	0.2% of full range	
GPWS	Discrete - 'warning' or 'off'		1		A suitable combination of discrettes unless recorder capacity is limited in which case a single discrete for all modes is acceptable

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Landing gear position or landing gear cockpit control selection	Discrete		4		A suitable combination of discretes should be recorded
Drift angle	As installed	As installed	4	0.1°	
Wind speed and direction	As installed	As installed	4	1kt and 1°	
Latitude and longitude	As installed	As installed	4	0.002°	Provided by the Primary Navigation System Reference. Where capacity permits latitude/longitude resolution should be 0.0002°
Stick shaker and pusher activation	Discrete - 'on' or 'off'		1		A suitable combination of discretes to determine activation
Windshear detection	Discrete - 'warning' or 'off'		1		
Throttle/power lever position	As installed. Full range	As installed. ±2%	1 per lever	2% of full range	For aeroplanes with non-mechanically linked cockpit engine controls

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Additional engine parameters	As installed	As installed	Each engine each second	2% of full range	EPR, N ₁ , N ₂ , EGT Where capacity permits, the preferred priority is - indicated vibration level, N ₂ , EGT, Fuel Flow, Fuel Cut-off lever position, and N ₃ , unless the engine manufacturer recommends otherwise
TCAS	Discretes	As installed	1		A suitable combination of discretes should be recorded to determine the status of - Combined Control, Vertical Control, Up Advisory, and Down Advisory. (refer ARINC Characteristic 735 - Attachment 6E, TCAS VERTICAL RA DATA OUTPUT WORD)
DME 1 and 2 distances	0 - 200nm	As installed	4	1nm	1 mile
Nav 1 and 2 selected frequency	Full range	As installed	4		Sufficient to determine selected frequency
Selected barometric setting	Full range	±5%	1 per 64 seconds	0.2% of full range	
Selected altitude	Full range	±5%	1	100'	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Selected speed	Full range	±5%	1	1kt	
Selected Mach	Full range	±5%	1	0.01	
Selected vertical speed	Full range	±5%	1	100ft/min	
Selected heading	Full range	±5%	1	1°	
Selected flight path	Full range	±5%	1	1°	
Selected decision height	Full range	±5%	64	1'	
EFIS display format	Discretes		4		Discretes should show the display system status (off, normal, fail, composite, sector, plan, navigation aids, weather radar, range, copy)
Multi-function/engine alerts display format	Discretes		4		Discretes should show the display system status (off, normal, fail) and the identity of display pages for emergency procedures need not be recorded
Thrust command	Full range	±2%	2	2% of full range	
Thrust target	Full range	±2%	4	2% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Fuel quantity in CG trim tank	Full range	±5%	1 per 64 seconds	1% of full range	
Primary navigation system reference	Discretes - 'GPS', 'INS', 'VOR/DME', 'MLS', 'Loran C', 'Omega', 'Localiser Glideslope'		4		A suitable combination of discretes to determine the Primary Navigation System reference
Ice detection	Discrete - 'ice' or 'no ice'		4		
Engine warning each engine - vibration	Discrete		1		
Engine warning each engine - over temp	Discrete		1		
Engine warning each engine - oil pressure low	Discrete		1		
Engine warning each engine - over speed	Discrete		1		
Yaw trim surface position	Full range	±3%	2	0.3% of full range	
Roll trim surface position	Full range	±3%	2	0.3% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Brake pressure - left and right	As installed	As installed $\pm 5\%$	1		To determine braking effort applied by pilots or by autobrakes
Brake pedal application - left and right	Discrete or analogue - 'applied' or 'off'	As installed $\pm 5\%$	1		To determine braking applied by pilots
Yaw and side-slip angle	Full range	$\pm 5\%$	1	0.5°	
Engine bleed valve position	Discrete - 'open' or 'closed'		4		
De-icing or anti-icing system selection	Discrete - 'on' or 'off'		4		
Computed centre of gravity	Full range	$\pm 5\%$	1 per 64 seconds	1% of full range	
AC electrical bus status	Discrete - 'power' or 'off'		4		Each bus
DC electrical bus status	Discrete - 'power' or 'off'		4		Each bus
APU bleed valve position	Discrete - 'open' or 'closed'		4		
Hydraulic pressure each system	Full range	$\pm 5\%$	2	100psi	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Loss of cabin pressure	Discrete - 'loss' or 'normal'		1		
Computer failure - critical flight and engine control systems	Discrete - 'fail' or 'normal'		4		
HUD	Discrete - 'on' or 'off'		4		
Para-visual display	Discrete - 'on' or 'off'		1		
Cockpit trim control input position - pitch	Full range	±5%	1	0.2% of full range	
Cockpit trim control input position - roll	Full range	±5%	1	0.2% of full range	
Cockpit trim control input position - yaw	Full range	±5%	1	0.2% of full range	
Trailing edge flap and cockpit flap control position	Full range or discrete each position	±5%	2	0.5% of full range	Trailing edge flaps and cockpit flap control position may each be sampled alternately at four second intervals to provide a sample each 0.5 second
Leading edge flap and cockpit flap control position	Full range or discrete each position	±5%	1	0.5% of full range	

Table 2. Part 121 - Flight Data Recorder Parameter Specifications.

This table refers to the FDR requirements of 121.373.

Parameters	Range	Sensor input accuracy	Seconds per sampling interval	Resolution	Remarks
Ground spoiler position and speed brake selection	Full range or discrete each position	±5%	0.5	0.2% of full range	
All cockpit flight control input forces - control wheel, control column, rudder pedal	Full range - wheel, column, pedals	±5% - ±70lbs, ±85lbs, ±165lbs respectively	1	0.2% of full range	For fly-by-wire flight control systems, where flight control surface position is a function of the displacement of the control input device only, it is not necessary to record this parameter

Notes:

1. For aeroplanes that can demonstrate the capability of deriving either the control input or control movement (one from the other) for all modes of operation and flight regimes only the surface position OR the control position need be sensed. For aeroplanes with non-mechanical control systems (fly-by-wire) both surface and control position must be recorded.

Appendix C — Runways

This Appendix is referred to in 121.71.

C.1 *Minimum runway widths*

To determine the minimum runway width it is necessary to ascertain the aerodrome reference code (ARC) appropriate to the aeroplane type by using Table 1. The code is composed of two elements which are related to the aeroplane performance, characteristics, and dimensions. Element 1 is a number based on the aeroplane reference field length (ARFL) and element 2 is a letter based on the aeroplane wing span and outer main gear wheel span.

C.1.1 *Determining the ARC using Table 1*

- (a) **Firstly:** Determine the ARFL of the aeroplane to be operated. The ARFL is the minimum field length for take-off at maximum certificated take-off weight, at sea level, in standard atmospheric conditions, in still air, and with zero runway slope, as derived from the aircraft flight manual;
- (b) **Secondly:** Determine the code number for element 1 applying the aeroplane's aerodrome reference field length; and
- (c) **Thirdly:** Determine the code letter of element 2 corresponding to the dimensions of the aeroplane's wing and outer main gear span. The code letter for element 2 is the code letter which corresponds to the wing span, or the outer main gear span, whichever gives the most demanding code letter. For instance, if code letter C corresponds to the aeroplane's wing span and code letter D corresponds to the aeroplane's outer main gear span, the code letter selected would be D for that aeroplane type.

Table 1. Aerodrome Reference Code (ARC)

Code Element 1			Code Element 2	
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

C.1.2 Determining the minimum runway width using Table 2

Having determined the aeroplane's ARC, the runway widths are determined by entering at the applicable code number and then moving across to the value under the applicable code letter. For instance, if the aeroplane ARC is 2C, the required runway width is 30 m.

Table 2. Runway widths

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

C.1.3 Determining Minimum runway strip widths

The minimum runway strip width for a particular aeroplane type should be determined by reference to Table 3 below.

Table 3 Minimum Runway Strip Width

Code Number	Runway Type	Strip Width
3 or 4	Precision instrument approach runway at an International aerodrome	300 m
3 or 4	Precision instrument approach runway	220 m
1 or 2	Precision instrument approach runway	150 m
3 and 4	Non-precision instrument approach or non-instrument approach runway	150 m
3 and 4	Non-instrument approach day only applicable to aeroplanes at or below 22700 kg MCTOW	90 m
1 and 2	Non-precision instrument approach runway	150 m
2	Non-instrument approach runway	80 m
1	Non-instrument approach runway	60 m

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CONSULTATION DETAILS

(This statement does not form part of the rules contained in Part 121.
It provides details of the consultation undertaken in making the rules.)

The consultation details relating to the amendment 5 to Part 121 are contained with the associated amendment 6 to Part 135. The comments and all the background material used in developing the rules are held on the docket and are available for public scrutiny. Persons wishing to view the docket should call at Aviation House, 1 Market Grove, Lower Hutt and ask for docket 98/CAR/1303.