

Civil Aviation Amendment Order (No. R94) 2004

I, WILLIAM BRUCE BYRON, Director of Aviation Safety, on behalf of CASA, issue the following Civil Aviation Order under subregulations 21.184 (4) and 21.184A (2) of the *Civil Aviation Safety Regulations 1998*.

[Signed Bruce Byron]

Bruce Byron
Director of Aviation Safety and
Chief Executive Officer

12 December 2004

1 Name of Order

This Order is the Civil Aviation Amendment Order (No. R94) 2004.

2 Commencement

This Order commences on gazettal.

3 Replacement of section 101.55 of the Civil Aviation Orders

Section 101.55 of the Civil Aviation Orders is omitted and a new section substituted as set out in Schedule 1.

Schedule 1 Substitution of section 101.55 of the Civil Aviation Orders

SECTION 101.55

AIRCRAFT CERTIFICATION REQUIREMENTS — AEROPLANES WITH A MAXIMUM WEIGHT NOT EXCEEDING 450 KILOGRAMS

1 APPLICATION

1.1 Subject to paragraph 1.2, this section applies to single engine propeller driven aeroplanes of maximum take-off weight not greater than 450 kilograms, subject to the limitations that:

- (a) they must have not more than 1 propeller, and a maximum of 2 places; and
- (b) in the cruising configuration, stall speed V_{S1} must not exceed 45 knots CAS; and
- (c) in the landing configuration, stall speed V_{SO} must not exceed 40 knots CAS; and
- (d) unless otherwise approved, the maximum speed in straight and level flight must not exceed 100 knots CAS at maximum power.

1.2 This section also applies to a single engine propeller driven aeroplane that complies with subparagraphs 1.1 (a), (b) and (d) and that has:

- (a) a maximum take-off weight of not more than 480 kilograms; and
- (b) in the landing configuration, a stall speed V_{SO} of not more than 42 knots CAS;

if, and only if, the product of the maximum take-off weight of the aeroplane (expressed in kilograms) and the square of the stall speed V_{SO} of the aeroplane in the landing configuration (expressed as knots CAS) does not exceed a value of 768 000.

Note: Aeroplanes capable of a maximum speed in excess of 100 knots CAS may be approved provided the applicant can provide acceptable flutter justification.

3 GENERAL

3.1 **Special Conditions.** If CASA finds that the design standards specified in this subsection do not provide adequate or appropriate safeguard against particular features or characteristics of the aeroplane, CASA may issue such special conditions which add to or vary the design standards for that aeroplane as CASA finds necessary to restore a level of safety equivalent to that otherwise established in the design standards.

Note 1: Flight control configurations such as weight shift, wing warping, spoilers, elevons, ailerons, flaperons, etc, may attract additional special conditions as CASA finds necessary.

- 3.2 **Basic Requirements and Equivalent Safety.** Subject to paragraph 3.3.1 and 3.3.2, the standards which follow must be complied with as applicable, unless CASA has determined on the basis of evidence submitted that any item not complied with is compensated for by factors which provide an equivalent level of safety.

Note 2: Airworthiness Directives must be complied with before a certificate of airworthiness will be issued for an individual aeroplane.

- 3.3 Subject to paragraphs 3.3.1 and 3.3.2, an aeroplane to which this section applies must comply with:

(a) 1 of the following design standards:

- (i) British Civil Airworthiness Requirements Section K;
- (ii) Federal Aviation Regulations Part 23;
- (iii) Joint Aviation Requirements JAR 22 (Sailplanes and Powered Sailplanes);
- (iv) Joint Aviation Requirements JAR-VLA (Very Light Aeroplanes);
- (v) a design standard, or a combination of design standards, nominated by the applicant that is acceptable to CASA; and

(b) the requirements specified in this section.

- 3.3.1 In spite of paragraphs 3.2 and 3.3, CASA may, in writing, exempt a particular aeroplane, or a class of aeroplanes, to which this section applies from compliance with specified provisions of this section.

- 3.3.2 An exemption under paragraph 3.3.1 is subject to the aeroplane exempted complying with such requirements (if any) as CASA specifies in the exemption as being necessary in the interests of safety and having regard to the purposes for which the aeroplane is to be used.

Note 3: Compliance with paragraph 3.3 does not preclude the requirement to comply with the remainder of this section. Compliance with other relevant sections of CASR Part 21 is also required.

- 3.4 An aeroplane to which this section applies and for which intentional spinning is desired must comply with the applicable requirements specified in FAR Part 23 and/or BCAR Section K.

4 PERFORMANCE

- 4.1 When establishing compliance with the performance standards the aeroplane must be handled in accordance with procedures that can be executed in service by pilots of average ability. The manner in which controls are used must be recorded in flight test reports in sufficient detail to enable the scheduled flight characteristics to be repeated.
- 4.2 The airspeed indicating system must be calibrated in flight to determine the system error.

- 4.3 **Stalling Speed.** In demonstrating compliance with the performance standards of this section, the speeds V_{SO} and V_{S1} have the following meanings:
- (a) V_{SO} (in knots CAS) is the stalling speed, or minimum steady flight speed at which the aeroplane is controllable with:
 - (i) wing flaps in the landing position; and
 - (ii) landing gear extended; and
 - (iii) engine idling with the throttle closed; and
 - (iv) centre of gravity in the most forward position; and
 - (v) maximum take-off weight;
 - (b) V_{S1} (in knots CAS) is the stalling speed, or minimum steady flight speed at which the aeroplane is controllable with:
 - (i) the aeroplane in the configuration associated with the performance standard in which V_{S1} is being used as a factor; and
 - (ii) engine idling with the throttle closed; and
 - (iii) centre of gravity in the most forward position; and
 - (iv) maximum take-off weight;
 - (c) V_{S1} and V_{SO} must be determined by flight test, in accordance with the following procedures:
 - (i) aeroplane trimmed, power off, at $1.5 V_{S1}$ or the minimum trim speed, whichever is the greater;
 - (ii) the speed reduced at a rate not exceeding 1 knot per second until the stall is produced as indicated by an uncontrolled downward pitching motion of the aeroplane or until the elevator control reaches its aft limit;
 - (d) positive response to control application must be available throughout the stall and recovery. Any roll which occurs between the initiation of the stall and the recovery must not exceed 20 degrees;
 - (e) the nature of the stall warning must be determined. The stall warning must be determined in any configuration of flaps and undercarriage in straight and turning flight. The stall warning must occur sufficiently before the stall to allow the pilot to recover safely.
- 4.4 **Take-off Safety Speed.** A take-off safety speed must be established for each flap setting for which take-off distance information is to be provided. The take-off safety speed must be an airspeed not less than $1.3 V_{S1}$ or V_{S1} plus 10 knots, whichever is the greater, at which adequate control is available in the event of sudden complete engine failure during the climb following take-off.
- 4.5 **Landing Approach Speed.** A landing approach speed must be established for each flap setting for which landing distance information is to be provided and must be not less than $1.3 V_{SO}$ or V_{SO} plus 10 knots, whichever is the greater. The landing approach speed must be such that the landing does not require exceptional piloting skill or exceptionally favourable conditions.

- 4.6 **Take-off Distance.** The take-off distance must be established for a short, dry, grass surface and must be the distance required to reach a height of 50 feet above the runway from a standing start with:
- (a) the engine operating within maximum take-off power limitations; and
 - (b) the aeroplane reaching the height of 50 feet at an airspeed of not less than the take-off safety speed; and
 - (c) landing gear extended throughout; and
 - (d) wing flaps in the take-off position; for maximum take-off weight; and sea level ISA.
- 4.7 **Take-off Climb.** The gradient of climb after take-off must not be less than 10% under the following conditions:
- (a) sea level ISA;
 - (b) maximum take-off weight;
 - (c) airspeed equal to the take-off safety speed;
 - (d) wing flaps in the take-off position;
 - (e) landing gear extended;
 - (f) engine operating with maximum take-off limitations;
 - (g) in still air and out of ground effect.
- 4.8 **Landing Distance.** The landing distance must be established for a short, dry, grass surface and must be the distance required to bring the aeroplane at maximum take-off weight under sea level ISA conditions to rest from a height of 50 feet above the runway surface. The aeroplane must reach the height of 50 feet at an airspeed of not less than the landing approach speed following a steady approach at that speed with the wing flaps in the landing position. The landing must be made without excessive vertical acceleration and without tendency to bounce, nose over or ground loop.

5 FUEL AND INDUCTION SYSTEMS

- 5.1 Notwithstanding the requirements of subsection S971 (a) (1) of subpart E of BCAR Section S, the sediment bowl must have a volume not less than 50 millilitres.
- 5.2 The fuel system of the engine must be designed and constructed to supply the appropriate quantity of fuel to the engine throughout the complete operating range of the engine under all starting, flight and atmospheric conditions.
- 5.3 The induction system of the installed engine must provide effective means to prevent and eliminate icing.
- 5.4 The type and degree of fuel filtering necessary for protection of the engine fuel system against foreign particles in the fuel must be specified. The applicant must show (e.g. within the 50 hour run prescribed in paragraph 6.34) that foreign particles passing through the prescribed filtering means will not critically impair engine fuel system functioning.

- 5.5 Each passage in the induction system that conducts a mixture of fuel and air, and in which fuel may accumulate, must be self-draining to prevent a liquid lock in the combustion chambers. This applies to all attitudes that the applicant establishes as those the engine can have when the aeroplane in which it is installed is in any of the established static ground attitudes.

6 ENGINE

- 6.1 **Engine Requirements.** One of the following conditions must be satisfied in relation to the engine installed in the aeroplane:
- (a) the engine is of a type to which a certificate of type approval under this subsection applies;
 - (b) the engine is of a type that has been certified as an aircraft engine in accordance with FAR 33, BCAR C or JAR E;
 - (c) the engine is of a type that has been approved by CASA as being appropriate for use in aeroplanes to which this section applies.

Note: An aeroplane to which this section applies that has an engine of a kind to which subparagraph 6.1 (c) applies may, because of the characteristics of that engine, have conditions included in its certificate of airworthiness.

- 6.1.1 **Certificates of Type Approval.** A certificate of type approval may be issued in relation to a type of spark or compression engine if the requirements set out in paragraphs 6.2 to 6.38 are satisfied in relation to engines of that type.

Note: When spark ignition is provided, a single ignition system may be acceptable.

- 6.2 **Instruction Manual.** An instruction manual containing the information that is necessary for properly installing, operating, servicing and maintaining the engine must be provided.
- 6.3 **Engine Ratings and Operating Limitations.** Engine ratings and operating limitations must be established. The engine ratings must be based on the operating conditions demonstrated during the bench tests prescribed in this subsection. They include power ratings and operational limitations relating to speeds, temperatures, pressures, fuels and oils which the applicant finds necessary for the safe operation of the engine.
- 6.4 **Selection of Engine Power Ratings.** Each selected rating must be for the lowest power that all engines of the same type may be expected to produce under the conditions used to determine that rating.

Design and Construction

- 6.11 **Materials.** The suitability and durability of materials used in the engine must:
- (a) be established on the basis of documented experience or tests; and
 - (b) conform to approved specifications.

6.12 **Fire Prevention**

- (a) The design and construction of the engine and the materials used must minimise the probability of the occurrence and spread of fire because of structural failure, overheating or other causes.
- (b) Each external line or fitting that conveys flammable fluids must be at least fire resistant. Components must be shielded or located to safeguard against the ignition of leaking flammable fluid.

6.13 **Engine Cooling.** Engine design and construction must provide the necessary cooling under conditions in which the aeroplane is expected to operate.

6.14 The induction system of the engine through which air, or fuel in combination with air, passes must be designed and constructed to minimise ice accretion and vapour condensation in those passages.

6.15 **Engine Mounting Attachments and Structure**

- (a) The maximum allowable limit and ultimate loads for engine mounting attachment and related engine structure must be specified by the applicant.
- (b) The engine mounting attachments and related engine structure must be able to withstand the specified loads without failure, malfunction or permanent deformation.

Note: In choosing the maximum allowable limit and ultimate loads, the applicant should take account of the flight and ground loads and the emergency alighting loads specified for the aeroplane as a whole.

6.16 **Accessory Attachment.** Each accessory drive and mounting attachment must be designed and constructed so that the engine will operate properly with the accessories attached. The design of the engine must allow the examination, adjustment or removal of each essential engine accessory.

6.17 **Vibration.** The engine must be designed and constructed to function throughout its normal operating range of crankshaft rotational speeds and engine powers without inducing stresses in excess of the design stresses in any of the engine parts or airframe components.

6.18 **Lubrication System** (four-stroke engines only)

- (a) The lubrication system of the engine must be designed and constructed so that it will function properly in all attitudes and atmospheric conditions in which the aeroplane is expected to operate. In wet-sump engines this requirement must be met when the engine contains only the minimum oil quantity, the minimum quantity being not more than half the maximum quantity.
- (b) The lubrication system of the engine must be designed and constructed to allow installing a means of cooling the lubricant.
- (c) The crankcase must be vented to preclude leakage of oil from excessive pressure in the crankcase.

Note: If the 2-stroke engine has a separate oil supply rather than oil-in-fuel, CASA may prescribe the necessary conditions for the lubricating system of the 2-stroke engine.

6.19 **Engine Starting.** Restarting the engine in flight must be possible.

Bench Tests

6.31 **Vibration Test.** Except where the engine is of a type of construction known not to be prone to hazardous vibration, the engine must undergo a vibration survey to establish crankshaft torsional and bending characteristics over a range of rotational speeds from idling to 110% of the maximum continuous speed or 103% of the maximum desired take-off speed, whichever is the greater. The survey must be conducted with a representative propeller. Hazardous conditions must not be present.

Note: The propeller should be so chosen that the prescribed maximum rotational speed is obtained at full throttle or at the desired maximum permissible manifold pressure, whichever is appropriate.

6.32 **Calibration Test.** Each test engine must be subject to the calibration tests necessary to establish its power characteristics and the conditions for the endurance test specified in paragraph 6.34. The results of the power characteristics calibration tests must form the basis for establishing the characteristics of the engine over its entire operating range of crankshaft rotational speeds, manifold pressures, and fuel/air mixture settings. Power ratings must be based on standard atmospheric conditions at sea level.

6.33 **Detonation Test** (spark ignition only). The engine must be tested to establish that it can function without detonation throughout the range of intended conditions of operation.

6.34 **Endurance Test**

- (a) The engine must be subject to an endurance test (with a representative propeller) that includes a total of 50 hours of operation and consists of the cycles specified in paragraph 6.34 (c) below.
- (b) Additional endurance testing at particular rotational speed(s) may be required depending on the results of the tests prescribed in paragraph 6.31 to establish the ability of the engine to operate without fatigue failure.

(c) Each cycle must be conducted as follows:

Sequence	Duration (Minutes)	Operation Conditions
1	5	Starting-Idle
2	5	Take-off power
3	5	Cooling run (Idle)
4	5	Take-off power
5	5	Cooling run (Idle)
6	5	Take-off power
7	5	Cooling run (Idle)
8	15	75% of maximum continuous power
9	5	Cooling run (Idle)
10	60	Maximum continuous power
11	5	Cooling run and stop

Total: 120

- (d) During or following the endurance test, the fuel and oil consumption must be determined.
- (e) A power check at sea level conditions must be accomplished on the endurance test engines after the endurance test. Any change in power characteristics which occurs during the endurance test must be determined. Measurements taken during the final portion of the endurance test may be used in showing compliance with the requirements of this paragraph.
- (f) The power characteristics determined by the power check at the end of the endurance test must show that the test engine/engines will produce the paragraph 6.4 power ratings. If the above power characteristics of the test engine/engines are less than the paragraph 6.4 power ratings then the applicant must select new engine power ratings and repeat the paragraph 6.34 endurance test at the new engine power ratings.

6.35 **Operation Test.** The operation test must include the demonstration of backfire characteristics, starting, idling, acceleration, overspeeding and any other operational characteristics of the engine.

6.36 **Engine Component Test**

- (a) For engine components that cannot be adequately substantiated by endurance testing in accordance with paragraph 6.34, the applicant must conduct additional tests to establish that components are able to function reliably in all normally anticipated flight and atmospheric conditions.
- (b) Temperature limits must be established for each component that requires temperature controlling provisions to ensure satisfactory functioning, reliability and durability.

- 6.37 **Teardown Inspection.** After the endurance test has been completed the engine must be completely disassembled. No essential component may show rupture, cracks or excessive wear.
- 6.38 **Engine Adjustment and Parts Replacement.** The applicant may service and make minor repairs to the engine during the bench tests. If major repairs to, or replacements of, parts are necessary during the tests or after the teardown inspection, or if essential parts have to be replaced, the engine must be subjected to any additional tests CASA may require.

Note: Testing carried out by the engine manufacturer may be acceptable for compliance with Bench Test requirements specified in this subsection if suitable manufacturer's substantiating documentation or other such documentation demonstrating suitable levels of safety and reliability is provided by the applicant.

7 PROPELLER

- 7.1 **Propeller Requirements.** One of the following conditions must be satisfied in relation to the propeller installed in the aeroplane:
- (a) the propeller is of a type to which a certificate of type approval under this subsection applies;
 - (b) the propeller is of a type that has been certified as an aircraft propeller in accordance with FAR 35, BCAR C or JAR P;
 - (c) the propeller is of a type that has been approved by CASA as being appropriate for use in aeroplanes to which this section applies.

Note: An aeroplane to which this section applies that has a propeller of a kind to which subparagraph 7.1 (c) applies may, because of the characteristics of that propeller, have conditions included in its certificate of airworthiness.

- 7.1.1 **Certificates of Type Approval.** A certificate of type approval may be issued in relation to a type of propeller if the requirements set out in paragraphs 7.2 to 7.29 are satisfied in relation to propellers of that type.
- 7.2 **Instruction Manual.** An instruction manual containing the information that is necessary for properly installing, servicing and maintaining the propeller must be provided.
- 7.3 **Propeller Operating Limitations.** Propeller operating limitations must be established on the basis of the conditions demonstrated during the tests specified in this subsection.

Design and Construction

- 7.11 **Materials.** The suitability and durability of materials used in the propeller must:
- (a) be established on the basis of documented experience or tests; and
 - (b) conform to approved specifications.
- 7.12 **Pitch Control.** Failure of the propeller pitch control must not cause hazardous overspeeding under intended operating conditions.

Tests and Inspections

- 7.21 **General.** The applicant must show that the propeller and its main accessories complete the tests and inspections prescribed in this subsection without evidence of failure or malfunction.

Note: Documentation substantiating equivalent levels of safety and reliability, including documentation of testing carried out by the manufacturer, may be acceptable as a demonstration of compliance with 1 or more tests of this subsection.

- 7.22 **Blade Retention Test.** The hub and blade retention arrangement of propellers with detachable blades must be shown to be capable of sustaining a load equal to twice the centrifugal force occurring at the maximum rotational speed (other than transient overspeed) for which approval is sought. This may be done either by a whirl test or a static pull test or other means acceptable to CASA.

- 7.23 **Fatigue Limit Tests.** A fatigue evaluation must be made and the fatigue limits determined for each metallic hub and blade, and each primary load carrying metal component of non-metallic blades. The fatigue evaluation must include consideration of all reasonably foreseeable vibration load patterns. The fatigue limits must account for the permissible service deterioration (such as nicks, grooves, galling, bearing wear, and variations in material properties).

- 7.24 **Endurance Test: Fixed-pitch or Ground-adjustable Propellers.** Fixed-pitch or ground-adjustable propellers must be subjected to 1 of the following tests:

- (a) a 50 hour flight test in level flight or in climb. At least 5 hours of this flight test must be with the propeller at the rated rotational speed and the remainder of the 50 hours must be with the propeller operated at not less than 90% of the rated rotational speed. This test must be conducted on a propeller of the greatest diameter for which certification is requested;
- (b) a 50 hour endurance bench test on an engine at the power and propeller rotational speed for which certification is sought. This test must be conducted on a propeller of the greatest diameter for which certification is requested;
- (c) in the case of fixed pitch wooden propellers for which a rational analysis shows adequate strength margins under critical operating conditions, an endurance test of 50 hours under normal operating conditions is required. At least 5 hours must be at the rotational speed and power condition associated with maximum climb and the remainder of the 50 hours must be with rotational speed not less than 90% of the speed associated with the aforementioned maximum climb condition.

- 7.25 **Endurance Test: Variable-pitch Propellers.** Variable pitch propellers (propellers the pitch of which can be changed by the pilot or by automatic means while the propeller is rotating) must be subjected to 1 of the following tests:
- (a) a 50 hour test on an engine with the same power and rotational speed characteristics as the engine or engines with which the propeller is to be used. Each test must be made at the maximum continuous rotational speed and power rating of the propeller. If a take-off performance greater than the maximum continuous rating is to be established, an additional 10 hour bench test must be made at the maximum power and rotational speed for the take-off rating;
 - (b) Operation of the propeller throughout the engine endurance tests prescribed in subsection 6.34.
- 7.26 **Functional Tests.** Each variable pitch propeller must be subjected to all applicable functional tests of this paragraph. The same propeller used in the endurance test must be used in the functional test and must be driven by an engine on a test stand or on an aeroplane. The functional tests to be performed are:
- (a) manually controllable propellers. 500 complete cycles of control throughout the pitch and rotational speed ranges, excluding the feathering range; and
 - (b) automatically controllable propellers. 1 500 complete cycles of control throughout the pitch and rotational speed ranges, excluding the feathering range.
- 7.27 **Teardown Inspection.** After the endurance test has been completed the propeller must be completely disassembled. No essential component may show rupture, cracks or excessive wear.
- 7.28 **Propeller Adjustments and Parts Replacement.** The applicant may service and make minor repairs to the propeller during the tests.
- 7.29 **Special Tests.** CASA may require any additional tests as are found necessary to substantiate the use of any unconventional features of design, material or construction, or to further determine the acceptability of propellers shown to require repairs or replacement of parts during the tests or in the teardown inspection.

8 DOCUMENTS

- 8.1 **General.** CASA must be supplied with a copy of each of the documents and data listed in paragraphs 8.2 to 8.4 inclusive. They must be in the English language, and in a format acceptable to CASA.

Note: Design data contained in manufacturers' documents will be treated as confidential information and will not be communicated to other persons without the written permission of the manufacturer concerned.

8.2 **Design Data.** The required design data is detailed in the applicable sections of Part 21 of the *Civil Aviation Safety Regulations 1998*, plus that listed here:

- (a) summary report providing statements of the means of compliance with the requirement paragraphs of this section including, where applicable, a reference to other documents in which compliance is substantiated;
- (b) reports substantiating compliance with the requirement paragraphs of this section;
- (c) type certificate and type certificate data sheet or equivalent documents issued by the competent authority in the state of manufacture for imported aircraft;
- (d) ground and flight type inspection reports or, where these do not exist, such other equivalent reports which summarise compliance of the aeroplane by inspection and flight assessment;
- (e) draft flight manual for the aeroplane model for each aircraft. An acceptable flight manual format is the GAMA Specification No. 1, or as detailed at Appendix I;
- (f) list of type design data, including reports in respect of the aeroplane, its engine and propeller — some of these data may be required by CASA;
- (g) type record or reports which summarise the design basic loads and the acceptability of the aeroplane against the structural design standard;
- (h) if the applicant so desires, any reports substantiating the aeroplane structural fatigue life;
- (i) all general assembly drawings and station diagrams for the aeroplane; drawings of all major structural elements and assemblies, and of all essential systems and services including powerplant installations;
- (j) complete drawing list;
- (k) for each propeller/engine/airframe combination for which certification is requested — reports establishing compliance with the requirements in respect of propeller vibration including, where available, propeller vibration stress surveys and fatigue test results;
- (l) details of any additional requirements, including special conditions, and exemptions, exceptions, equivalent safety findings and any other deviations.

Note: The determination of aeroplane structural fatigue life is not mandatory. The applicant is strongly urged to evaluate the aeroplane structural fatigue characteristics to enhance the type's continued airworthiness. Documentary evidence of the above fatigue evaluation should be submitted to CASA.

8.3 **Service Documents.** All current field service documents, flight manual and advice to operators which contain modifications or changes, or which establish or change inspections in respect of the aircraft, airframe, engines, propellers, systems or equipment, together with statements from

the manufacturers undertaking to supply CASA with copies of all subsequent documents of that type.

- 8.4 **Manual.** The applicant must provide Instructions for Continued Airworthiness in accordance with Appendix H to this section that are acceptable to CASA and must supply:
- (a) manufacturer's manuals detailing procedures for maintenance, overhaul, and repair of the aeroplane including its airframe, engine, propeller, systems and equipment; and
 - (b) illustrated parts catalogues for the aeroplane including its airframe, engines, propellers, systems and equipment; and
 - (c) manufacturer's documents detailing any additional or special operating characteristics and functional test procedures for services, systems and equipment, including equipment manufactured to commercial specifications.

9 NOISE CERTIFICATION

9.1 **General.** The *Air Navigation (Aircraft Noise) Regulations 1984* introduced noise certification for aeroplanes subject to ANRs with effect 2 August 1984.

9.2 The noise certification scheme applies noise standards to aeroplanes to which this section of the CAOs apply. It is the applicant's responsibility to apply to Airservices Australia for the issue of a noise certificate.

APPENDIX I

FLIGHT MANUAL

1 INTRODUCTION

- 1.1 This appendix describes a minimum acceptable standard of data presentation for a flight manual.
- 1.2 The content of the manual must be based on data determined in accordance with the requirements of this section, on manufacturer's specifications and procedures and on such other data as are specified or approved by CASA.
- 1.3 The manual must be in the English language.
- 1.4 If a flight manual is to be prepared specially for use in Australia, the data it contains should, where practicable, be presented in the following units:
- | | |
|--|-----------------|
| weights | kilograms |
| aeroplane dimensions | millimetres |
| distances (e.g. landing) | metres |
| liquid quantities | litres |
| speeds | knots, IAS |
| altitudes and vertical distances | feet |
| rates of climb/descent | feet/minute |
| pressures (except barometric pressure) | kilopascals |
| temperatures | degrees Celsius |
| barometric pressure | hectopascals |
- 1.4.1 If a quantity expressed as a unit on the face of an aircraft instrument is to be presented in the flight manual for an aeroplane, it must be presented using the same system of unit as on the instrument.
- 1.5 The manual must have a protective cover and must be in such a form as can be readily amended.
- 1.6 The manual must be specifically identified and this identification must appear on each page of the manual together with the date of issue of that page. Each page must be marked or otherwise identified as being approved by CASA, except sections 6, 7 and 8. The contents of section 6 are separately approved by a weight control officer or other authorised person. Sections 7 and 8 are also not approved by CASA but may be included as an option by the applicant or manufacturer.
- 1.7 The Flight Manual may form part of another manual.

2 CONTENTS OF FLIGHT MANUAL

- 2.1 The manual must comprise the following distinct sections and each section must be clearly identified and separated from each other section.

Introductory Pages

Section 1 — General

Section 2 — Limitations

Section 3 — Emergency Procedures

Section 4 — Normal Procedures

Section 5 — Performance

Section 6 — Weight and Balance and Equipment List

Section 7 — Aircraft and Systems Description (Optional)

Section 8 — Aircraft Handling, Service and Maintenance (Optional)

Section 9 — Supplements.

- 2.2 **Introductory Pages** — This section must contain the following:

- (a) a cover page which must include:
 - (i) name of the manufacturer; and
 - (ii) aircraft type and model; and
 - (iii) provision for the signature of the CASA delegate signifying his or her approval of the manual, together with the date of his or her approval;
- (b) an approval page which must include:
 - (i) name of the manufacturer; and
 - (ii) aircraft type and model; and
 - (iii) aircraft serial number; and
 - (iv) nationality and registration markings of the aircraft; and
 - (v) airworthiness certification category; and
 - (vi) number of the associated Certificate of Airworthiness; and
 - (vi) provision for the signature of the CASA delegate signifying the issue of the manual to the specified aircraft and the date of issue;
- (c) a table of contents which must clearly indicate those parts of the manual which are approved;
- (d) pages for recording of both general and particular amendments including a description of the amendment system;
- (e) an introduction page specifying the applicability of the manual, the requirement for its carriage in the aircraft and the manner of the issue of amendments;
- (f) a list of effective pages specifying the current revision/amendment status of all approved pages, with provision for the signature of the CASA delegate signifying his or her approval of the revision/amendment;
- (g) definitions of the following terms:
 - (i) airfield pressure altitude;
 - (ii) indicated airspeed;
 - (iii) take-off safety speed;

- (iv) landing safety speed;
- (v) normal operating speed;
- (vi) manoeuvring speed;
- (vii) any other term used in the manual which may not be readily understood.

2.3 **Section 1 — General** — must contain the general information pertaining to the aircraft which must include the following:

- (i) 3 view drawings;
- (ii) ground turning clearance;
- (iii) approved engines;
- (iv) approved propellers;
- (v) approved fuel types and grades;
- (vi) total and usable capacity of each fuel tank;
- (vii) approved oil grades;
- (viii) total and usable oil capacity.

2.4 **Section 2 — Limitations.** This section must contain the following limitations as applicable together with any other item established as being a limitation on the operation of the aeroplane:

- (a) the following indicated airspeeds, as appropriate, in knots together with an explanation of any associated instrument colour markings:
 - (i) never exceed speed (V_{NE});
 - (ii) manoeuvring speed (V_A);
 - (iii) maximum wing flaps extended speed (V_{FE});
 - (iv) maximum landing gear extended speed (V_{LC});
 - (v) maximum landing gear operating speed (V_{LO});
- (b) weights and loadings as follows:
 - (i) maximum take-off weight;
 - (ii) maximum landing weight.
 - (iii) maximum disposable loads;
 - (iv) cargo compartment maximum loads;
 - (v) any other loading limitations;
- (c) centre of gravity limits and reference datum;
- (d) powerplant information including:
 - (i) power, r.p.m. and temperature limitations for each rated power condition; and
 - (ii) oil pressure and temperature limitations; and
 - (iii) an explanation of any instrument colour markings associated with powerplant limitations;
- (e) miscellaneous information including:
 - (i) a statement of the authorised manoeuvres and associated limitations appropriate to the certification category of the aeroplane; and
 - (ii) maximum permissible number of occupants; and
 - (iii) statement of any restriction on smoking in the aeroplane; and
 - (iv) maximum air temperature in which operation of the aircraft is permitted, if applicable; and

- (v) a statement of the inscription on, and the location of each placard which is required to be displayed, together with an explanation of the significance of any instrument colour markings not covered by paragraphs 2.3 (a) and 2.3 (d) of this Appendix; and
- (vi) a prominent statement to the effect that the aircraft structural durability is unknown, unless the structural fatigue life has been evaluated to the satisfaction of CASA.

2.5 **Section 3 — Emergency Procedures.** This section must contain those operating procedures for flight and system emergency conditions which are essential for the continued safe operation of the aeroplane. The procedures must be presented as briefly as possible commensurate with maximum clarity, and in addition must include at least the following:

- (a) airspeeds for emergency operations;
- (b) emergency procedures check list;
- (c) emergencies:
 - (i) engine failure;
 - (ii) airstart and limitations;
 - (iii) fire;
 - (iv) system emergencies, including load shedding for electrical failures, if applicable;
 - (v) take-off and landing emergencies.

2.6 **Section 4 — Normal Procedures.** This section must contain recommended procedures and information necessary for the safe operation of the aeroplane, and in addition must include at least the following:

- (a) check lists as appropriate to the operation of the aeroplane;
- (b) procedures and limitations in the use of all aircraft systems.

2.7 **Section 5 — Performance.** This section must contain the performance information necessary for observance of the operational and airworthiness performance requirements specified in the Civil Aviation Orders, and must include at least the following:

- (a) stalling (or minimum steady flight) speeds for zero, take-off and landing flap settings for at least maximum take-off and landing weights;
- (b) a statement of the nature of the stall warning;
- (c) the distance required for take-off and landing which must be the greater of:
 - (i) 1.4 times the take-off distance established under paragraph 4.6; or
 - (ii) 1.4 times the landing distance established under paragraph 4.8;
- (d) a statement to the effect that this distance must be increased by a distance increment equal to 20% for each 1 000 feet of pressure altitude above sea level;
- (e) maximum crosswind component for take-off and landing;

- (f) data presentation:
 - (i) the required information must be presented in graphical or tabular form or, in the form of a statement acceptable to CASA; and
 - (ii) each graph and tabulation must contain an example to illustrate the method of use; and
 - (iii) the configuration, conditions and factors associated with each graph and tabulation must be stated either on or adjacent to the appropriate graph or tabulation.

2.8 **Section 6 — Weight and Balance and Equipment List.** This section must contain:

- (a) information necessary to ensure loading of the aeroplane within the limitations specified in section 2 of the manual including:
 - (i) a load data sheet; and
 - (ii) an equipment list; and
 - (iii) where appropriate, a loading system including such instructions as are necessary to ensure correct use of the system;
- (b) where a loading system is not required the flight manual must contain a statement to this effect; and
- (c) where the loading system takes the form of a cockpit placard, the flight manual must contain a statement of the inscription on, and the location of, the placard.

Note 1: Section 100.7 of the CAOs specifies requirements in relation to the provision of loading data.

Note 2: Flight manual loading data approved by weight control officers should not bear additional indication of CASA approval.

2.9 **Section 7 — Aircraft and Systems Descriptions.** Optional, not approved by CASA but may be included by the applicant or manufacturer.

2.10 **Section 8 — Aircraft Handling, Service and Maintenance.** Optional, not approved by CASA but may be included by the applicant or manufacturer.

2.11 **Section 9 — Supplements** — This section must contain, in the form of supplements, information applicable to any installed equipment or operation of the aircraft not covered by the body of the manual. A list of mandatory and individually approved supplements is to be provided. Each supplement must consist of:

- (a) face page stating applicability and provision for the signature of the CASA delegate signifying his or her approval of the supplement and date of approval; and
- (b) a list of effective pages specifying the current revision or amendment status of all pages and provision for the signature of CASA or its delegate signifying its approval of the revision/amendment and date of approval; and

- (c) describe the equipment or operation of the aircraft to which it is related and must list any additions to or revisions of the limitations and procedures of the basic manual.

APPENDIX II

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

1 INTRODUCTION

- 1.1 This appendix specifies requirements for the preparation of Instructions for Continued Airworthiness as required by subsection 8.4.
- 1.2 The Instructions for Continued Airworthiness for each aeroplane must include the Instructions for Continued Airworthiness for the engine and the propeller (hereinafter designated “components”), for each item of equipment required by this section, and any required information relating to the interface of those items of equipment and components with the aeroplane. If Instructions for Continued Airworthiness are not supplied by the manufacturer of any component or item of equipment installed in the aeroplane, the aeroplane manufacturer must include the essential information in the instructions for the aeroplane for continued airworthiness of the components or items of equipment.
- 1.3 The applicant must submit to CASA a program to show how changes to the Instructions for Continued Airworthiness made by the applicant or by the manufacturers of components or equipment installed in the aeroplane will be distributed.

2 FORMAT

- 2.1 The Instructions for Continued Airworthiness must be in the form of a manual or manuals as appropriate for the quantity of data to be provided.
- 2.2 The format of the manual or manuals must provide for a practical arrangement, and be in such a form as can be readily amended.

3 CONTENT

- 3.1 The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following manuals or sections:
 - (a) aeroplane information and data;
 - (b) maintenance instructions.
- 3.2 **Aeroplane Information and Data.** This manual or section must include at least the following:
 - (a) introductory information that includes an explanation of the aeroplane’s features and data to the extent necessary for maintenance or preventative maintenance;
 - (b) a description of the aeroplane and its systems and installations including its components and items of equipment;

- (c) basic control and operation information describing how the aeroplane components and systems operate, including any special procedures and limitations that apply;
- (d) information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, location of access panels for inspection and servicing, locations of lubrication points, lubricants to be used, equipment required for servicing, tow instructions and limitations, mooring, jacking, and levelling information;
- (e) diagrams of structural access plates and information needed to gain access for inspections when access plates are not provided;
- (f) all data relative to structural fasteners such as identification, discard recommendations, and torque values;
- (g) a list of special tools needed;
- (h) details of mandatory placards, if any.

3.3 **Maintenance Instructions.** This manual or section must include at least the following:

- (a) scheduling information for each part of the aeroplane and its engine, propeller, accessories, component, instruments, and equipment that provides the recommended periods at which they should be cleaned, inspected, adjusted, tested and lubricated, and the degree of inspection, the applicable wear tolerances, and work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialised maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross reference to the Airworthiness Limitations section of the manual must also be included;
- (b) an inspection programme, which includes a periodic inspection schedule and which will provide for the continued airworthiness of the aeroplane;
- (c) troubleshooting information describing probable malfunctions, how to recognise those malfunctions, and the remedial action for those malfunctions;
- (d) information describing the order and method of removing and replacing components, item or equipment and parts including any precautions to be taken;
- (e) other general procedural instructions including procedures for system testing during ground running, symmetry checks, weighing lifting and shoring, and storage limitations;
- (f) maintenance instructions to disassemble, transport, store and reassemble the aircraft to an airworthy condition, where major components are designed to be removed for such purposes;

- (g) details for the application of special inspection techniques including nondestructive inspection (NDI) methods where such processes are specified;
- (h) information needed to apply protective treatments to the structure after inspection.

4 AIRWORTHINESS LIMITATIONS

- 4.1 The Instructions for Continued Airworthiness must contain a section titled Airworthiness Limitations that is segregated and clearly distinguishable from the rest of the document. This section must set forth each mandatory replacement time, structural inspection interval, and related structural inspection procedure. If the Instructions for Continued Airworthiness consist of multiple documents, the section required by this paragraph must be included in the principal manual.
- 4.2 If the structural fatigue life was not evaluated, a prominent statement is required to the effect that the aircraft structural durability is unknown.