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Civil Aviation Safety Authority



Type Certification Procedures Manual

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This document contains guidance material intended to assist CASA officers, delegates and the aviation industry in understanding the operation of the aviation legislation. However, you should not rely on this document as a legal reference. Refer to the civil aviation legislation including the Civil Aviation Act 1988 (Cth), its related regulations and any other legislative instruments—to ascertain the requirements of, and the obligations imposed by or under, the law.

Preface

As a Commonwealth government authority, CASA must ensure that the decisions we make, and the processes by which we make them, are effective, efficient, fair, timely, transparent, properly documented and otherwise comply with the requirements of the law. At the same time, we are committed to ensuring that all of our actions are consistent with the principles reflected in our Regulatory Philosophy.

Most of the regulatory decisions CASA makes are such that conformity with authoritative policy and established procedures will lead to the achievement of these outcomes. Frequently, however, CASA decision-makers will encounter situations in which the strict application of policy may not be appropriate. In such cases, striking a proper balance between the need for consistency and a corresponding need for flexibility, the responsible exercise of discretion is required.

In conjunction with a clear understanding of the considerations mentioned above, and a thorough knowledge of the relevant provisions of the civil aviation legislation, adherence to the procedures described in this manual will help to guide and inform the decisions you make, with a view to better ensuring the achievement of optimal outcomes in the interest of safety and fairness alike.

Chief Executive Officer and
Director of Aviation Safety

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Glossary

Acronyms and abbreviations

Acronym / abbreviation	Description
ACR	Aircraft Register
AD	Airworthiness Directive
ADF	Australian Defence Force
AFM	Aircraft Flight Manual
ATSO	Australian Technical Standard Order
CAR	<i>Civil Aviation Regulations 1988</i>
CASA	Civil Aviation Safety Authority
CASR	<i>Civil Aviation Safety Regulations 1998</i>
CCL	Compliance Checklist
CofA	Certificate of Airworthiness
CTA	Certificates of Type Approval
CTADS	Certificate of Type Approval Data Sheet
ESD	Equivalent Safety Determination
FAA	Federal Aviation Administration of the USA
FAR	Federal Aviation Regulation of the USA
GIR	Ground Inspection Report
ICAO	International Civil Aviation Organization
MMEL	Master Minimum Equipment List
MTOW	Maximum Take-off Weight
NAA	National Airworthiness Authority (for a country other than Australia)
NASA	National Aeronautics and Space Administration
PC	Production Certificate
STC	Supplemental Type Certificate
TAC	Type Acceptance Certificate
TACDS	Type Acceptance Certificate Data Sheet
TC	Type Certificate
TCDS	Type Certificate Data Sheet
TIA	Type Inspection Authorisation
TIR	Type Inspection Report
TSO	Technical Standard Order

Definitions

Term	Definition
Amended Type Certificate	An amendment of the Type Certificate made in accordance with Subpart 21.D of the <i>Civil Aviation Safety Regulation 1998 (CASR)</i> . Only a TC holder may apply for a TC amendment.
Appliance	Any instrument, mechanism, equipment, part, apparatus, appurtenance or accessory, including communication equipment, that is used or intended to be used in operating or controlling an aircraft in flight, as installed in or attached to the aircraft and is not a part of an airframe, engine or propeller.
Article	A material, a component or an assembly used in a part as specified in the approved design data.
Major change	All other changes that do not come under a minor change classification. In accordance with regulation 21.093 of CASR.
Manufacturer	The holder or licensee of a TC producing duplicate products in accordance with either Subpart 21.F or 21.G of CASR.
Minor change	A change that has no appreciable effect on the weight, balance, structural strength, reliability, operational characteristics, or other characteristics affecting the airworthiness of an aircraft, aircraft engine or propeller.
Part	An item to be installed on a type-certificated aircraft, aircraft engine or propeller. Such an item may comprise a component, an assembly, a material, as well as proprietary parts.
Product	An aircraft, an aircraft engine or propeller. In regard to export airworthiness approvals, 'product' is further divided into International Civil Aviation Organisation (ICAO) Class I, Class II and Class III products, and includes components and parts of aircraft, of aircraft engines and of propellers; also parts, materials and appliances, approved under the Australian Technical Standard Order Authorisation system. TCs are only issued for aircraft, aircraft engines and propellers.
Production Certificate (PC)	A certificate that is an authorisation by the Authority for a manufacturer to manufacture a product in compliance with the CASRs. A PC may be issued to either the holder of a TC, an STC, or to a licensee of a TC holder, who meets the requirements of regulations 21.135, 21.139 and 21.143 or CASR.
Provisional Type Certificate	A certificate that may be issued for a major change in a type design when the change is not so extensive as to require a new TC, as required by regulation 21.019 of CASR. Minor changes do not require STCs. Minor and major changes are classified in regulation 21.093 of CASR.

Term	Definition
Recognised country	As per the definition in regulation 21.010B of CASR, a recognised country means any of the following: <ul style="list-style-type: none"> • Canada • France • Germany • Netherlands • New Zealand • United Kingdom • United States of America.
Supplemental Type Certificate	A certificate that may be issued for a major change in a type design when the change is not so extensive as to require a new TC, as required by regulation 21.019 of CASR. Minor changes do not require STCs.
Supplier	Any person who furnishes articles or services related to the manufacture of type-certificated products.
Type Certificate	In relation to an aircraft, includes the type design, the operating limitations, the Type Certificate Data Sheet (TCDS), the applicable airworthiness standards for which the certificate records compliance and any other conditions or limitations prescribed by CASA.

Revision history

Amendments/revisions of this Manual are recorded below in order of most recent first.

Version No.	Date	Parts/Sections	Details
2.3	October 2022	All	Administrative review only
2.2	October 2017	Chapter 5	Note: to be used in conjunction with Chapter 5 of the (PAPM).
2.1	July 2017	All	Position Descriptions and functions amended to reflect current organisational structure
2.0	February 2017	All	Updated to new approved manual template. Minor changes to text incorporated.
1.3	November 2010	Table of Contents	Preface added
1.2	November 2009	Section 1-9	Minor changes to text and headings to reflect Organisation Changes as of October 2009 (restructure, realignment and renaming of roles)
1.1	November 2001	All	Updated process and position titles
1.0	January 2001	All	First issue

References

Regulations

Regulation	Title
	<i>Freedom of Information Act 1982</i>
	<i>Air Navigation Act 1920</i>
	<i>Civil Aviation (Fees) Regulations 1995</i>
Subpart 21.F of CASR	Production under type certificate only
Subpart 21.G of CASR	Production certificates
Part 33 of CASR	Airworthiness standards for aircraft engines
Part 35 of CASR	Airworthiness standards for aircraft propellers
Civil Aviation Order (CAO) 101.55	Airworthiness certification requirements - Aeroplanes with a maximum weight not exceeding 450 kilograms

Advisory

Document	Title
Advisory Circular (AC) 21-7	Primary Category Aircraft - Certification
AC 21-6	Restricted Category Aircraft - Certification
AC 21-13	Australian-Designed Aircraft - Type Certification
AC 21-14	Production Certificates
AC 21-15	Supplemental Type Certificates - Certification
AC 21-22	Approval of Imported Engines, Propellers, Materials, Parts and Appliances
AC 21-30	Type Acceptance Certificates for Imported Aircraft
AC 21-31	Type Certificates for Imported Aircraft
	Flight Test and Evaluation Procedures Manual
	The FAA and Industry Guide to Product Certification
FAA AC 21.17-1A	Type Certification—Airships
FAA AC 21.17-2A	Type Certification—Fixed Wing Gliders (Sailplanes), Including Powered Gliders
FAA AC 21.17-3	Type Certification of Very Light Aircraft under FAR 21.17 (b)
FAA Order 8100.5B	Aircraft Certification Service – Mission, Vision, Organizational Structure and Functions
FAA Order 8110.4C	Type Certification
	Annex 16, Environmental Protection to the Convention on International Civil Aviation (the Chicago Convention)

Forms

Form ID	Title
Form 724	Statement of Conformity
Form 733	Application for Supplemental Type Certificate
Form 735	Application for Type Acceptance Certificate for Imported Aircraft
Form 882	Conformity Inspection Record
Form 979	Statement of Compliance with the Civil Aviation Regulations
Form 979i	Statement of Compliance Instructions for Compilation by the originator
Form 989	Issue Paper

1. Purpose of Type Certification

The purpose of this manual is to familiarise CASA staff involved in type certification with the type certification process for civil aircraft, aircraft engines and propellers required by the *Civil Aviation Safety Regulations 1998 (CASRs)*.

This manual establishes procedures for evaluating and approving aircraft type design data and changes to approved type design data. The procedures apply to all engineering, manufacturing inspection and administrative personnel involved in the type certification process.

The type certification processes described in this procedures manual apply only to the issue of the following certificates and amendments of:

- Type Certificate (TC)
- Provisional TC
- Supplemental Type Certificates (STC)
- Type Acceptance Certificates (TAC)
- TC for aircraft imported from a non-recognised country.

1.1 Certification philosophy

Aircraft type certification is the process of evaluation and approval of aircraft type design data against designated airworthiness standards that culminates in the initial issue of a TC. It is a prerequisite for the issue of a Certificate of Airworthiness (CofA) for an individual aircraft. Subsequently, the TC may be amended or STCs issued when there are major changes.

CASA also issues TACs, which have the force of a TC, for aircraft imported from a recognised country and TCs for aircraft imported from a non-recognised country.

Type certification (including supplemental type certification and other approval of major modifications) of an aircraft, aircraft engine or propeller involves:

- prescribing appropriate design standards and requirements
- ensuring that the product design is proven to meet the design standards, through competent and adequate ground tests, engineering analysis and flight tests
- checking that the test articles, when manufactured, conform to the design requirements
- ensuring that the Aircraft Flight Manual (AFM) and associated operating aspects are satisfactory
- accepting the maintenance manual and approving the Airworthiness Limitations Section of the maintenance manual (if applicable)
- ensuring that the manufacturer has satisfactory arrangements in place for continuing airworthiness control, defect reporting and supply of service documents in accordance with subregulation 21.050 (2) of the *Civil Aviation Safety Regulations 1998 (CASR)*.

1.2 Requirement for certification documentation procedures

CASA staff are required to follow clearly defined processes for certification project applications for issue of/amendment to TCs and STCs to ensure:

- timely action by CASA
- accuracy
- consistency
- traceability
- transparency
- accountability.

The processes must fulfil the following objectives:

- establishment of priorities
- establishment of responsibilities and lines of communication
- application of project management principles, where appropriate
- application of proper records management principles
- documentation of communications with applicants
- formal recording of the receipt of technical data from applicants
- tracking of documents sent for assessment
- formal recording of decisions
- communication of the decision to the applicant
- provision of status reports
- feedback from staff and industry to improve the procedures.

These objectives are supported by the:

- establishment of documented procedures
- establishment of effective process controls
- provision of adequate certification and specialist staff resources
- provision of adequate clerical resources to assist with record keeping and cost recovery
- provision of adequate work facilities
- appropriate training of staff
- management systems to optimise human performance and process improvement
- provision of information to the industry in the form of listings of TACs, Type Certificate Data Sheets (TCDSs) and TCs that have been approved by CASA
- establishment of performance indicators
- review of processes and potential backlogs
- investigation of industry complaints
- review of the safety value.

1.3 Responsible personnel

1.3.1 Branch Manager Airworthiness and Engineering

The Branch Manager, Airworthiness and Engineering is responsible for the overall policy guidance and provision of resources to support type certification activities.

1.3.2 Principal Engineer - Certification (Programs)

The Principal Engineer - Certification (Programs) is responsible for the overall management of type certification activities and determination of priorities for all certification programs associated with the issue of TCs, Provisional TCs, STCs, TACs and amendments to those certificates and broad control of certification programs through designated Project Managers.

1.3.3 Project Managers

Project Managers, assigned by the Principal Engineer - Certification (Programs), are responsible for the project management of specific certification programs.

Project Managers are the formal contact point for applicants throughout the project.

1.3.4 Manufacturing Inspectors

Manufacturing Inspectors from the Airworthiness and Engineering Branch provide additional project support, particularly for conformity and other manufacturing related activities.

1.3.5 Airworthiness Inspectors

Additional project support may be provided by Airworthiness Inspectors from the Regulatory Oversight Branch from the relevant national CASA offices.

1.3.6 Airworthiness specialists within Airworthiness and Engineering Branch

The airworthiness specialists provide specialist support on particular aspects of certification projects as requested by the Project Manager.

1.3.7 Project Team

For TC and Complex STC projects

The Project Manager (in conjunction with the Principal Engineer - Certification (Programs) and the Manager Design and Manufacturing Oversight) is responsible for assigning an appropriate project team for each particular project. The team may comprise the following members, depending on the nature and complexity of the project:

- the Project Manager (as the leader)
- airworthiness specialists of appropriate engineering disciplines
- airworthiness inspectors
- flight test and flight performance personnel
- CASA officers performing manufacturing inspection duties.

For TAC projects

The Project Manager is normally the prime action officer, with support from airworthiness specialists as required.

2. Type or Supplemental Type Certification process

2.1 Scope of the Type Certification Process

This chapter describes the type certification process. The type or supplemental type certification process applies to TC, Provisional TC, STC and amendment activities relevant to those certificates. However, all the steps and procedures may not apply to all certification activities, especially small projects.

In addition to a TC or STC, it is necessary for the applicant to have a Production Certificate (PC) or other CASA production approval prior to manufacturing the product. These approvals will require concurrent work with CASA Manufacturing Section. Refer to Chapter 4 for the specific requirements for STCs.

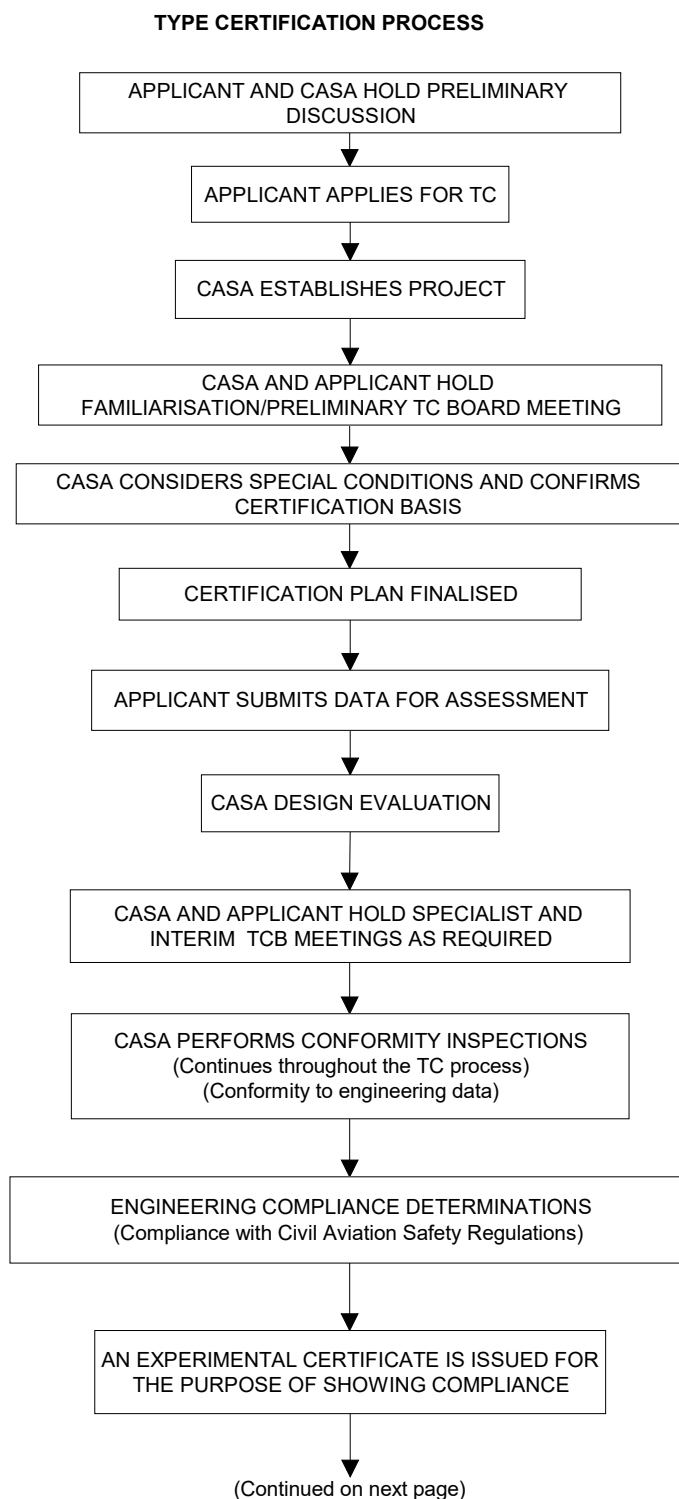
2.2 Initial contact with the applicant

CASA may have had initial contact with the applicant through a familiarisation meeting or through involvement with a research and development project under an experimental certificate. Section 8 of Advisory Circular (AC) 21-13 gives an overview of the issues to be addressed in the initial contact stage.

In many cases, the initial contact with an applicant is informal. For example, a CASA officer may refer the applicant to the appropriate ACs, explain the certification process and/or provide advice. The advice should include a request to the applicant to initiate contact by writing to CASA. This allows CASA to respond formally and advise as to the next step.

2.2.1 Flowchart of the certification process

Figure 2-1 outlines the full certification process for the issue of a TC. Depending on the particular project not all the steps may be required. Similar steps are required for complex STCs, depending on the complexity and significance of the modification. The Certification Plan defines the particular process to be followed.



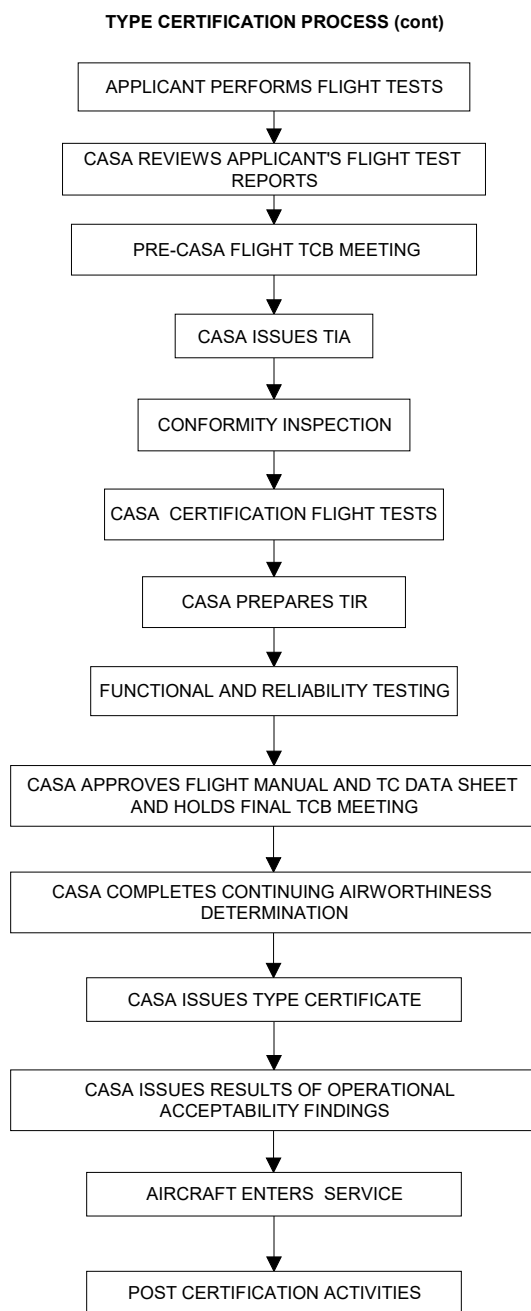


Figure 1: Type Certification Process

2.2.2 Type certification application

An aircraft TC application must be accompanied by a three-view drawing of the aircraft and available basic data. An aircraft engine or propeller TC application must have a description of the engine or propeller design features, operating characteristics and the proposed operating limitations. A TC application is made on CASA Type or Supplemental Type Certificate Application (Form 733).

An application form is required for the issue of each of the following:

- A TC for a new model(s) aircraft (aeroplane, glider, rotorcraft, balloon, airship), aircraft engine or propeller (in accordance with regulations 21.015 and 21.019 of CASR), or for extension(s) of time in accordance with subregulation 21.017 (4) of CASR.
- An amended TC for:
 - approval of change(s) in type design
 - addition(s) of a new model(s) prior to the original issue of the TC
 - approval of follow-on models after the initial issue of a TC (in accordance with regulations 21.091 - 21.101 (inclusive) of CASR)
- A provisional TC (Class I or II) when the provisional TC is desired before the standard TC is issued (in accordance with regulations 21.071, 21.081 and 21.083 of CASR)
- An application for an amendment to a provisional TC for a follow-on model or a major change to a type-certificated model, after a TC has been issued (in accordance with regulations 21.075 and 21.085 of CASR); and for changes to a Class I or II provisional TC (in accordance with regulations 21.075, 21.081 and 21.085 of CASR)
- An STC for an aircraft, aircraft engine or propeller (see AC 21-15 for further guidance).
- An amended STC to include additional product models to the STC or to introduce significant changes in the modification previously approved.
- AC 21-14 contains guidance for PC application. Application for a PC may be made at the same time application is made for a TC, amended TC or STC. However, a PC cannot be obtained prior to issue of the TC.

2.3 Project establishment

2.3.1 Receipt of an application

Following initial contact with the applicant (see section 2.2) an application may be received.

When a formal application (Form 733) for a TC, amended TC or STC is received by CASA, follow the steps below.

Airworthiness Coordination Officer

- Send an acknowledgment to the applicant advising of receipt of the data and nominating a CASA officer as an interim contact point for information on the task.
 - Whenever the contact officer is changed, the applicant must be advised.

- Handle all documentation received by CASA in accordance with the procedures in CASA's Records Management Manual.
- Arrange for the project to be logged as a certification task.
- Assign a priority.
- Principal Engineer - Certification (Programs) to assign a Project Manager.

Project Manager

On receipt of an application:

- check the application, contact the applicant if necessary to correct any omissions or errors.
- contact the applicant to advise:
 - your name and contact details
 - that you are the formal point of contact and that all correspondence should, in the first instance, be forwarded to you
 - that the applicant is to quote the CASA file number and project number on all correspondence.
- arrange, if necessary, a meeting to explain the certification process and offer any advice that may assist the applicant.
- raise a file, noting that the TC or STC number is not allocated at this stage (see paragraph 8.4.3 of AC 21-13)
- if a team is necessary for the project or airworthiness specialist assessment is necessary, Principal Engineer - Certification (Programs) will task and advise which airworthiness specialist/s will assist with the project. Coordinate as appropriate.
- liaise with the applicant for an initial familiarisation meeting (see paragraph 9.1 of AC 21-13).

In the course of a TC or STC project, the Project Manager is responsible for the following:

- Planning, reviewing, evaluating and coordinating all aspects of the TC or STC project.
- Initiating the development of an agreed Certification Plan between the applicant and the Authority (see section 2.3.2).
- Establishing a project team for all projects that require significant technical involvement by CASA and coordinating with the appropriate manager(s) in the selection of other team members. Depending on the complexity and nature of the project, the project team may consist of some or all of the following:
 - The Project Manager
 - Airworthiness specialists
 - Test pilots and/or flight test engineers
 - Inspectors involved with manufacturing and/or airworthiness.

2.3.2 The Certification Plan

The Certification Plan is drafted by the applicant and given to the Project Manager who will consider the involvement of CASA prior to the preliminary meeting of the Type Certification

Board (TCB). The Certification Plan is finalised at the preliminary meeting of the TCB where detailed roles and responsibilities are discussed with the applicant.

Recommend the use of the Federal Aviation Administration (FAA) proforma Project Specific Certification Plan contained in the FAA and Industry Guide to Product Certification to the applicant. This document is available from the FAA website (see advisory references on page 14)

The Partnership for Safety Plan contained in the FAA guide is also good reference material.

2.4 Type Certification Board

2.4.1 Requirement for a TCB

A TCB is established for projects for:

- all aircraft and engines for which complete type certification is required
- propellers (except fixed pitch)
- modifications involving significant changes to the type design.

Note: Depending on the complexity of the project, a TCB is not always required for STC projects.

2.4.2 Purposes of a TCB

The purposes of a TCB are to:

- acquaint the applicant and CASA with the certification project
- resolve significant problems
- establish a schedule for the overall accomplishment of the type certification program.

2.4.3 TCB members

TCB members are:

- the Manager Aircraft Certification, or their nominee, who is the chairperson of the TCB
- the project team
- the applicant and their nominated engineering representatives.

Members participate in specific phases of the TCB activity, as required by the project under consideration.

Members of the TCB should be familiar with the project during the development stages and in advance of TCB meetings.

The Project Manager is responsible for requesting technical assistance or guidance for the project, if necessary, from the Manager Aircraft Certification. Such requests should be made as far as possible in advance of TCB meetings to facilitate work scheduling.

2.4.4 Type Certification Board meeting stages

Meetings may be held at the discretion of the chairperson or nominee, or as requested by the Project Manager or applicant. The Manager Aircraft Certification, as chairperson of the TCB,

convenes the TCB as necessary and notifies the appropriate representatives of the time, date and location of the meeting. There are different stages of TCB meetings, these include:

- Familiarisation TCB Meeting (see section 2.4.5)
- Preliminary TCB Meeting (see section 2.4.6)
- Progress TCB Meetings (see section 2.4.7)
- Pre-CASA Flight TCB Meeting (see section 2.4.8)
- Final TCB Meeting (see section 2.4.9).

Note: It is not mandatory for members to participate in every meeting. A TCB member, with concurrence of the chairperson, may designate a CASA officer to represent them at TCB meetings.

Minutes of Meetings

Minutes of meetings should be transmitted to the applicant and contain the following:

Subject: Minutes of {Familiarisation, Preliminary, Progress, Pre-flight or Final} Meeting

1. Manufacturer
2. Model and project number
3. Location and date of meeting
4. Personnel present at meeting
5. Purpose of meeting
6. Discussion of agenda items
7. Specialty items, including major problems and actions to be taken. Each item or subject discussed should be identified and summarised under a separate heading with the appropriate airworthiness requirement referenced. The item should include a discussion and conclusion.

2.4.5 Familiarisation TCB meeting

The familiarisation TCB meeting between CASA and the applicant is held to:

- explain the need for certification
- provide an overview of the certification process
- explain CASA's role
- detail the applicant's responsibilities
- discuss the certification basis
- explain CASA's cost-recovery policy.

Note: The familiarisation meeting may be combined with the preliminary TCB meeting that follows.

2.4.6 Preliminary TCB meeting

The preliminary meeting is held to:

- acquaint CASA personnel with the project
- discuss and finalise the certification basis (which will be confirmed in writing when finalised)

- permit discussion of design details and possible problem areas with specialists
- identify areas needing the formation of special compliance teams to attain the earliest possible resolution of potential problems
- identify novel or unique design features, materials or processes
- establish a schedule for the certification program
- finalise the Certification Plan prepared by the applicant to include CASA involvement.

2.4.7 Progress TCB meetings

Progress TCB meetings may be required to resolve problems that arise during the type certification program. Progress meetings may be requested by CASA or the applicant; and need only involve the necessary participants, including appropriate specialists (if required), to resolve problems. The Project Manager is responsible for arranging the meeting(s) and informing the necessary participants.

2.4.8 Pre-CASA flight TCB meeting

The pre-CASA flight TCB meeting is held to discuss and clarify any questions the applicant may have about the required CASA flight testing of the aircraft or the CASA type testing program of the engine and propeller. This meeting, or a progress meeting, may be requested by either CASA or the applicant.

2.4.9 Final TCB meeting

The final TCB meeting is held when the Project Manager determines that the applicant has demonstrated compliance with all applicable airworthiness requirements (certification basis) in accordance with technical policies established by CASA. The final TCB meeting is held to:

- review all outstanding items, such as the TCDS, AFM, continued airworthiness program and items on which there may be some question of compliance with the established airworthiness standard
- determine the status of any outstanding technical data
- decide whether to issue the TC or STC.

2.5 Type certification basis

2.5.1 General

The proposed certification basis is established by CASA at the beginning of a TC or STC program. This is to ensure that the certification basis is correct, and the applicant is advised of all aspects early in the program, including operational requirements.

2.5.2 The certification basis for new applications

The certification basis for any type certification project consists of the basic design standard together with any special conditions associated with the individual design. The certification basis also makes explicit reference to design standard issue dates and amendment states (refer to subregulation 21.017 (3) of CASR) and any Equivalent Safety Determinations (ESDs)

that may be agreed on prior to program commencement (refer to subregulation 21.016 (1) of CASR).

Example of a certification basis:

The certification basis for the Acme Fastcommuter Mark 1 aircraft shall be Civil Aviation Safety Regulation (CASR) 23.001(a), embodying Federal Aviation Regulation (FAR) Part 23, up to and including Amendment 34 dated 14 September 1987, and Special Conditions AF-1 to 12.

Once the certification basis has been set and agreed with the applicant, which may be during the preliminary TCB meeting or soon thereafter, it is valid until the effective period expires. Unless CASA has agreed to an extension of this period, the certification basis may be required to incorporate a design standard with a later amendment state that dates three (or five) years earlier than the date of resetting the certification basis. Alternatively, nothing precludes an applicant revising the certification basis during the course of their project to incorporate later design standards.

Example time limit requirements:

- An applicant for a small aircraft TC submits Form 733 signed on 16th October 2016. Therefore, the effective period expires on 15 October 2021
- The certification basis is set and formally notified to the applicant on 16 December 2016, two months after application. The certification basis is valid until 15 October 2019
- After a lengthy period of inactivity, on 6 May 2020 the applicant requests that the certification program should recommence
- CASA may now incorporate any applicable design standard amendments introduced between the period 16 December 2016 and 6 May 2017 into a revised certification basis.

2.5.3 Basic design standards

The standards are now promulgated as follows:

- Normal aeroplanes—Part 23 of CASR
- Utility aeroplanes—Part 23 of CASR
- Acrobatic aeroplanes—Part 23 of CASR

Note: Part 23 of CASR embodies FAR Part 23, the European CS-23 and CS-VLA. The former two codes are conventional small aeroplane standards (maximum take-off weight [MTOW] not exceeding 5,700 kg). CS-VLA is a standard for a smaller, minimum capability aircraft in the normal category, not exceeding 750 kg MTOW, and having restrictions on the purposes for which the aircraft may be used.

- Commuter aeroplanes—Part 23 of CASR; additional items for aircraft with MTOWs up to 8,618 kilograms are contained in FAR Part 23 and CS-23
- Transport aeroplanes—Part 25 of CASR (embodies FAR Part 25 and CS-25)
- Normal rotorcraft—Part 27 of CASR (embodies FAR Part 27 and CS-27)
- Transport rotorcraft—Part 29 of CASR (embodies FAR Part 29 and CS-29)
- Special class aircraft—subregulation 21.017(1) of CASR
- Restricted aircraft—subregulation 21.017 (1) of CASR, with cross-reference to regulation 21.025 of CASR
- Primary aircraft—Part 26 of CASR
- Intermediate aircraft—Part 26 of CASR
- Gliders and powered sailplanes—Part 22 of CASR (embodies CS-22; note that gliders and powered sailplanes are categorised as normal, utility and/or acrobatic)
- Manned free balloons—Part 31 of CASR
- Amateur-built category aeroplanes—Civil Aviation Order (CAO) 101.28
- Aeroplanes with a maximum weight not exceeding 450 kilograms—CAO 101.55
- Engines—Part 33 of CASR
- Propellers—Part 35 of CASR.

The following categories of Australian-designed aircraft are required to be type-certificated, but no formal basic design standard has been prescribed in Australian legislation:

- Primary (see AC 21-7)
- Intermediate
- Special Class (e.g. airships, tiltrotor)
- Restricted (see AC 21-6).

For these categories, the certification basis is proposed by the applicant. Detailed negotiations are then undertaken by the applicant with CASA. When agreement on the certification basis is reached, the inherent design standards are approved under regulation 21 of the *Civil Aviation Safety Regulations 1988 (CASR)*.

2.5.4 Special classes of aircraft

Special classes of aircraft include:

- Airships
- Gliders
- Motor gliders
- Very light aircraft
- Other non-conventional aircraft for which airworthiness standards have not been issued under Part 21 of CASR (refer to subregulation 21.017 (2) of CASR).

The procedures necessary to establish and receive approval for the certification basis for special classes of aircraft are provided in the following FAA Advisory Circulars and, similar ACs issued by CASA, may be used as guidance:

- FAA AC 21.17-1A - this AC also references a design criteria, FAA P-8110-2, Airship Design Criteria, which provides an airworthiness criteria for airships
- FAA AC 21.17-2A, - this AC also references Certification Standard 22 (CS-22), Certification Standard for Sailplanes and Powered Sailplanes, which provides an airworthiness standard for sailplanes and powered sailplanes
- FAA AC 21.17-3 - this AC also references Certification Standards for Very Light Aeroplanes (CS-VLA), which provides an airworthiness standard for very light aircraft.
- CASA AC 21-13
- CASA AC 21-7.

Powered Lift Aircraft are another special class of aircraft for which airworthiness standards have not been issued under Part 21 of CASR. Any design standard negotiated with an applicant would be approved under regulation 21 of CASR.

2.5.5 Certification basis for changed aviation products

This section is applicable to changed aircraft, aircraft engines and propellers that contain type design changes of a previously certificated product whose change is significant but not extensive enough to require a new TC under regulation 21.019 of CASR. This applies to all changed products regardless of the approval method (such as amended TC or STC).

The objective is to enhance the safety of changed products through the use of later amended airworthiness standards. The applicant is responsible for the whole product as altered, and not just for the change itself. The certification basis for changed aviation products is established as follows:

1. Except as provided in points 2 and 3 below, the certification basis for the changed product should consist of the certification basis of the model being changed (defined as the basic certification basis) plus those requirements effective on the date of the application that are generally related to the components or areas affected by the change. These components and areas are those where there is a need for re-substantiation that includes the change, components, systems and all other matters relevant to certification that are all affected by the change.
2. The applicant may elect to comply with the applicable regulations in effect on the date of application, plus any other amendments that CASA find to be directly related.

3. Requirements of the later standards, required by point 1 above, do not need consideration if the basic certification basis, together with applicable documented service experience, provide a level of safety equivalent to that of the later standards. Applicable service experience is a reflection of the existing components history that are being changed or that are directly affected by the change. Additionally, the changed components must be sufficiently similar to the existing components, both in design and usage, so that it can be determined that the service history is applicable.
4. The determination of which other amendments are applicable should be conducted and documented by the applicant, approved by CASA and placed in the project file. This documentation should include the rationale for not complying with later standards.
5. Because restricted category and limited category aircraft do not meet an applicable airworthiness standard that is published in the CASRs, the enhancement of the level of safety of changes to products of these categories would be the subject of negotiation with the applicant. This should apply equally to applications for changes to type-certificated products for both Australian and non-Australian manufactured products.
6. In accordance with subregulation 21.019 (1) of CASR, CASA engineers must determine whether proposed changes, such as these, are so extensive that a substantially complete investigation of compliance with the applicable regulations is required. The following design changes are examples of changes to type designs which, individually, do not necessarily require application for a new aircraft TC. An application for a new aircraft TC may be required after consideration is given to the extent, number and cumulative effect of the following changes:
 - a design change that constitutes a new design or a substantially complete redesign of a component, equipment installation or system installation, as such a change extensively invalidates the compliance demonstration of the original design.
 - a design change that noticeably affects the basic loads.
 - a design change that introduces novel or unusual methods of construction or new materials (e.g. composites). If the later airworthiness regulations do not provide adequate standards with respect to the proposed change, special conditions may be necessary.
 - a design change that includes new 'state-of-the-art' systems or components that have not been previously certificated.
 - a design change that alters the kinematics, dynamics or substantially alters the configuration of either the flight controls or rotorcraft rotor drive system.
 - a design change to replace reciprocating engines with the same number of turbopropeller-engines.
 - a design change that affects the integrity of the basic load-bearing structure necessary for continued safe flight and landing or operation of the aircraft within approved limits.
 - a design change that would substantially alter the aircraft flight characteristics or performance from the type design being changed.

- a design change that affects compressor/turbine rotor integrity, kinematics or dynamics of an engine.
 - a design change that constitutes a substantial flight deck change.
 - a design change that substantially increases power.
 - a design change that alters the crashworthiness features.
7. The following design changes will not be considered extensive and need not require a new or amended TC:
- Installation of an alternative engine, using the same principles of operation (e.g. reciprocating replacing reciprocating; turbopropeller replacing turbopropeller, etc.) that does not noticeably increase power, and has a minimum of installation changes.
 - The installation of electronic flight display systems if installed on relatively modern aircraft where changes are not substantial.
 - The installation of an autopilot.
 - A design change that incurs a small weight change increase.
 - Small design changes that constitute production improvements.
8. Because design changes vary in complexity and magnitude, each proposed change to a product must be evaluated on an individual case-by-case basis. In reviewing an application, no consideration should be given to the way in which the changed product is identified.
9. An applicant may be required to show that the product meets additional standards in order to receive type certification in a foreign country or to be eligible to operate under the provisions of the Australian operating rules or a foreign equivalent.

2.5.6 Applicable regulations

The certification basis is established by CASA in accordance with regulations 21.017, 21.101 and 21.115 of CASR, as appropriate, with additional requirements:

- Special Conditions deemed necessary under regulation 21.016 of CASR.
- Equivalent Level of Safety Findings under subregulation 21.021(b) of CASR.
- Noise certification requirements (see section 30 of AC 21-13), which are the responsibility of Airservices Australia.
- Emission standards, which are the responsibility of Airservices Australia.

2.5.7 Special conditions

Basis for issue and amendment of special conditions

The basis for the issue and amendment of special conditions is under regulation 21.016 of CASR. Under the provisions of this regulation, a special condition is issued only if the existing applicable airworthiness standards do not contain adequate or appropriate safety standards for an aircraft, aircraft engine or propeller because of novel or unusual design features of the product to be type-certificated. The phrase 'novel or unusual' applies to design features of the product to be certificated when compared to the applicable airworthiness standards. Special conditions will not be used to upgrade the applicable airworthiness standards when novel or unusual design features are not involved. Whenever CASA determines that an upgrading of

the airworthiness standards is warranted, the upgrading should be accomplished through the rulemaking process to amend the standards.

Issue papers for special conditions

Issue papers may be used for the development of the basis, need and wording of special conditions. They are also used for the identification and resolution of other significant technical, regulatory and administrative issues (i.e. the development of acceptable means of compliance). See section 2.6 for full development of issue papers.

Procedures for issue of special conditions

1. Proposed special conditions are drafted by the Project Manager for an application for a TC, an amended TC or an STC.
The proposal is formulated with full participation by the applicant, the appropriate airworthiness specialists and with any other interested persons deemed appropriate. In cases where the design feature is covered by a specific objective rule, a special condition is not to be used as a particular method or technique to show compliance with the rule. In those cases where CASA determines a special condition is appropriate, and the applicant indicates that they have complied or will voluntarily comply, the special condition will be proposed. It is essential that the list of special conditions be completed. This establishes the certification basis and forms an exact record of the rules applicable to the product.
Subregulation 21.101 (2) of CASR is applicable when the application is for an amended TC or an STC.
2. An applicant requesting a change to a TC or an STC must comply with either the regulations incorporated by reference in the TC, or the applicable regulations in effect on the date of the application and any other amendments CASA finds to be directly related.
If CASA finds the regulations do not provide adequate standards with respect to the proposed change, the applicant must comply with the applicable provisions of Part 21 of CASR and any special conditions (including amendments to those special conditions) prescribed by CASA to provide a level of safety established in the regulations.
3. Special conditions should be determined as early as possible and communicated to the applicant to give them the maximum notification. These special conditions may need to be modified, and/or additional ones issued, as technical information is developed during the type certification program.
4. Incomplete information or insufficient justification can delay the processing of special conditions. Complete information is needed in covering the general characteristics of the aircraft or other products and their unusual design features. The Project Manager prepares the special conditions including all the required details and justification. The following information should be included:
 - The full certification basis, indicated in a manner similar to the TCDS.
 - A general description of the product (e.g. for an aircraft - location of the wings, number and type of engines, maximum weight, speeds, seating capacity, etc.)
 - Description of features requiring the issue of special conditions.

- For an amended TC or an STC, a statement of the extent and features of the modification.
 - The exact nature of the novel or unusual design feature, including an evaluation where appropriate, that the design feature may produce an unsafe condition unless the proposed special conditions were applied.
 - The relationship between the design feature and the applicable regulations indicating how the standard is inadequate or inappropriate.
 - An evaluation that the proposed special condition establishes a level of safety that neither raises nor lowers the standard set in the applicable regulations.
5. As technical information is developed during the design and testing of a product, it may become appropriate to modify a previously issued special condition or add a new one. The same procedure is followed in amending a special condition or adding a new one, as is used for an original issue.
6. Special conditions, in their final format for a product, are to be referred to the delegate for consideration as to whether they are generally applicable. Periodically, special conditions that are found to be generally applicable are published in a Notice of Proposed Rulemaking as proposed amendments to the applicable airworthiness standards. Pending adoption of such amendments, a special condition may be proposed by CASA or an applicant for application to any subsequent design case for which they would be appropriate.

2.5.8 Equivalent level of safety findings

Equivalent level of safety findings are made under subregulation 21.016 (1) of CASR when literal compliance with a certification regulation cannot be shown and compensating factors exist that can be shown to provide an equivalent level of safety (refer to subregulation 21.021 (b) of CASR).

An ESD is the culmination of a process where compliance with a particular design requirement has been proposed, demonstrated and finally accepted by a means other than that specified in the design requirement. ESDs may be applied to physical components or systems (or lack thereof), or to characteristics such as aircraft handling qualities. ESDs may be made when a specific design standard (e.g. an item of FAR 23) cannot be met exactly, but the safety intent of the standard can be met by other means, often by compensating factors. ESD proposals are put forward by an applicant during the design submission phase, or during the course of development and testing of components, systems or the aircraft as a whole. ESDs are processed as discrete issue papers (see section 2.6).

A listing of ESDs must be placed in the TCDS.

2.6 Issue papers

2.6.1 General

An issue paper provides a means for the identification and resolution of significant technical, regulatory and administrative issues that occur during the certification process. Issue papers are primarily intended to provide an overview of significant issues, a means of determining the status of issues and a post-certification summary statement on how issues were resolved.

Issue papers provide a simple, structured means of accomplishing several necessary steps in the type certification process in that they provide a means for describing and tracking the resolution of significant type certification issues and problems throughout a program. Issue papers provide an efficient means of assuring coordinated certification decisions and should replace other paperwork such as briefing papers, memoranda and lengthy letters whenever possible. They are 'living' documents in that the positions of CASA and the applicant are entered into the documents in succession until resolution is gained.

Significant issues may not be identified or resolved at initial project familiarisation briefings and may require negotiation between CASA and the applicant.

The following items may arise as significant issues on major projects, requiring the development of issue papers.

Table 1: Significant issues

Item	Notes
Type certification basis	Designates the applicable airworthiness standards, including special conditions (as necessary) that must be met for type certification. This issue paper should provide the definitive justification for selection of the certification basis, including specific amendment levels. A project checklist or, by document reference, the applicant's own compliance checklist (if found acceptable) must be included as an attachment. Updates to the checklist may be necessary as the program progresses.
Determination of compliance	To resolve interpretations of rules and related issues to a satisfactory demonstration of compliance.
Export requirements	Cites, for those projects where it is clearly established that the applicant plans to export the product to a foreign country, the extent of CASA's findings of compliance with that country's airworthiness requirements on behalf of the foreign National Airworthiness Authority (NAA).
Rulemaking actions required of CASA	These include the issue of special conditions pursuant to either regulation 21.016 or paragraph 21.101 (2) (b) of CASR, as applicable.
Equivalent safety findings	Equivalent safety findings proposed or made in accordance with subregulation 21.016 (1) of CASR.
Unsafe situations	Unsafe situations that could preclude certification, as indirectly defined in subregulation 21.016 (2) of CASR.

Item	Notes
Application of later regulations	Per subregulation 21.017 (3) of CASR, not voluntarily agreed to by the applicant.
Areas of new technology or novel design	Areas of new technology or novel design that do not require special conditions, but may require the development of an acceptable means of compliance with existing regulations that would set a precedent.
Items	Items requiring the utilisation of a special certification review team for resolution.
All other issues	All other issues that become controversial or may otherwise require TCB action to resolve.

2.6.2 Issue paper development

New issue papers may be proposed to the TCB at any time during the certification process, prior to final type certification.

Draft issue papers should be developed by the applicant or project team members for each significant issue as early in the program as practicable.

Issue papers are primarily intended to provide CASA and applicant management with an overview of significant issues, such as:

- a means of determining the status of these issues
- a post-certification summary statement on how significant issues were resolved
- general reference on future projects that might encounter similar situations.

It is recommended that issue papers be prepared by the applicant or CASA, as appropriate, using the Form 989.

Alternative formats may be used, provided the following headings are used:

Major Heading

- Issue Paper Number (obtained from the CASA Project Manager)
- Appropriate Title for the particular issue underneath the number—e.g. 'EQUIVALENT SAFETY DETERMINATION PROPOSAL'; or 'POTENTIAL NON-COMPLIANCE'.

Section Headings

1. Regulatory reference
2. Nature of the issue or proposal
3. Justification for the issue or proposal
4. CASA comment
5. CASA determination
6. Issue status.

For an ESD, the applicant should complete (1), (2) and (3) above and submit the completed ESD to the Project Manager. Section (4) will be completed by the Project Manager after consideration of the ESD application.

The Project Manager makes a final recommendation in writing to the delegate. Final processing consists of the completion of the 'CASA determination' block and the signature of the delegate, with a final tick in the 'Closed' block when the issue is finalised.

2.6.3 Issues file

If warranted, the Project Manager assembles closed issue papers and consolidates in a discrete file known as the issues file. The issues file is available to the TCB members, project team members and the applicant. The issues file can be revised to add new issue papers or update existing papers without holding a formal TCB meeting, provided that the new or updated paper can be coordinated through the applicant and the TCB.

2.7 Type certification program

2.7.1 General

For a TC, amended TC or STC - An applicant submits to CASA the type design, test reports and computations necessary to show that the product to be type-certificated meets the applicable airworthiness standards and any special conditions prescribed by CASA.

CASA examines the data submitted by the applicant and determines if compliance with the applicable airworthiness requirements has been shown. To be entitled to a TC, amended TC or STC for an aircraft, CASA must find that there are no features or characteristics for the requested type certification that makes it unsafe (refer to regulation 21.021 of CASR).

2.7.2 Responsibility of CASA

CASA is responsible for:

- providing guidance to an applicant in the certification process
- establishing the certification basis
- establishing special conditions
- determining equivalent levels of safety
- approving drawings, reports, data and AFMs, when satisfied, if not already approved by an authorised person and requested by the applicant and cost-recovered
- performing the Type Inspection Authorisation (TIA) inspections and tests needed to verify compliance with the applicable airworthiness requirements and conformity with the type design
- preparing the Type Inspection Report (TIR)
- establishing that compliance has been shown, utilising a compliance checklist
- preparing the final TCDS from the applicant's draft
- issuing certificates.

2.7.3 Responsibility of the applicant

An applicant is responsible for showing compliance with the applicable airworthiness standards applicable to the specific product or operation. These responsibilities are fulfilled as follows:

- An applicant submits the type design and substantiating data necessary to show that the product to be type-certificated meets the applicable airworthiness standards and any special conditions prescribed by CASA (refer to regulation 21.021 of CASR).
The type design is data approved by CASA or an authorised person, as appropriate (refer to paragraph 21.031 (1) (a) of CASR) and consists of:
 - drawings and specifications
 - information on dimensions, materials and processes
 - airworthiness limitations
 - AFM
 - any other data necessary to describe the design of the product.
- Type design data may allow the determination of the airworthiness by comparison of the type design of a similar product (where applicable) (refer to regulation 21.031 of CASR).
Substantiating data is additional data that is necessary to show compliance with the certification basis (e.g. test and analysis reports, ground and flight test reports, etc.)
- An applicant is required to prepare and submit to CASA a compliance checklist that addresses each section of the airworthiness requirements applicable to the product. An applicant can identify certification basis problem areas early in the type certification program.
- An applicant is required to submit Form 724 to CASA for each aircraft engine and propeller presented for type certification, and for each aircraft or part presented for testing (refer to regulation 21.053 of CASR).
- An applicant must allow CASA to make any inspection and any flight or ground test necessary to determine compliance with the applicable airworthiness requirements. CASA expects that the applicant has conducted all inspections and tests to a high degree of confidence that compliance will be demonstrated before the final compliance demonstration to CASA (refer to regulation 21.033 of CASR).
- The applicant accomplishes the requirements of subregulation 21.035 (1) of CASR prior to making flight tests, and on showing compliance, makes all flight tests that CASA finds necessary. The applicant must provide a person holding an appropriate pilot certificate to make the flight tests (refer to regulations 21.035 and 21.037 of CASR).

2.8 Technical data

2.8.1 General

Disclosure of technical data

The policy for disclosure of CASA information is in accordance with the *Freedom of Information Act 1982*. Descriptive and substantive data received from applicants are

proprietary and are not to be released by CASA without the written permission of the owner of the documents.

Note: Any information held by CASA may be subpoenaed by the courts.

Use of technical data by CASA

CASA personnel may use an applicant's or certificate holder's data for reference. This information will not be disclosed to third parties who have not obtained written permission for access from the applicant or certificate holder.

Authorised use of CASA approved data

An applicant who applies for a TC, amended TC or an STC, and wants to make use of data submitted by a previous applicant or certificate holder, must obtain and submit to CASA a written consent from the previous applicant or certificate holder.

Applicant provided data

An applicant showing compliance with the applicable requirements may submit previously approved data without showing further compliance if the applicant:

- provides sufficient evidence to substantiate that the data presented was previously approved by CASA.
- establishes that previously approved data is applicable to the applicant's design to the extent that any design deviations will have no effect on the airworthiness of the design or on showing compliance with the applicable regulations.
- provides sufficient substantiation and descriptive data of its own alteration that a finding of compliance can be made.
- has sufficient engineering data necessary to provide continued airworthiness information should the alteration be the subject of a Service Difficulty Report or Airworthiness Directive (AD) and to produce duplicate detail parts and installations if multiple STC approval is requested.

The CASA representative will not question the source or the method by which an applicant for a design approval obtains data submitted with an application.

All data should be in the form of controlled documents.

Information submitted by a previous applicant not to be supplied to a subsequent applicant

While needless duplication of testing and data gathering should be avoided, CASA's primary responsibility is to determine the airworthiness of the altered product. CASA will not supply a subsequent applicant with information submitted by a previous applicant, either directly or indirectly.

2.8.2 Evaluation and approval of design and test data

Review of drawings, specifications and reports

Design data consists of drawings, specifications and reports necessary to define and substantiate the product. This includes information on configuration, materials and processes. Data submitted by an applicant should be complete and in a logical format for review by CASA. CASA may reduce its own participation in the project to the minimum necessary to

verify compliance with the applicable airworthiness requirements depending on the knowledge it has of the person(s) who approved the data. For example, instead of making a complete evaluation, CASA may make spot checks.

CASA is only responsible for the review of the data submitted by the applicant, not for the development of methods or calculations.

Data approval

An applicant should submit data as soon as it is complete so review by CASA can be accomplished during the normal course of a type certification program. During this review, CASA determines that compliance has been shown with specific provisions of the applicable airworthiness standards.

The data is approved when completion of all inspections and necessary tests show that the product conforms to the type design and complies with the applicable airworthiness requirements. Data can be approved by an authorised person or a CASA officer within their authorisation limitations.

Data submitted to CASA must be accompanied by a completed Form 979. If the data is not marked as 'Approved', but as 'Recommend approval of these data', the applicant must state why the data has not been approved and will be subject to CASA cost-recovery. Data approved by CASA is to be marked as approved on the title/approval page with the CASA approval stamp and the signature of the delegate who approved the data.

CASA will accept the finding of compliance made by an authorised person in accordance with the agreed Certification Plan.

Test schedules

The test schedule is used to ensure that testing is orderly and complete.

An applicant's own testing for development does not require CASA approval. However, type certification credit cannot be granted for these tests unless arrangements between CASA and the applicant are made and agreed to prior to the testing.

The applicant should prepare a test schedule when testing is necessary to show compliance with the applicable airworthiness requirements. The test schedule should be prepared and approved by CASA or an authorised person, if authorised for the specific test, as early in the program as possible, but as a minimum prior to the start of each test.

At a minimum, the following items should be contained in the test schedule:

- Specific airworthiness requirement to be addressed
- Description and configuration of the item(s) to be tested
- List and description of all test equipment and facilities necessary to conduct the test
- Description of how the equipment will be calibrated and approved prior to the test
- Description of how the results of the testing will show compliance
- Loads to be applied and any load cycling requirements
- A test procedure written in a step-by-step format and sequence, including the recording of test results.

Conformity and witnessing of tests

All tests must be witnessed by CASA or delegated to a suitable person.

The conformity of the test article, test set-up, test procedures used and the validity of the test results must be established for each test conducted to show compliance with a type certification requirement. If the test is lengthy, at least the initial part of the testing should be witnessed and a post-test examination conducted.

The tests are not to proceed until the test schedule has been approved by CASA and satisfactory conformity inspections of the test specimen and test set-up in accordance with engineering drawings and the test schedule have been completed.

The applicant is to provide knowledgeable personnel capable of performing and recording the results of the test.

After the test, the witness may need to record any significant comments for file and action.

The applicant should prepare a test report detailing the results for each test and an explanation of the calculations necessary to evaluate the data. The report should include conclusions and recommendations and be presented to CASA or to an Authorised Person (if delegated) for approval.

2.8.3 Conformity inspections

Conformity inspections of test articles are required to ensure that the product being tested conforms with the approved drawings and specifications and test plans.

When the applicant is satisfied that conformity can be shown for the test specimen and the test set-up, the applicant is to complete and submit Form 724 to CASA and request conformity inspections by CASA.

The Program Manager is to arrange the required conformity inspections. Because of the complex nature of the conformity process and the necessity for parts conformity inspections early in the certification program, the responsible CASA office should be consulted early in the program. This will ensure that necessary inspections are requested and scheduled at appropriate times.

It is the responsibility of CASA to determine that the product conforms with drawings, specifications and special processes. A conformity inspection should be successfully conducted by CASA before any official CASA tests (ground or flight) are conducted.

The person performing each conformity inspection is to complete Form 882, noting any items found unsatisfactory, and return these to the Program Manager. All unsatisfactory items must be resolved prior to the testing.

The Program Manager is to determine which vendor or sub-contractor parts require conformity inspection by CASA. Vendor parts that undergo qualification testing will require conformity inspection by CASA prior to testing.

To ensure no schedule delays, it is imperative that the applicant identify the parts that will be procured by vendors and present this information to CASA early in the program.

2.8.4 Engineering compliance inspections by CASA

An engineering compliance inspection should be given to any aspect of product design for which compliance with the certification requirements cannot be established through the review of drawings or reports. These are normally conducted as part of the ground and flight type inspections conducted under the TIA (see section 2.10).

An engineering compliance inspection is to ensure that an installation complies with the applicable airworthiness requirements. This inspection should not be confused with a conformity inspection done by CASA officers performing manufacturing inspection duties. A conformity inspection is performed to determine conformity to engineering data, while an engineering compliance inspection is performed to determine compliance with the airworthiness requirements. An engineering compliance inspection provides an opportunity to review an installation and its relationship to other installations on a product.

The product should conform to the type design prior to conducting the engineering compliance inspection. Findings are to be documented and included in the project file. Engineering compliance inspections may be delegated to Authorised Persons. However, such persons should be provided with proper guidance in order to effectively make the findings on behalf of CASA.

Engineering compliance inspections for aircraft interiors are generally more complex than other compliance inspections. This is primarily due to the many varied requirements that must be complied with (e.g. emergency lighting, emergency exit arrangement, ordinance signs, aisle widths, cockpit controls, waste containers, placards and occupant protection).

In accomplishing an interior compliance inspection, the project team will make many determinations and should be very familiar with current regulations and policy.

Note: Engineering compliance inspections for interiors are generally not delegated.

Control system compliance inspections are accomplished to determine ease of control operation, strength of components and detection of interference or deflection of control system linkages.

Flammable fluid fire protection compliance inspections are to include the airworthiness requirements of separation and isolation of flammable fluid carrying lines from ignition sources. A physical inspection of installations is required to ensure compliance.

Hydraulic/electrical system routing requires inspection to ensure that proper support and separation is maintained.

Determination of operational and ease of maintenance acceptability is performed by CASA engineers, inspectors or test pilot (as appropriate).

2.8.5 Notification of non-compliance

The Project Manager must notify the applicant in writing when non-compliance items are found during ground or flight inspections, but the type certification tests are not discontinued. The notification must include reference to the specific requirement(s). The applicant must satisfactorily resolve all non-compliance prior to the Authority issuing the TC, amended TC or STC.

2.8.6 Discontinuance Letter

The Project Manager must notify the applicant in writing when it becomes necessary to discontinue official type certification tests for any reason. The notification must include reference to the specific CASR(s) and advise the applicant to notify the Project Manager when the cause of the discontinuance has been corrected and a resumption of the type certification test is desired.

2.9 The Compliance Checklist

2.9.1 Form of the Compliance Checklist

The Compliance Checklist (CCL) should include compliance statements against all elements/paragraphs of the certification basis. The CCL should contain a statement of compliance, how compliance was demonstrated and reference to documents substantiating compliance.

The recommended form of this CCL is:

Column 1: Requirement from the basic document—e.g. FAR 23.

Column 2: Compliance statement:

- C – Complies
- S/R – Substitute requirement
- N/C – Does not comply
- N/A – Not applicable
- O – Open issue.

Column 3: Method of compliance—e.g. calculations/analysis; lab/rig test; ground test; flight test; design drawing etc.

A suggested code is:

- A – calculations/analysis
- T – test
- I – by inspection
- D – inherent in the design
- E/S – equivalent safety
- O/E – satisfactory operational experience—e.g. of a class of material or technique.

Column 4: Document reference (by number and title, and section and paragraph number if applicable).

Column 5: Remarks.

If the compliance statement for any item is a “N/C” or “O”, the Remarks column should include a statement on the action being taken—e.g. reference to an Issue Paper, preparation of an equivalent safety submission, preparation of modifications etc.).

If the compliance statement of any item is an “N/A” or No Change, the Remarks column should include a statement made by the applicant justifying the non-applicability or contain a Document referenced to such a justification.

The final issue of the CCL should contain no “open” items.

Note 1: The CCL is a “living” document, continuously amended throughout the duration of the program. It serves as the master reference for all activities aimed toward compliance.

Note 2: The applicant should be offered the use of any suitable CASA proforma CCL available, so that the CASA TIA and final agreement of the findings of compliance use similar document layouts to the applicant’s CCL claiming compliance.

Note 3: Some applicants may not list certification requirement(s) which they consider not to be applicable. Without an adequate statement and/or justification against every requirement, the possibility exists that an important safety consideration impacting the design will not be appropriately addressed and accounted for. In such cases, CASA approval should not be forthcoming until each relevant requirement has been appropriately addressed by the applicant.

Note 4: Additionally, aircraft/product outcomes or scope can change through the life of a certification project. Without an appropriate justification against every requirement, the possibility exists that a change in compliance due to a project deviation may not be adequately addressed.

2.10 Type inspection authorisation and type inspection report

2.10.1 General

The TIA is the document used by CASA to specify those official airworthiness inspections and flight tests necessary to fulfil certain requirements for TC, amended TC or STC certification. The TIA specifies what specific ground and flight inspections are required, and by whom. A division of responsibilities is established as to who performs and certifies for compliance with specific portions of the inspections.

2.10.2 Purpose of a type inspection

The purpose of the type inspection is for CASA to verify the applicant's claims of findings of compliance for those items that require a physical specification.

For some items, compliance can only be shown by a physical inspection of the aircraft or specified parts (i.e. clearances, accessibility, actual ease of usage etc).

For other items, compliance can only be shown by actually flying the aircraft (i.e. stalling behaviour) or only evaluated by a physical presence in the aircraft (i.e. cockpit ergonomics, night lighting etc). For such items, the applicant will have conducted the inspections and tests they consider justifies a claim of compliance. This will be indicated on the applicant's CCL as 'Complies' by 'Inspection' or 'Reference Report No. xxx' as appropriate.

2.10.3 Preparation of the TIA

The TIA is essentially a list of those requirements (by paragraph number of the design standard—e.g. FAR 23, CS-VLA etc.) that are subject to a ground or flight type inspection and a list of those persons responsible for verifying compliance for those items.

The TIA is prepared by the Project Manager, based on the particular design standard and a responsibility matrix. The TIA is not prepared until coordination is accomplished with each appropriate engineering discipline such that all required information relative to the engineering discipline's portion of the inspection or authorisation is included.

The TIA is issued when the examination of the technical data required for type certification is completed or has reached a point where it appears that the aircraft or component being examined will meet the applicable regulations.

2.10.4 Letter of notification

At the time the TIA is prepared, a letter of notification to the applicant should also be prepared by the Project Manager. The letter of notification informs the applicant that the type inspection will be conducted and includes a copy of the TIA for their information.

2.10.5 Conformity inspection requirement

Conformity inspections are to be accomplished by CASA personnel or an authorised person prior to official CASA certification flight tests.

2.10.6 Tests

Official certification tests are conducted or witnessed by CASA personnel or authorised persons, when authorised under the TIA, after the applicant has complied with subregulation 21.035 (1) of CASR.

Risk management processes should be applied to any flight testing to be conducted by CASA to ensure the associated flight test risks are acceptable. The guidance given in the CASA Flight Test and Evaluation Procedures Manual may be used.

2.10.7 Type inspection report

The TIR is the formal report prepared by CASA to document the physical inspections and tests that CASA conducted to verify the applicant's claim of finding of compliance for those items.

Whilst the TIR is a separate document, it is closely associated with the final CCL accepted by CASA. Indication of a finding of compliance by CASA on a CCL is 'Complies' by 'TIR'.

The TIR should:

- contain the results of all TIA inspections and tests
- contain a chronological list of all changes made to the prototype product during the test program and identified as 'made by the applicant' or 'required by CASA as a result of type certification tests showing non-compliance'
- be approved by the Project Manager in conjunction with the project team
- be retained by CASA for reference purposes
- be provided to the certificate holder (courtesy copy).

The TIR for an engine or propeller is developed similarly to an aircraft. It must address the design standard and is to be completed as soon as possible on conclusion of the endurance testing and teardown inspections. The following items should also be included in the TIR:

- the conformity inspection reports
- the results of the teardown inspection
- copies of the memoranda pertaining to the inspections.

2.11 Operational and airworthiness evaluations

The operational and airworthiness evaluations of the aircraft type certification process are normally only applied to transport category aircraft. In such cases, once the aircraft enters service these will be assessed on an individual basis as they arise. FAA Order 8110.4C may be used as a guide.

Some aspects covered are:

- evaluation of the aircraft and its systems for operational suitability and continued airworthiness
- operations specifications, training and maintenance programs and aircrew qualification
- Maintenance Review Board activities
- development of the Master Minimum Equipment List (MMEL)
- establishment of type rating requirements
- participation in crew complement determinations
- participation in emergency evacuation demonstrations
- establishing acceptance of flight crew sleeping quarters
- establishing any unique or special training requirements
- participation in functional and reliability testing.

2.12 Aircraft Flight Manual

2.12.1 Aircraft Flight Manual Approvals

An AFM for each new aircraft is required in accordance with regulation 21.005 of CASR and regulation 23.1581 etc. of FAR.

The delegate is responsible for approving master AFMs, including revisions and supplements. The AFM should not be approved until:

- the CASA project flight test pilot, flight test engineer and appropriate CASA engineers concur with the operational limitations and normal and emergency procedures.
- the CASA flight test engineer recommends approval of the required performance section of the AFM.
- the Project Manager has reviewed and coordinated the satisfactory completion of the AFM.

2.12.2 Revisions to the TC holder's AFM

Changes to AFMs submitted by the TC holder will be handled by CASA in the same manner as original manuals. Each revised page should bear a revision date or symbol so that required revisions may be properly identified.

2.12.3 Changes to an AFM by other than the TC holder

Changes to AFMs required as a result of third party STCs are to be accomplished by the use of an AFM supplement.

2.13 Post-certification activities

2.13.1 Certification summary report

The purpose of the certification summary report is to provide a single source document that summarises the record of examination of a type design by CASA, discusses significant safety issues and describes how the applicable airworthiness requirements were met.

CASA prepares the certification summary report. Refer to FAA Order 8100.5B for guidance regarding details of the content of the certification summary report. Not all projects require a summary report and the Project Manager is responsible for determining which projects do. Summary reports should generally be prepared for:

- all new aircraft models over 34,030 kg maximum gross weight and significant modifications to those aircraft,
- all new transport category rotorcraft and significant modifications to those rotorcraft
- aircraft which involve significant technology issues
- aircraft which have unusual or novel features or are of controversial design
- projects that have potential for unusual public interest.

The certification summary report, if required, should be in an acceptable draft form at the time of issue of the TC, amended TC or STC.

2.13.2 Continued airworthiness

The Instructions for Continued Airworthiness are required for type certification because it is part of the type design defined in regulation 21.031 of CASR and also part of the TC as defined in regulation 21.041 of CASR.

The Instructions for Continued Airworthiness are prepared in accordance with regulations 23.1529, 25.1529, 27.1529, 29.1529, 31.82, 33.4, or 35.4 of FAR (as appropriate).

The Instructions for Continued Airworthiness are reviewed by the relevant members of the project team, with assistance from the maintenance specialists to determine their adequacy and to make any recommendations regarding the Maintenance Manual and the Illustrated Parts Catalogue. However, only the airworthiness limitations section and, in addition for engines and propellers, the instructions for installing and operating the engine or propeller, are approved by CASA.

As allowed in the applicable airworthiness requirements, the Instructions for Continued Airworthiness may be incomplete at the time of type certification. However, the airworthiness limitations are required by regulation 21.031 of CASR and must be approved by CASA before certificate issue.

Note: This CASA approval does not necessarily have to be the final printed form at this stage of the process.

The Instructions for Continued Airworthiness must be in final printed form when the first CofA issued, or prior to delivery of first product, whichever is later.

Certification Maintenance Requirements—i.e. systems and powerplant maintenance requirements developed during the certification process, which contain frequency and extent of inspections—should be included as part of the maintenance instructions portions of the Instructions for Continued Airworthiness.

In order to have a standard repair included in the Maintenance Manual or any Structural Repair Manual, the repair must have adequate justification approved by CASA or an authorised person.

The Project Manager must ensure that the applicant provides any required MMEL, including the establishment of an update service.

2.13.3 Retention of data

The Project Manager must ensure that all documents showing a decision or action taken by CASA are filed in the project file.

Regulation 21.049 of CASR, requires the TC holder to make the certificate and the type design available for examination by CASA on request.

The Project Manager is to ensure that all data is stored in the Records Management System.

See Chapter 3 for procedures regarding the disposition of the data in the case of suspension, cancellation or transfer of a TC.

3. Type Certificate procedures

3.1 General

This part provides guidance for preparation of the TC and the TCDS. The TCDS, which is a part of the TC, provides a concise definition of the configuration of a type-certificated product. This part also provides information about the standard format of the TCDS, which is necessary if information about a specific product is to be found easily.

3.2 Type Certificates

3.2.1 Type Certificate issue

When an applicant completes the requirements of the applicable airworthiness standards for the product, the delegate signs and issues a TC upon a written recommendation from the Project Manager.

The TC is prepared using the CASA template for the Type Certificate (Form 981). TCs are printed on the current CASA approved certificate paper.

When issued, the original TC or STC is given to the applicant.

3.2.2 Type Certificate numbers

A common register of TC numbers is maintained by Aircraft Certification for TCs issued under regulations 21.013A and 21.029 of CASR. This register is held as a shared drive in Initial Airworthiness and can be accessed by appropriate CASA staff. The Project Manager obtains the TC number from Aircraft Certification.

The TC number is not assigned until the TC is ready to be issued. This is because:

- uncontrolled use of the TC number could lead to a perception that the TC has been issued
- if the project were to lapse, or never eventuate, there would be gaps in the register.

The numbers are sequential starting from 500 and is preceded by letters that identify the product:

VA Aeroplane
VR Rotorcraft
VL Lighter Than Air
VE Engines
VP Propellers.

For example:

The first TC for an aeroplane in the series would be VA501.

Note: TCs for gliders are issued by the Gliding Federation of Australia under authority delegated by CASA.

3.2.3 Amendment to a Type Certificate

A TC holder wanting to change the type design for a product may apply for an STC or an amendment of the original TC. Only the TC holder may apply for an amendment to the TC. Persons other than the TC holder require an STC.

Amendment of a TC is accomplished by re-issuing the TC under the same number, but with a new date and revised TCDS.

3.2.4 Record keeping requirements

A copy of the TC or STC is kept in Aircraft Certification on a master folder of TCs issued or amended. A copy is also kept on the project file.

The details of the TC or STC are entered on the TC or STC register held as a shared drive in Aircraft Certification. An electronic copy of the TC, STC or any Data Sheet is also kept on the shared drive.

3.2.5 Transfer of a Type Certificate

The recipient of a transferred TC, as authorised by regulation 21.047 of CASR, receives the privileges of a TC holder but also assumes all responsibilities. These responsibilities include the continued airworthiness responsibilities for all aircraft produced under that TC (inclusive of those aircraft produced by previous TC holders).

- When TC ownership is transferred, the TC must be reissued, but under the same number.
- If a TC holder submits a statutory declaration attesting that the original TC is lost, misplaced, or destroyed, CASA's records must record that. CASA may issue a replacement TC under CASR 11.115. If the lost TC is subsequently located, that should be surrendered to CASA.
- If the new TC holder is to maintain the type data file held by CASA, reissue of the TC should not occur until the new owner and CASA reach an agreement on maintenance and storage of the data.
- A company name change requires the TC be reissued.

TC Holder

Where the transfer of a TC is required, the TC holder should submit the original TC to CASA with a letter requesting the transfer - this changes the ownership. The effective date is the date of the TC holder's signature and the signature can only be that of the individual(s) shown as the TC holder.

In the case of a TC issued to an organisation, it is necessary to submit a letter signed by a duly elected officer of the grantor organisation (with the corporate seal where the holder is a corporation) certifying that the person signing as grantor is duly authorised and empowered to execute the transfer on behalf of the TC holder.

3.2.6 Cancellation or suspension of a Type Certificate

A TC is effective until cancelled or suspended in accordance with regulation 21.051 of CASR.

Cancellation of a TC is an enforcement action and must be conducted pursuant to CASA's enforcement manual. For example, such action is taken when the TC holder is unwilling or

unable to take the necessary action to ensure continued airworthiness. CASA can direct the holder to surrender the TC to CASA.

Cancellation or suspension of a TC may be a basis for cancelling the Certificates of Airworthiness of all the aircraft built under the TC.

3.2.7 Surrender of a Type Certificate

The surrender of a TC renders it ineffective in accordance with regulation 21.002E of CASR. This action precludes further production of the product covered by the TC, but it does not affect the eligibility of the aircraft, produced prior to the surrender, for airworthiness certification.

Note: The TC data may not be claimed by a third party as being proprietary; the data remains in the public domain in perpetuity

Once the TC has been surrendered, all information that constitutes the TC (refer to regulation 21.041 of CASR), including the type design with substantiating data (refer to regulation 21.031 of CASR) is retained by CASA. CASA will have custody of this information to conduct follow-on activities related to the product (i.e. STCs, manufacturing approvals, modifications approved under Subpart 21.M of CASR etc). CASA will retain this information for as long as an aircraft of that type is registered.

The process for surrendering a TC includes the following:

- On surrender of a TC, the word 'SURRENDERED' is stamped or typed on the body of the original TC and an appropriate notation made on the file copy of the TC.
- The delegate dates and signs the surrendered original TC.
- The surrendered original TC is returned to the holder.
- A note is added to the TCDS documenting the surrender date of the TC and advising that only aircraft manufactured prior to the date of surrender of the TC are eligible for airworthiness certification.
- Persons or entities wishing to manufacture the product from a surrendered TC may:
 - obtain copies of the TC data that now resides in the public domain and apply for a new TC through the normal approval process. Since a new and distinct TC would be issued in this case, the certification basis would be established in accordance with regulation 21.017 of CASR (not regulation 21.101 of CASR); or
 - request that the TC be reissued in their name. The request will be honoured if the requestor is qualified and in possession of all information that would constitute the TC (refer to regulation 21.041 of CASR). The applicant should be aware that they assume all responsibilities for the product, as well as the privileges of a TC holder as defined in Subpart 21.B of CASR. The applicable procedures for transfer of a TC also apply.

3.2.8 Procedures when certificate holders cannot be located

Occasionally TC or STC holders go out of business without transferring their certificates, or they cannot otherwise be located. In these situations, the Principal Engineer - Certification (Programs) is to decide on the continuation of the TC and the disposition of approval records and design data.

3.2.9 Splitting a Type Certificate

Requests may be received from TC holders to 'split out' one or more models (aircraft, engines, or propellers) from a TC to allow the transfer of the type design approval of those models to another party without transferring the complete TC. The CASR does not provide for that to occur.

Splitting out models would require the issue of a new TC to the transferee and the airworthiness requirements of Part 21 of CASR would prevail. In particular, the airworthiness requirements specified by paragraph 21.017 (1) (a) of CASR must be met.

This position does not preclude a TC holder from selling or otherwise making its design data available to another party. If the transferee (receiving party) wishes to produce aircraft, engines or propellers and the designs are eligible for airworthiness certification or acceptance, several alternatives are available.

The receiving party may either:

1. produce the product under licence to the extent allowed under Subparts 21.F or 21.G of CASR without becoming the holder of the TC; or
2. obtain a new TC for the aircraft, engine or propeller under the provisions of Subpart 21.B of CASR.

If option 1 is selected, the holder of the TC remains responsible for the continued integrity of the approved type design and must continue to be CASA's contact point for resolving safety issues that may require corrective action (e.g. ADs).

If option 2 is selected, CASA should allow the new applicant as much credit for previously-approved design data and tests as is practicable in showing compliance with the later requirements. In determining the aircraft certification basis, consideration should be given to equivalent safety findings where clearly documented evidence is presented by the applicant that shows the objectives of the later requirements have been met. The certification basis should retain those requirements set by Subpart 21.B of CASR.

3.2.10 Provisional Type Certificate

Provisional TCs are printed on the current CASA approved certificate paper.

A provisional TC is appropriate and necessary for the following aircraft uses:

- flight crew training
- demonstration flights by the manufacturer for prospective purchasers
- market surveys by the manufacturer
- flight checking of instruments, accessories and equipment
- service testing of the aircraft.

For the preparation of a Provisional TC, the Project Manager must:

- use the CASA template for the Type Certificate (Form 981) Select Provisional Type Certificate and do not include 'This certificate may be transferred in accordance with regulation 21.047 of CAR', which should only appear on the Type Certificate.
- use the same TC number for both the Provisional and the final TC.

Note: A provisional TC is not transferable.

3.3 Type Certificate Data Sheet

3.3.1 Overview

The TCDS is the part of the TC that documents the conditions and limitations necessary to meet the requirements of the applicable airworthiness standards.

The TCDS is prepared using the CASA templates for the Type Certificate Data Sheet (Form 982) and the Type Certificate Data Sheet continuation (Form 983). The TCDS is printed on CASA letterhead and the continuation sheets are printed on the current CASA approved certificate paper.

3.3.2 Approval of the TCDS

CASA finalises and issues the TCDS as required by subregulation 21.041 (2) of CASR, from the draft and information supplied by the applicant.

3.3.3 Completion of the TCDS

The TCDS should be completed as soon as possible after approval of the engineering data. The TCDS can be in a partial state of completion at the time of issue of the TIA. However, the TCDS must be completed by the time the TC is issued.

3.3.4 Format of the TCDS

The format of the TCDS should be consistent for any type-certificated product, although the information will be relevant for that particular product. The first page of a typical TCDS, shown in Figure 1, is as viewed in the online template form.

**Australian Government
Civil Aviation Safety Authority**

TCDS number—same as the TC number

Revision number

Aircraft and models to which the TCDS applies, listed in alphabetical or numerical order for convenience in

Issue date of TCDS

TYPE CERTIFICATE DATA SHEET

This data sheet, which is part of Type Certificate No. VAzzz, lists the conditions and operational limitations under which the subject aircraft meets the airworthiness requirements of the Civil Aviation Safety Authority.

Certificate Holder **ACME Pty Ltd**
ACN 119 523 830
P.O. Box 24, Westside
NSW, Australia 3340

I Model MKI. Approved in Normal Category 10th October 2000

Engine Textron Lycoming IO-540-K1A5

Engine Limits Take Off 2500 rpm and full throttle (275 hp), or 2700 rpm and full throttle (300 hp) – max 2

Maximum Continuous 2500 rpm and full throttle (275

Propeller Hartzell HC-C2YR-1BF/F8475R metal constant speed
Diameter not over 2134 mm
not under 1981 mm

The name and address of the TC holder. Must be updated to reflect the name of the new TC holder when a TC is transferred. The name and address should agree exactly with that shown on the application for TC.
For military surplus aircraft the current TC holder's name, not the original manufacturer's name.

One or more sections, each section confined to an individual model of the general type covered by the TC. Head the section covering each model by a Roman numeral followed by the model designation (from the application for TC).
Include the airworthiness category, or categories, in which the aircraft may be certificated in parenthesis following the model designation. Follow this with the approval date, as shown on the TC.
See section 3.3.5 that follows for the information required for each model listed on the aircraft TCDS.
Indicate differences between a new model added to the TCDS and a previously approved model immediately below the heading for the new model. This information assists in determining the eligibility of a conversion from one model to another.
Add further information on the Type Certificate Data Sheet Continuation Sheet.

Figure 2: TCDS Example

3.3.5 Information required for each model listed on the aircraft TCDS

Each of the items listed in this section appear in the TCDS exactly as entitled. Where several models are included under the same TC, items are repeated under each section with the exception of the following that may be listed, if common to all models, under 'Data Pertinent to All Models' just before the 'Notes' section (item 25):

- Datum
- Mean aerodynamic chord
- Leveling Means
- Control Surface Movements
- Production Basis.

Detailed information for each item may be referenced if that information is maintained in an approved document and readily available—e.g. information contained in the AFM could be referenced for an item where copying that information on the TCDS would be voluminous.

Table 2: TCDS details

Item		Detail
1	Engine	Show the abbreviated name of the manufacturer, the engine TC number and the complete model designation for all engines for which the manufacturer obtained approval. Show the number of installed engines.
2	Fuel	Show the minimum fuel grade to be used in the basic engine and list approved alternative fuels. Include the fuel grade with the pertinent limits where optional engines are included.
3	Engine limits	Show the installed maximum continuous and take-off limits of the engine(s), including power setting parameters (e.g. manifold pressure, engine pressure ratio), rpm and power or thrust output. The limits may be less than, but must never exceed, the rating for the engine as shown on the pertinent engine TCDS. Any reduction may be dictated by other requirements such as structural, vibrational or performance. In the case of altitude engines (i.e. supercharged engines) the limits are shown for sea level and for critical altitude or altitudes. Include a statement regarding variation between altitudes such as "straight line manifold pressure variation with altitude to 10,000 feet".
4	Propeller and Propeller limits	Show the name of the manufacturer, the propeller TC number and the model designation for each propeller for which the manufacturer has obtained approval, together with the propeller limits and any operating restrictions peculiar to the propeller or propeller-engine combination. <ul style="list-style-type: none"> • Show the static rpm limits and diameter limits for fixed-pitch propellers. If the TIR indicates in a given case that the rpm limits are 2200-2350, the TCDS indicates as follows: • "Static rpm at permissible throttle setting, not over 2350, not under 2200. No additional tolerance permitted." Thus, all tolerance permitted is indicated in the basic limits. • Show the diameter limits and blade angle settings (feathering, high, low and reverse, as applicable) for adjustable, two-position, controllable and automatic propellers. The applicable static rpm limits (with tolerances) may also be shown if considered desirable.

Item		Detail
		<p>The diameter limits should include both the maximum and minimum allowable limits for repairs with the notation: "No further reduction permitted."</p> <ul style="list-style-type: none"> Additional information is required in certain circumstances such as: <ul style="list-style-type: none"> The model designation of both the hub and the blades when propeller blades are not an integral part of the hub. A note indicating where the listing of the other eligible blades may be found when interchangeable blades are listed. The reference blade station at which the angle is measured for propellers which permit the blade angle setting to be varied.
5	Rotor speed limits	Include helicopter rotor speed limitations, power on and power off.
6	Transmission torque limits	Include helicopter transmission torque limits.
7	Airspeed Limits	Show all pertinent airspeed limits as calibrated airspeeds in knots. The terminology is the same as that used in the applicable airworthiness standards under which the aircraft is type-certificated.
8	Centre of Gravity (C.G.) Range	The C.G. ranges approved for the extreme loading conditions of the aircraft are given in mm from the datum. Dimensions are carried out only to the nearest mm. Where the landing gear is retractable, values should be given in terms of landing gear extended and a statement added to that effect. Include the moment change (in kg-mm) due to the retracting of the landing gear. No specific standard for presentation can be set in the case of aircraft where the C.G. limits vary with loaded weight.
9	Empty Weight C.G. Range	<p>An empty weight C.G. range may be established. If no range exists, the condition is indicated by inserting the word "none" after the heading. The range is given as forward and aft limits in mm from the datum. Include a full explanation when the C.G. range is affected by items of equipment. Include the following statement, with the wording modified to suit the individual case, where an empty weight C.G. range is established.</p> <p>"When the empty weight C.G. falls within the range given, complete computations of critical forward and aft C.G. positions are unnecessary. Range is not valid for non-standard arrangements."</p>
10	Datum	The datum, designated by the applicant, is a definite, unmistakable and unchangeable point. It is defined in such a manner that it may be readily identified.
11	Leveling Means	Include the description of the means provided for leveling the aircraft with information for location and accessibility of a leveling point. The leveling point is always a definite, unmistakable and unchangeable point.
12	Maximum Weights	Include all pertinent maximum weights such as ramp, landing, take-off, and zero fuel (must show if fuselage fuel is included as part of zero fuel weight). Include engine-out ferrying operation weight, if available. If the explanatory material appears cumbersome, it may be included in a note which is cross-referenced under the item.
13	Minimum Crew	Include the minimum crew required for normal operation when

Item		Detail
		established by regulation. Identify pilot-in-command station location.
14	Number of seats	<p>The following are some of the design considerations which may limit the number of seats:</p> <ul style="list-style-type: none"> • The passenger capacity of transport category aircraft may be limited by either the emergency exit requirements, oxygen requirements (when applicable—i.e. above 25,000 ft.), demonstration of emergency evacuation procedures or the structural strength of the floor. Other considerations may also be applicable. For example, cabin attendants are not included in the maximum number of passengers. • Indicate the number of seats and the moment arms of the seats for aircraft other than transport category. The seat moment arms are ordinarily those of the occupants of the seats rather than the seats. The occupant's C.G. may be assumed at a point 216 mm (8.5 inches) forward and 267 mm (10.5 inches) above the intersection of the seat back and the seat bottom with the upholstery compressed approximately the same as when the seat is occupied. Ordinarily, the moment arms of adjustable seats are given for the mean or average location, but the extreme positions may be defined where the C.G. range is critical. • Show the number of seats if the aircraft is approved for cargo only as: "None. Approved for cargo only."
15	Maximum Baggage	Show the maximum capacity and moment arm of each baggage compartment and list the floor loading densities, as appropriate.
16	Fuel Capacity	Indicate the total capacity of each fuel tank installed in the aircraft and its moment arm. List the amount of usable and unusable fuel, with a reference to see the appropriate note for the requirement to add the unusable fuel to the certificated empty weight of the aircraft.
17	Oil Capacity	Same considerations as fuel capacity.
18	Maximum Operation Altitude	Include when appropriate.
19	Control Surface Movements	Include the total travel in each direction of each movable control surface on the aircraft. This information is included as a convenience to maintenance organisations, as well as to representatives of the Authority, and is not intended to prescribe control movements as an item of inspection unless a specific statement to that effect is included. Where the flight characteristics of the aircraft require close tolerance on the control movements, it is necessary to have a method of measuring the movements such that the individual using the information may make accurate measurement. In such cases, it is generally satisfactory to list the maximum movements in terms of distance from some well-defined point rather than in degrees.
20	Manufacturer's Serial Numbers	Include the manufacturer's serial numbers for each aircraft under a particular model. List the number that appears on the manufacturer's aircraft data plate in exactly the same form. If the aircraft is being manufactured under more than one production approval, the serial numbers should be separated according to manufacturer.

Item		Detail
21	Certification Basis	<ul style="list-style-type: none"> Define the applicable airworthiness standards and amendments, special conditions and effective dates. Record applicable airworthiness standards under this heading for each change in the TC which is accomplished in accordance with standards other than those recorded at the time of issue of the TC. Indicate where compliance with pertinent ditching provisions and ice protection criteria for aircraft has been demonstrated. Identify all equivalent safety findings made in accordance with CASR 21.021(b). Include the TC number and date issued. Include the date of application for the TC.
22	Production Basis	<ul style="list-style-type: none"> If a PC has been issued to the TC holder, listing of the PC and number is sufficient. If no PC has been issued, the following entry should be made: "None. Prior to original certification of each aircraft, a representative of the Authority must perform a detailed inspection for workmanship, materials, conformity with the approved technical data and a check of the flight characteristics." If the aircraft is being manufactured by a licensee of the TC holder, the licensee's name and PC number should be listed along with the aircraft serial numbers produced by the licensee. If the PC is cancelled and the TC remains active, the production status is defined as follows: "None. Prior to original certification of each aircraft manufactured subsequent to (date of cancellation of PC) a representative of the Authority must perform a detailed inspection for workmanship, materials, conformity with the approved technical data and a check of the flight characteristics."
23	Equipment	<ul style="list-style-type: none"> Use the following statement: "The basic required equipment as prescribed in the applicable airworthiness regulations (see Certification Basis) must be installed in the aircraft for certification." List the additional or special equipment found necessary for type certification, as well as the exceptions to the prescribed minimum equipment. List alternatives to equipment found necessary for certification. Do not list on the TCDS the optional items of equipment, except engines and propellers for which the aircraft manufacturer obtains approval. Show the equipment list supplied by the manufacturer with each aircraft.
24	Placards	<ul style="list-style-type: none"> All placards required in the approved AFM must be installed in the appropriate locations.
25	Notes	<ul style="list-style-type: none"> Avoid the overuse of notes whenever possible. Include pertinent explanatory material with the item to which it refers. Follow this practice even though it becomes necessary to repeat the information several times. If it is impractical to include the explanatory material with the item to which it refers because of its length or complexity, the information may be included in a separate note. In this case, the pertinent items would include a reference to the note. Indicate the material which is found in the note when a note is referenced. An example of cross-reference would be the following notation inserted after the fuel capacity: "See Note 1 for data on weight and balance."

Item	Detail
	<ul style="list-style-type: none"> The need for care in choosing the language used cannot be overemphasised in the preparation of notes. Many difficulties have arisen in the past due to misinterpretation of information included in the notes. Examine material carefully to ensure that the meaning is unmistakable. <ul style="list-style-type: none"> Reserve Note 1 for the weight and balance note. This note pertains to weight and balance data, equipment lists and loading instructions. It is standardised except for special considerations regarding weight and balance (e.g., information on unusable fuel, system fuel and oil, variations in C.G. ranges or removable ballast). The standardised part of this note reads as follows: "A current weight and balance report including list of equipment included in the certificated empty weight, and loading instructions when necessary, must be provided for each aircraft at the time of original certification." Reserve Note 2 for a list of required placards including the one regarding operation in compliance with the operating limitations when applicable. All placards required in the approved AFM must be installed in the appropriate locations. If any required placard is not listed in the manual, it should be listed in the note. Reserve Note 3 for reference to the Instructions for Continued Airworthiness required under CASR 21.050 for service life limits on components, required inspections and inspection intervals, and Certification Maintenance Requirements, as appropriate. When an applicant has developed advisory information for restricted category operation of an aircraft, the following information should be included in a note on the TCDS: <ul style="list-style-type: none"> Restricted category weights, speeds, ranges and altitudes at which the applicant has shown compliance with CASR 21.025 Additional operating restrictions for individual restricted operations approved under CASR 21.025 A statement that all parts of the standard category airworthiness standards are not necessarily complied with for restricted category operation. Additional miscellaneous notes may be required to convey necessary information not provided for elsewhere.
26	Page Numbering The first and subsequent pages of the TCDS are numbered as "n of m pages", where "n" is the number of the page and "m" is the total number of pages of the TCDS. The numbers are on the bottom right of each page.
27	Revision Status <ul style="list-style-type: none"> Add the revision number directly below the TCDS or specification number in a box in the upper right-hand corner of the first page. Enter the revision date inside the box at the bottom of the box. Identify the revised material by placing a change bar (a vertical black line) in the right-hand margin alongside the printed matter that was changed. When a new model is approved, the model designation should be inserted in proper order and a change bar used to designate the new model.

3.3.6 Information required for an engine TCDS

Refer to FAA Order 8110.4C for guidance.

3.3.7 Information required for a propeller TCDS

Refer to FAA Order 8110.4C for guidance.

4. Preparation of Supplemental Type Certificates

4.1 Background

The same procedures apply for approval and issue of an STC as those that apply for a TC. The STC is prepared using the CASA template for the Supplemental Type Certificate (Form 986). STCs are printed on the current CASA approved certificate paper.

4.1.1 Purpose of an STC

Any person may apply for an STC and minor changes to the type design do not require an STC.

Note: Minor and major changes are classified in regulation 21.093 of CASR.

An STC is issued for major design changes to type-certificated products when the change is not so extensive as to require a new TC (refer to regulation 21.019 of CASR). A TC holder may apply for an amendment to the TC rather than apply for an STC.

An STC will normally be required to authorise the installation of replacement parts only if the installation represents a major change in the type design. However, even for installation of replacement parts not constituting a major change, an STC may be deemed necessary because of the existence of unique circumstance. One example of this is a situation where special instructions are necessary for installation of the replacement part.

An STC will not normally be issued to:

- approve minor changes or to approve identical replacement parts (unless the installation of such parts constitutes a major change to the type design)
- approve design changes to Technical Standard Order (TSO) or Australian Technical Standard Order (ATSO) approved articles unless the TSO or ATSO is invalidated for the modified article. An STC that modifies a TSO or ATSO article must provide for installation
- combine two or more STCs without additional showing of compliance
- manufacturers or applicants outside of Australia.

An application for a single STC applicable to more than one type-certificated product may be accepted by CASA, but would have to be considered on an individual basis (refer to FAA Order 8110.4C Chapter 4 for guidance).

4.1.2 Requirements for an STC

The applicant must submit data adequate to show compliance with the applicable certification basis. It is the applicant's responsibility to develop and provide the required data.

If an applicant desires to incorporate any change resulting in an increased passenger seating configuration for transport category aircraft, compliance with later amendments to the applicable airworthiness standards may be required.

An STC can be issued when CASA determines that the design change meets the applicable airworthiness standards.

An STC will be issued only if:

- the relevant technical data has been examined and found satisfactory by CASA

- all necessary tests and compliance inspections have been completed
- the alteration has been found to conform with the technical data.

An STC may be issued as a 'one-only' STC for a particular aircraft by make, model and serial number if it has been determined that the descriptive data pertaining to the change are inadequate for duplication on other aircraft. All subsequent approvals of the modification must be handled via a multiple STC. A 'one-only' STC cannot be amended and the holder is not eligible for issue of any CASA production approval including Australian Parts Manufacturing Approval.

4.1.3 Acceptance of data

Major changes to a type design are approved after receipt of descriptive and substantiating data for inclusion in the type design.

- **For multiple STCs** (for more than one aircraft of a specific model) - all drawings or other data accepted must be adequate for reproduction of parts and/or installation of subsequent modifications. Photographs are acceptable, provided they or the report in which they are included contain all the information that otherwise would be found on engineering drawings.
- **For a one-only STC** (for only one aircraft of a specific model) - the drawings or other descriptive data submitted do not need to be satisfactory for reproduction of parts and/or the installation, and may consist of marked photographs, sketches and word description. All other data must be the same as that required for a multiple STC.

4.1.4 Compliance inspection

Compliance inspections are physical inspections of the prototype alteration to determine compliance with applicable airworthiness standards that cannot be determined adequately from an evaluation of the technical data. These inspections will be conducted by the appropriate engineer, inspector or authorised person (if so directed by CASA).

As part of the compliance inspections, flight tests may be required when flight characteristics, performance and/or systems are affected.

A reduced version of the TIA for a full TC may be used. Items noted as 'not affected' are to be verified as such.

4.1.5 Compatibility examination

A new design change should be compatible with related previous design changes to ensure continued compliance with applicable airworthiness requirements. Reliance on any previously approved changes should be described in the approved data.

Unless otherwise stated on the STC, an STC is applicable to a standard unmodified aircraft. If a pre-requisite or related previously approved change is required to incorporate the new STC, then this must be stated on the STC.

4.1.6 Need for an experimental certificate

An experimental certificate is required when flight tests are necessary for showing compliance with the regulations.

4.1.7 Compliance determination

The methods of determining compliance with applicable requirements are the same as those used for basic type certification except as provided herein.

Revisions to performance data

Existing published performance data for the type-certificated product must be reviewed by the applicant to determine if the change adversely affects any aspect of performance. Existing performance data that could mislead the operator due to changes in performance caused by the STC must be corrected in the applicant's proposed flight manual supplement. This supplement is to be approved by CASA before the STC is issued.

Non-interference STCs

Non-interference STCs are modifications to products that provide a convenience or function that is not required by the applicable airworthiness standards. Therefore, they offer no relief from airworthiness standards or from the product's operating limitations. They are installed and approved on a non-interference or no hazard basis.

When non-interference STCs are approved, explicit limitations are required in the 'Limitations and Conditions' section of the STC to preclude any misunderstanding or misinterpretation that may be implied by incorporation of the non-interference STC.

4.2 Preparation and issue of a Supplemental Type Certificate

4.2.1 STC Number

The STC number consists of:

- the two letters 'SV' for Australian STC
- a letter to identify the product (see the note below)
- three numerical digits issued in sequential order are obtained from the STC register.

An example of a format for the twenty-eighth STC issued for a rotorcraft is SVR028.

Note: The STC product identifiers are:

A	Aeroplane
R	Rotorcraft
L	Lighter Than Air
E	Engine
P	Propeller.

STCs for gliders are issued by the Gliding Federation of Australia under authority delegated by CASA.

4.2.2 Certificate issued to

The name of the person, corporation or organisation to whom the STC is issued must be shown exactly as indicated on the application (Form 733).

4.2.3 Certification basis

The certification basis of the STC should include the following:

- Reference to the certification basis identified on the TCDS of the TC product

- Any other airworthiness standards involved, in which case the STC should indicate that the certification basis is a combination of the pertinent standards
- Any special conditions that apply, which must be indicated and explained on the STC and STC continuation sheet, if appropriate, by number and date
- Any equivalent level of safety findings.

4.2.4 Original product

Include the TC number and the TC holder's name of the product being altered as shown on the aircraft specification or TCDS. All applicable models should be listed with model designations identical to that on the TCDS.

4.2.5 Description of change

The following data should be collated by CASA and included in a description of change:

- a description of the design change and the controlling document
- references to AFM supplements, loading instructions, drawings and/or sealed drawings lists etc., that are required as part of the design change.

The applicant should separate the installation and manufacturing data in cases where parts or kits are to be sold. If the installation data list is specified on the STC, the installer will know what data is required to properly install the design change.

4.2.6 Limitations and conditions

1. If previously incorporated design changes are necessary to enable the newly altered product to be airworthy, clearly indicate this fact.
2. Include the following note in every multiple STC:

Compatibility of this design change with previously approved modifications must be determined by the installer.
3. If the approval is for one product only, a statement should be made on the STC under 'Limitations and Conditions' to read as follows:

Descriptive data pertaining to this design change are considered inadequate for duplication in other products. This approval is limited to only the installation made in (Make of product) _____ Model _____ Serial No. _____.

4. If the STC is to make provisions for equipment installation but does not install the equipment, include a statement similar to the following to prevent completion of the installation without further approval or use of the equipment provisions for other purposes:

The equipment to which these provisions apply may not have been certificated. Additional approval by the Authority is required for the installation of this equipment which must be evaluated to ensure satisfactory compliance with the applicable airworthiness standards.

5. The STC holder is to give permission to the operator to install the STC and to maintain a register of users of the STC for the purpose of forwarding continuing airworthiness information. Include the following note in every STC:

If the holder agrees to permit another person to use this certificate to modify the product, the holder shall give the other person written evidence of that permission.

4.2.7 Written permission statement

The STC may only be installed if the registered operator has obtained the written permission of the STC holder to install the STC to their applicable aircraft. A statement to this effect should be included in the STC.

The STC holder is to provide written evidence if the holder permits another person to use the STC data to modify an aircraft, aircraft engine or propeller. This written evidence will be known as the 'permission statement'. In order for the form of the permission statement to be acceptable by CASA, it must, at a minimum, contain:

- a written statement of the agreement specifying product(s) to be altered
- the STC number
- the person(s) who is/are being given consent to use the STC
- any other information the STC holder desires (i.e. the effective date, how many times the STC may be used for fleets of aircraft, etc.)

4.2.8 Installer's responsibility

It is the responsibility of the installer, not the registered operator or the holder of the STC, to ensure that the STC can be installed in accordance with the supplied instructions. If this cannot be guaranteed, further engineering investigation and approval is required.

The installer must take into consideration that the particular aircraft may have other modifications or repairs installed that impact upon the incorporation of the STC. A statement to this effect should be included on the STC.

4.2.9 Additional information

More information may be listed if the STC holder so desires, such as the effective date and how many times the STC may be used for fleets of aircraft, etc.

4.2.10 Date of application

Include the date of application from the Form 733.

4.2.11 Date of issue

Do not give the STC to the applicant prior to this date.

4.2.12 Date reissued

An STC may be reissued only by CASA. Add the new date to those already shown every time the STC is reissued.

The date reissued is the date when the STC is transferred and reissued to another company or individual. An STC may be reissued to change the owner's name and/or address, to correct administrative errors or to replace a lost or destroyed original.

Any other changes to the certificate are defined as amendments.

4.2.13 Date amended

Add the amended date to those already shown every time the STC is amended. The date amended is the date when the STC is revised to update the model number, etc.

4.2.14 Signature and title

The STC is signed by the delegate.

4.2.15 Revision control

If the STC is more than one page, use a revision control system like that used for a TC (see item 27 - Revision Status in section 3.3.5.)

4.2.16 Continuation sheets

Use the CASA template for the Supplemental Type Certificate (Continuation Sheet) (Form 987) when additional space is needed to describe the design change and/or to include all the limitations and conditions, such as operation limitations, equipment installations, weights, etc.

Continuation sheets are printed on the current CASA approved certificate paper. Number the first and all continuation sheets and indicate the latest effective date of the STC, either the date of issue or the last date revised. Any data required that would be included on a TCDS for a TC should follow the same format as a TCDS, but should be included on the continuation sheets. (See section 3.3.4.)

4.2.17 Transfer of an STC

The procedures for an amendment (see section 3.2.3) or a transfer (see section 3.2.5) of an STC are the same as those for a TC.

4.2.18 Duration of an STC

An STC is effective until suspended or cancelled in accordance with regulation 21.118 of CASR.

The procedures for surrender or cancellation of an STC are same as those for a TC (see sections 3.2.6 or 3.2.7).

4.2.19 STC issue

When a determination is made that the design change complies with the regulations, the STC may be issued.

5. Manufacturing and engineering inspections and tests

Note: This chapter is to be read in conjunction with Chapter 5 of the Production Authorisation Procedures Manual (PAPM).

5.1 Manufacturing inspection personnel

This chapter provides the procedures and methods that should be followed by CASA officers performing manufacturing inspection duties. The applicant is responsible for conducting 100 per cent satisfactory conformity with the proposed type design data. CASA is responsible for ensuring inspections determine the applicant's compliance with subregulation 21.033 (2) of CASR and that products (e.g. aircraft, engines, propellers or components thereof) conform to the approved design drawings and specifications.

Coordination with the Project Manager concerning questionable design features and airworthiness considerations should be actioned as soon as possible. When a CASA officer is requested to witness conformity inspections, the necessary instructions in accordance with procedures are set out in this chapter should be provided by the Project Manager.

5.1.1 Functions and responsibilities

The CASA officer should be alert for any detail design feature that does not appear to comply with the applicable regulation. Particular attention should be given to:

- fits
- tolerances
- clearance
- interference
- ventilation
- drainage
- compatibility with other installations
- servicing
- maintenance.

Although the final design responsibility is vested in the appropriate engineering member(s) of the project team, the officer performing the manufacturing inspection duties determines that the applicant has satisfactorily established that the final product configuration conforms to the type design and is in a condition for safe operation including, as applicable, the issue of an airworthiness approval.

5.2 Request for Conformity and Type Inspection Authorisation

The applicant has the responsibility for presenting articles in conformity with the type design when CASA certification tests are to be performed or for the final ground and flight type inspections. The applicant is to submit Form 724 to CASA.

CASA will then conduct the conformity inspection to verify the applicant's claim of conformance and record the results on Form 882.

The TIA required ground and flight type inspections are to be performed by the responsible CASA staff indicated on the TIA to verify the applicant's claim of compliance with the applicable airworthiness standards.

For significant projects, a file may be created to contain:

- all Statements of Conformity
- all Conformity Inspection Records
- TIAs
- TIRs.

5.2.1 Statement of Conformity submittal

Applicants should be encouraged at type certification meetings to submit Form 724 as early as possible in the program to prevent delays in the type certification approval process. Except for 'in-process' evaluations, such as process review, hidden inspections etc. The Statement of Conformity should be submitted to CASA prior to the start of conformity inspections.

The person authorised under the quality system should sign the Statement of Conformity.

In cases where the conformity inspection is conducted away from the applicant's manufacturing facility, the applicant may choose to utilise one of the following procedures for signing the Statement of Conformity:

- The applicant may send an authorised representative to the manufacturer's facility to inspect the prototype article and sign the Statement of Conformity
- The applicant may delegate, in writing, a representative of the supplier to act as their agent. In this case, a copy of the authorisation letter will be attached to the Statement of Conformity when it is submitted.

5.2.2 Conformity determination by CASA

Conformity determination varies depending on the circumstances. An applicant's policies, quality control procedures, experience, inspection personnel, equipment and facilities will dictate the extent of conformity inspections to be conducted or witnessed by CASA. Due to differences between applicants, the conformity program should be adjusted to fit existing conditions. For example, in the case of an inexperienced applicant whose ability is unknown, it may be necessary for CASA to conduct a high percentage of conformity inspections until such time as CASA has confidence that reliance can safely be placed to a greater degree on the company inspectors. CASA may then gradually reduce inspection effort accordingly.

Applicants who have previously demonstrated the acceptability of their quality control system and, subject the prototype to these controls, should benefit by greater CASA confidence. In such cases, CASA conformity determination may be reduced by a form of sampling inspection of products and records. If sampling procedures are used, they should be based on nationally recognised standards, which establish a confidence level of 90 per cent or greater. A complete description of the procedure used should be part of CASA files.

Some applicants direct experimental and prototype parts through inspection channels that are distinct from the normal quality control system for production articles. In such cases, the applicant should provide detailed information on this inspection system to explain how it will provide assurance for conformity and document design changes for maintaining configuration

control. This type of information is essential so that CASA may develop the necessary conformity verification program.

Another factor that determines the degree of inspection and evaluation by CASA is the complexity of the product and its effect on air safety. This takes into consideration, for example, product designs using relatively new materials or methods of construction, manufacturing technologies, and destructive and non-destructive inspection techniques. In these cases, there may not be well-established or industry-wide recognised standards for assuring process and quality control. Consequently, the CASA conformity verification program should be adjusted accordingly.

Based on the circumstances mentioned above, the CASA officer performing the manufacturing inspection duties should develop, in coordination with the applicant, an appropriate conformity verification plan. The plan should focus on:

- verifying the conformity of the critical and major characteristics of materials, parts and assemblies.
- evaluating process controls to ensure production of consistent and uniform products. Statistical quality control methods may be utilised for process evaluation. Records of these activities and complete descriptions of such statistical methods should become part of the CASA file.
- observing tests of important functional parameters of systems, modules, components and completed products.

Areas of consideration

Regardless of the applicant's experience, CASA is responsible for determining that a complete conformity inspection has been performed by the applicant and that the results of that inspection are properly recorded and reported by the applicant on Form 724. In witnessing conformity inspections, the CASA officer performing the manufacturing inspection duties should consider the following:

1. Materials:
 - Were raw materials used in the fabrication process in conformity with the design data?
 - Is evidence available to ensure that chemical and/or physical properties were identified and checked as appropriate?
 - Is there documented evidence to show traceability from the raw material to the prototype part?
 - Are there any part or process deviations recorded against the submitted design data (including material review dispositions)?
2. Processes and processing:
 - Is there a process specification for each special process?
 - Has the process specification been submitted for engineering review by CASA?
 - Does a check of the articles processed indicate that the process will produce consistent parts during production in accordance with the type design?
 - Is there statistical or other evidence to indicate this?
 - Is the process being operated in accordance with the process specification?

- Are any deviations recorded?
3. Critical and major characteristics:
 - Has the applicant identified and inspected all of the critical and major characteristics?
 - Does the applicant have a record of these inspections?
 - Does witnessing the re-inspection and surveillance indicate that the above inspections were accurate and adequate?
 - Are there any deviations recorded against the submitted design data (including material review disposition)?
 4. Workmanship:
 - Does the workmanship contribute to the quality of the product?
 - Could the workmanship be duplicated under production conditions?
 - Have criteria been established to identify workmanship practices?
 5. Adequacy of drawings and related change records:
 - Can the part be produced and inspected using the information on the drawing?
 - Are drawing tolerances practicable and attainable under production conditions? What evidence supports this?
 - Have all of the changes been incorporated into the drawing submitted for approval by CASA (including one-time only deviations in the prototype article submitted for CASA testing)?
 - What procedure is used to ensure the incorporation of an engineering change in the production part and on the drawing?
 - Did the drawing include all of the characteristics necessary to inspect the part, the material to be used, the treatment of the material such as hardness and finish and any special process specifications?
 - Did the drawing include applicable test specifications?
 - Were these test specifications reviewed by the appropriate project team member(s)?
 6. Adequacy of inspection records:
 - Do the inspection records show all inspections that are conducted?
 - Do they show who conducted the inspection?
 - Do they indicate the results of the inspection and disposition of unsatisfactory conditions?
 - Are procedures adequate to ensure re-inspection of any parts that are reworked or replaced? (This includes inspection of installation of new parts as well as inspection of the parts.)
 7. Material review action:
 - Is the material review procedure documented and adequate to ensure disposition for non-conformities?
 - Is there adequate corrective action for observed non-conformities to prevent recurrence?

- Have 'use as is or 'repair' dispositions for non-conformities been submitted to CASA for engineering review and have they been incorporated in the type design (one-time only engineering orders)?
8. Previously produced parts:
- If the design specifies parts of previously type-certificated products and such parts are taken from production stock, were precautions taken to determine whether such parts may have been subjected to material review action?
 - Non-conforming parts should not be used unless it can be shown that they will have no adverse effects, or they are re-inspected to record all deviations for engineering evaluation.
 - Have the previously accepted deviations been made a part of the current design data submitted?
 - Are they listed by the applicant on Form 724?
9. Software:
- Are all software products (version description document, source code, object code, documentation, test procedures, loaded hardware/firmware, etc.) properly identified, including revision levels, when compared to the hardware and software engineering drawings?
 - Have all software problem reports been properly dispositioned?
 - Do the records indicate that all software products, including support software and procedures have been placed under configuration control?
 - Have the verification and acceptance tests been successfully executed in accordance with approved test procedures and recorded?
 - Are there records that indicate that the object code was compiled from released source code by approved procedures?
 - Do records indicate technical acceptance of the software, prior to loading into the system or product?
 - Does the product load correctly with released object code to released procedures?
 - Is the load verified per applicable procedures—e.g. check sums, cycle redundancy checks, load maps?
 - Does the software successfully execute the initialisation procedure?
 - Are there any indications of non-compliance with the manufacturer's procedures?

5.2.3 Conformity discrepancies

If the CASA officer performing manufacturing inspection duties finds discrepancies, they may be justified in requesting a complete re-inspection by the applicant. It is not intended nor recommended that the CASA officers performing manufacturing inspection duties personally conduct a complete conformity inspection of each part they record on Form 882. They should, however, witness the applicant's inspection of critical characteristics previously identified.

Inspection of large assemblies and subassemblies may be witnessed on a progressive basis to ensure that inspection of critical areas is witnessed by the CASA officers performing manufacturing inspection duties, prior to final assembly.

5.3 Processes

Design regulations require fabrication methods that will consistently produce conforming parts. All methods requiring close control to attain this objective must be covered by approved process specifications.

All such process specifications should be identified on the related drawings and thoroughly evaluated by the CASA officers performing manufacturing inspection duties and the Project Manager.

5.3.1 Method of presenting information

Process specifications should present information in an orderly and complete manner. The following outline can be used as a guide for checking the content of a typical process specification:

1. Scope
2. Applicable documents
3. Quality requirements
4. Materials used in the process
5. Manufacturing
 - Manufacturing operation
 - Manufacturing controls
 - Test specimen (construction)
 - Tooling qualifications
 - Tooling control.
6. Inspection
 - Process inspection
 - Inspection records
 - Inspection test
 - Inspection controls.

Note: The data submitted in any process for approval should not contain terms which are subject to various degrees of interpretation such as, 'adequate', 'as necessary', 'as required', 'room temperature', 'periodically' etc. Also, any tolerances that are required to control the process should be clearly defined.

5.3.2 Operations within processes

Since the usage of process specifications varies in the industry, the CASA officers performing manufacturing inspection duties should note those operations within processes, which will require surveillance during conformity checks. The process controls that are used to ensure that the quality of the articles being produced is within the type design limits should be

evaluated. Any deviations in these areas should be approved before they are used in processing articles.

5.3.3 Evaluation of processes

In evaluating processes, the CASA officer performing manufacturing inspection duties is primarily concerned with performance and conformity. Process performance should be capable of consistently producing articles that meet the requirements as specified in the type design.

- **Process conformity** is determined by checking the articles being processed to determine that they are being processed in accordance with the process specification and that the materials, tools and equipment required are being utilised. Since the end results depend on strict adherence to the process instructions, any deviation or discrepancy should be corrected on the initial runs. Use of statistical data is recommended to determine process capability.
- **Product conformity** is determined by inspecting the processed articles. A determination should be made by the applicant that the process operations are capable of consistently producing articles in conformity with the design requirements. The method used in determining this fact should be measurable and required by the process specification.

5.3.4 Process submittal

Early in the program (at TCB meetings), applicants should be encouraged to develop their process specifications as approved data (see Review of Drawings, Specifications and Reports and Data Approval in section 2.8.2). The applicant should also be reminded that the TC cannot be issued until all processes have been reviewed.

Process specifications in the type design data may be submitted under Form 979 (see data approval in section 2.8.2).

Major changes, amendments, etc. to the process should be carefully evaluated by the project team to determine what effect these will have on the quality of the end products. In some cases, this may require a re-inspection of the operations depending upon the extent of the changes.

5.3.5 Process phase evaluation

The CASA officer performing manufacturing inspection duties, in collaboration with the Project Manager, can recommend approval or rejection of the process after the following five phases have been completed:

- | | |
|----------|---|
| Phase I | The CASA officer should evaluate the basic information of the process. It is important to see that the process information is presented in an orderly and complete manner. Otherwise, it may lead to misinterpretation and confusion, causing the quality of the end articles to vary outside the type design limits. |
| Phase II | The CASA officer should review the actual process and the process specification for the variables that must be controlled to ensure a conforming and consistent product. Variables may exist in many of the factors, which affect the product quality such as: |

- raw materials used to fabricate the end item
- equipment used to fabricate the part
- production facilities and environment
- inspection and test equipment
- production operators.

Phase III The CASA officer should verify that the process specification identifies the necessary controls over the variables. These controls should establish the units of measure and acceptance limits, a description of the measurement techniques and action to be taken when the actual measurement does not meet acceptance standards.

Phase IV The CASA officer should verify that the articles being processed are being processed in accordance with the process specification and that the material, methods, tools and equipment required are being utilised. Since the end results depend on strict adherence to the process instructions, any deviation or discrepancy should be corrected in the initial runs.

Phase V Since the inspection of the processed articles is the main point of any process evaluation, the CASA officer should make a determination that the process operations are capable of consistently producing articles in conformity with the type design requirements. The method used in determining this fact should be in accordance with the quality plan. If the process is followed, all parts produced should be of equal quality.

5.3.6 Non-destructive inspection method evaluation

The procedure for evaluating a non-destructive inspection method is similar to the process phase evaluation. However, the applicant should demonstrate to the satisfaction of the CASA officer performing manufacturing inspection duties that:

- the non-destructive inspection method used has the capability to detect the allowable defect size and location specified by the engineering drawing
- the inspection results are repeatable
- the instruments required to perform the inspection meet the procedural acceptability requirements.

5.4 Testing

5.4.1 Witnessing official tests

Official CASA tests, such as static, endurance, operational, pressure, environmental etc. are normally witnessed by the appropriate specialist or Project Manager. However, certain tests may be witnessed by a CASA officer performing manufacturing inspection duties as requested by the Project Manager. In such cases, the Project Manager should provide the officer with the appropriate instructions and a reference to the applicant's test proposal report.

5.5 Test articles

Prior to initiating conformity inspection activity for test articles, it is essential that the applicant, the Project Manager and the CASA officers performing manufacturing inspection duties have a clear understanding of the test article configuration, test equipment configuration and expected results. This information should be submitted by the applicant to the Project Manager in test proposal reports.

5.5.1 Structural test articles—aircraft

Conformity determination

Determining conformity of structural test articles is an essential phase of the type certification program. The CASA officers performing manufacturing inspection duties should list all drawings that were used in the definition of the article and detect and report any non-conformities. All non-conformity conditions should be recorded on CASA Conformity Inspection Record (form 882). (The CASA Conformity Inspection Record [form 882] is contained in the Production Approval Procedures Manual.)

Conformity inspection

CASR Part 21 Subpart B requires the applicant to allow the Authority to perform conformity inspections on structural test articles during fabrication and assembly and that the CASA Statement of Conformity (form 724) be submitted to the Authority prior to testing. Additionally, Subpart B requires that the final design submitted for approval by the Authority must reflect all changes that have been found necessary as a result of the test and that the configuration control system ensures that all changes are incorporated into the production drawings. Only in this manner can the Authority be certain that subsequent production articles conform to the tested articles. (The CASA Statement of Conformity [form 724] is contained in the Production Approval Procedures Manual.)

Non-conformities

It is strongly recommended that, due to the different effects of non-conformities on structural test articles versus flight articles, parts and assemblies destined for official structural testing should be clearly identified. This should be necessary only in those cases where structural test articles are being fabricated concurrently with prototype flight articles. It is important that, once parts and assemblies have been subjected to structural testing beyond limit load testing, they be clearly and permanently identified to prevent their use in production products.

5.5.2 Prototype flight test articles—aircraft

Conformity determination

Determining conformity of prototype flight test articles, including system checks, should begin during fabrication. Form 724 must be submitted by the applicant to CASA before prototype flight articles are released for CASA flight test.

Non-conformities

Any non-conformities described under deviations should be brought to the attention of the Project Manager for evaluation and decision as to their effect on safety and the validity of the test under consideration.

5.5.3 Endurance test articles—engines and propellers

Conformity determination

As in the case of aircraft, determining the conformity status of test engines and propellers is an important phase of the type certification program. Only parts subject to distortion, fatigue and wear are inspected for conformity and witnessed by the CASA officer performing manufacturing inspection duties prior to, and after, the endurance test.

Prior to the endurance test, the CASA officer performing manufacturing inspection duties should coordinate with the Project Manager to identify the parts subject to inspection. The CASA officer should note the condition of all surfaces subject to distortion, fatigue and wear and record the actual dimensions. These and other critical parts should be serialised or otherwise positively identified for pre-test and post-test comparison. Subpart 21.B of CASR requires that Form 724 be submitted by the applicant prior to the start of the CASA test.

Conformity inspection

At the conclusion of the endurance test and tear-down inspection, the CASA officer performing manufacturing inspection duties should spot check conformity of major and critical parts by witnessing the applicant's inspection, giving particular attention to critical characteristics.

5.5.4 Post-test evaluation

Complete dismantling and inspection of test articles after structural testing may be required and is a specific requirement of Parts 33 and Part 35 of CASR after endurance testing. These activities should be witnessed by the CASA officer performing manufacturing inspection duties and the Project Manager. The applicant should not clean or disassemble the test article until the CASA officer performing manufacturing inspection duties is present, at which time the applicant's inspection should be conducted as follows:

1. Verify that the applicant carefully notes the appearance of sub-assemblies during the dismantling and before complete disassembly. The applicant should specifically note any:
 - abnormal leakage in valves, seal, fittings, etc.
 - indication of excessive or lack of lubrication
 - excessive coking
 - metal or foreign particles in the oil screens or passages
 - sticking or breakage of parts
 - lack of freedom of moving parts
 - breakaway torques
 - other condition that may not be noticeable until after complete disassembly and cleaning.
2. Verify that all parts are thoroughly cleaned and visually inspected for indications of galling, metallic pick-up, corrosion, distortion, interference between moving parts and cracks.
 - Highly finished surfaces should be checked for condition and discoloration due to excessive heat and lack of lubrication.
 - Special attention should be given to bearings, gears and seals.

- Engine pistons, cylinder heads and turbine assemblies should be carefully inspected for indications of cracking or burning.
- 3. Verify that both ferrous and non-ferrous stressed parts are inspected for incipient failures by suitable non-destructive testing methods such as magnetic particle inspection, x-ray, penetrant, ultrasonics, etc., in accordance with the test plan.
- 4. Verify that all parts subject to wear or distortion are dimensionally inspected to determine the extent of change during the test. This may be done by pre-test and post-test dimensional comparisons. The results should be suitably recorded by the applicant.
- 5. On completion of steps 1 to 4, the applicant's inspection report, as verified by the CASA officer, should be submitted to the Project Manager. This report should contain the results of the inspection, giving a comprehensive description of all defects, failures, wear or other unsatisfactory conditions including photographs as required.
- 6. Also ensure that questionable parts are identified and retained by the applicant in safe storage for review by the Project Manager and appropriate airworthiness specialists.

5.6 Use of engineering data

Applicants should be encouraged to submit, for conformity inspection purposes only, those drawings that may readily be expanded into final production drawings.

However, when a product is undergoing development, it is realised that this may not always be practical and it may be necessary to inspect engineering layouts or even sketches. In such cases, the applicant should be advised that it may be necessary to conduct a complete conformity inspection on the first production article using not only approved production drawings, but also original sketches and layouts prior to TC or STC approval.

As an alternative, if the applicant can show that they have a system whereby the original sketches and layouts are incorporated into the production drawings, then this double conformity inspection would not be required prior to type design approval.

The CASA officer performing manufacturing inspection duties may require additional validation when products are submitted for airworthiness certification or approval to ensure that they are representative of the test articles.

5.7 Ground inspection - aircraft

5.7.1 Purpose

The ground inspection is the final inspection of the complete prototype and should be performed just prior to the CASA flight test to determine that the aircraft submitted for the CASA flight test is representative of what a production aircraft should be:

- loaded correctly
- properly instrumented
- safe for the intended flight test.

5.7.2 Process

On notification from the applicant that the aircraft is ready for inspection, a completed Form 724 should be obtained from the applicant. This is the applicant's notification and commitment that the aircraft is ready for inspection and flight test by CASA.

To give CASA flight test personnel sufficient time to prepare for the flight test program, they should be notified by the Project Manager when the ground inspection is to be started. The applicant should prepare the aircraft for inspection, providing all necessary assistance, equipment and data essential for the inspection. The applicant should also not perform any work on the aircraft without the agreement of CASA.

Note: CASA personnel are not authorised to perform any mechanical work on the aircraft.

If unsatisfactory conditions are revealed, they should be referred to, and discussed with, the applicant's representatives. The CASA officer performing manufacturing inspection duties should exert every reasonable effort to promote communication and coordination for the activity between the applicant and CASA. Actual operation of the particular system should only be actioned by the applicant's personnel.

CASA should also be satisfied that the weight and balance data is accurate and suitable for the tests. It is satisfactory to perform a weighing (especially for the specific test) both before and after test, rather than to compute changes from earlier data supplied by a Weight Control Officer. The presence and location of equipment installed, including test equipment, should be verified before each flight test. A copy of the weight and balance report should be retained by the flight test engineer.

Note: It may be necessary to verify weights and moment arms of equipment items.

When the aircraft has been returned to flight status after completion of the inspection, it is the CASA officer's responsibility to ensure that the aircraft is airworthy and ready for flight testing. This includes a determination that all unsatisfactory items requiring correction prior to CASA flight test are rectified. All non-conformities should be coordinated with the Project Manager prior to releasing the aircraft to CASA flight test.

The assigned CASA officer should be aware of the TIA requirements and the operation of the aircraft and its systems to ensure the safe completion of the TIA mandated flight test.

The initial acceptance of the test aircraft for CASA flight testing should be made by the CASA officer performing manufacturing inspection duties based on the determination of the aircraft condition for safe operation and the testing to be conducted. The CASA officer performing manufacturing inspection duties and the flight test pilot should establish a mutually agreeable system for informing the Project Manager of daily changes to the aircraft and any problems encountered during flight test. Cooperation between the assigned CASA officer and flight test pilot is crucial to the safe and professional completion of the flight testing.

The CASA flight test pilot should not fly a test aircraft without coordinating with the assigned CASA officer or the Project Manager, as previously approved by the CASA officer performing manufacturing inspection duties, to ensure that the aircraft has been released for flight. This should not be construed to prohibit multiple flights so long as the assigned CASA officer performing manufacturing inspection duties has reviewed all of the planned aircraft configurations for the desired test, conducted any necessary inspections and has coordinated this information with the CASA flight test pilot.

The final acceptance of the test aircraft for flight is made by the CASA flight test pilot, as it relates to the operation of the aircraft and the integrity of the test. In this phase, the coordination with the CASA flight test specialist is of high importance.

5.7.3 Instrumentation

Instruments, gauges, recording devices, etc., which are used in the official flight test should be in current calibration by a qualified agency and affidavits supplied. Copies of the affidavits should be given to the flight test pilot prior to flight.

It is the responsibility of the CASA officers performing manufacturing inspection duties to determine that the equipment is properly installed and safe for operation. Additional functional tests may be required after installation.

5.7.4 Flight loadings

The CASA officer performing manufacturing inspection duties should determine that the various loading conditions specified by the flight test specialist are carried out by the applicant. This includes a determination that the ballast used is accurately weighed, located and safely secured.

5.7.5 Periodic safety checks

Throughout the CASA flight test program, the CASA officer performing manufacturing inspection duties should determine that the applicant has a plan to ensure that the aircraft is given adequate inspection to reveal any unsafe conditions that may develop and require correction prior to further CASA flight testing. The frequency and extent of such checks should be coordinated with the CASA officer performing manufacturing inspection duties who should participate in the checks whenever practicable to determine compliance. The CASA officer performing manufacturing inspection duties and the flight test specialist should have a system of informing each other of daily changes to the aircraft and problems encountered during flight test.

5.8 Airworthiness certification of prototype products

When a potential type certification project becomes known to CASA, the CASA officer performing manufacturing inspection duties should determine whether the applicant will seek a CofA for the prototype product. If so, the applicant should provide for conformity inspection by CASA at the start of parts fabrication.

The applicant should also be informed that Subpart 21.B of CASR requires that all changes found necessary as a result of the test program are to be incorporated in the prototype, and complete conformity with the type design will be required.

CAUTION: If this is not done progressively, extensive disassembly, modification and inspection may be necessary prior to airworthiness approval.

5.8.1 Aircraft

The airworthiness certification of an aircraft should be processed in accordance with Part 21 of CASR. The CASA officer performing manufacturing inspection duties should ensure that the prototype satisfactorily incorporates all required changes and that a final CASA Statement of

Conformity (Form 724), is obtained. When applicable, the CASA officer should also review the final TCB report to determine that all outstanding items recorded have been resolved.

5.8.2 Engines and propellers

Airworthiness approval of prototype engines and propellers should be handled in a similar manner as aircraft, in that a final Statement of Conformity should be required for each product prior to test.

Engines or propellers that are not yet type-certificated, and which are supplied for use on experimental aircraft, may need to be modified to conform to their approved type design and to be properly identified. Under these circumstances, the CASA officer performing manufacturing inspection duties should be fully aware of the approval status of the engines or propellers originally supplied as well as the modifications necessary to bring them up to fully approved status.

If the work is to be performed at the aircraft manufacturer's plant, a list of these modifications (with copies to CASA offices concerned) should be supplied directly to the CASA officer.

The modification list should have a statement signed by the manufacturer at the source, certifying that:

- the engine or propeller originally supplied was modified in accordance with the manufacturer's instructions
- it has been satisfactorily inspected
- it conforms to the type design.

Any replacement or newly designed parts furnished to the aircraft manufacturer should be accompanied by release documentation

The modification work should be performed by, or under the personal supervision of, a representative of the engine or propeller manufacturer.

5.9 Accounting for engineering changes

The applicant should establish a procedure to inform the CASA officer performing manufacturing inspection duties of all changes that are made to parts, assemblies or complete products during the type certification program. This is important once such items have received manufacturing inspection clearance so that the CASA officer should have the opportunity to witness conformity of the changes as necessary.

When changes to previously inspected items are checked for conformity, they should be reported on Form 882. When checked in connection with a ground inspection, the results should be reported on the TIR, if it is affected. For example, if the previously inspected TIR items were originally found to be unsatisfactory and change renders them satisfactory, that fact should be reported. If the previously inspected TIR items were originally found satisfactory and the change appears to make them unsatisfactory, that should also be reported together with a suitable explanation of the condition.

The CASA officer performing manufacturing inspection duties should determine that satisfactory procedures are in effect for assuring that all changes required in the test and prototype articles are incorporated into production drawings.

5.10 Function and reliability testing

5.10.1 Purpose

Function and reliability testing is an evaluation of the operation and reliability of a new aircraft type prior to entering service. This is usually only required for the following type of aircraft:

- new transport category
- sophisticated
- novel normal
- commuter category.

Note: Should such testing be required for an Australian-designed aircraft, refer to section 22 of AC 21-13. FAA Order 8110.4C may also be used as a guide.

5.11 Conformity inspection record keeping

All conformity inspections conducted, or tests witnessed, by the CASA officer performing manufacturing inspection duties should be reported on the CASA Conformity Inspection Record (Form 882), and include all discrepancies, non-conformities and corrective actions.

5.11.1 Resolution of unsatisfactory or non-conformity items

The Project Manager should determine that all unsatisfactory or non-conformity items reported should be resolved between the CASA officer performing manufacturing inspection duties and the applicant prior to the completion of the TIR.

All corrective actions should be listed on Form 882, which should become an attachment to the TIR.

5.11.2 Supplemental type inspection report

For complex STCs, ground and flight type inspection reports may be required as for a TC application, but limited to those items appropriate to the STC. These reports are to be completed in a similar manner to those for a TC.

6. Miscellaneous Type Certification Information

6.1 Restricted category aircraft

Restricted category aircraft are certificated by CASA in order to conduct certain special purpose operations defined by CASA. Paragraphs 21.025 (1) (a) and (b) of CASR provide for the issue of TCs in the restricted category for civil aircraft and for surplus military aircraft respectively.

Subparagraph 21.025 (1) (a) (i) addresses civil aircraft that meet the airworthiness requirements of an aircraft category except those requirements found inappropriate for the particular special purpose operation for which the aircraft is to be used. The type certification and production certification procedures for these aircraft are the same as those for other types of civil aircraft. CASA approval of these aircraft is based on compliance with the applicable airworthiness standards.

Subparagraph 21.025 (1) (b) (ii) of CASR addresses surplus military aircraft, modified for a special purpose operation, that were manufactured in accordance with the requirements of, and accepted for use by, the Australian Defence Force (ADF), or an armed force of Canada, the United Kingdom or the United States of America. Both functions are required to ensure that individual aircraft were designed to military design requirements and also are in conformity with the accepted configuration. These aircraft may be manufactured either in Australia or in a foreign country. Type certification of surplus military aircraft is primarily based on military records and service history. These types of aircraft may be:

- manufactured for the restricted category
- aircraft that have been type-certificated in another category and altered for a special purpose operation
- a surplus military aircraft altered for a special purpose operation.

Note: Surplus military cargo aircraft may not need an alteration when the special purpose is the carriage of cargo.

Because these aircraft have not been shown to meet standard category airworthiness standards, they have numerous restrictions. These restrictions are implemented through the operating limitations attached to the CofA, as well as operating limitations in the regulations themselves. These regulatory operating limitations include prohibit:

- operations over densely populated areas
- operations in congested airspace
- operations near a busy airport where passenger transport operations are conducted
- the carriage of persons or the carriage of property for compensation or hire.
 - The only persons allowed on board are those who are required for the flight being conducted under the special purpose operation for which the aircraft is approved.

6.2 Restricted category type certification of civil aircraft

Under paragraph 21.025 (1) (a) of CASR, aircraft manufactured for the restricted category or aircraft that have been type-certificated in another category and altered for a special purpose operation must meet the applicable airworthiness standards, the applicable noise and emission requirements (administered by Airservices Australia) and it must be shown that no feature or characteristic of the aircraft makes it unsafe when operated under the limitations prescribed for its intended use. The type certification procedures for standard aircraft apply here except for the guidance provided below:

- The level of certification and the levels of safety may be reduced from that for aircraft meeting the airworthiness requirements of a standard aircraft category. However, through operating limitations and operating rules, equivalent levels of safety must be maintained for the public. This policy is not intended to eliminate any type certification procedural requirements, such as the need to address continued airworthiness.
- The basic airworthiness requirements that are inappropriate for the special purpose operation for which the aircraft is to be used may be waived or modified. The Project Manager is responsible for determining those airworthiness requirements that are inappropriate for the special purpose operation for which the aircraft is to be used.
- Any reduction in the level of safety from that defined by the appropriate airworthiness standards must be based on requirements found inappropriate for the special purpose, modified requirements which are not entirely appropriate, or an operating environment less stringent than that envisaged by the appropriate standards.
- Regulation 8 of CAR / Civil Aeronautics Manual 8 is not an acceptable airworthiness standard for current type certification programs. It is only acceptable when the requirements are appropriate for alterations of small agricultural aircraft that were originally type-certificated to those standards.
- For aircraft type-certificated in dual categories (such as restricted and normal), the certification activity for the restricted category must not permit degradation of the aircraft for use in the normal category.
- The certification basis for an aircraft, being altered for a special purpose operation that was previously certificated in a standard category, is the original certification basis, except for the airworthiness requirements CASA determines are inappropriate for the special purpose operation. Exceptions are made to the extent that an appropriate level of safety for the public is maintained. It is never acceptable to waive a rule merely because the applicant cannot show compliance.

6.3 Restricted category type certification of surplus military aircraft

Under paragraph 21.025 (1) (b) of CASR, the type certification program for surplus military aircraft being type-certificated in the restricted category consists of evaluating the type of aircraft to determine that they are acceptable for civil certification. In addition, the following items need to be considered:

- The following data is required:
 - complete historical and modification records
 - original identification plate

- Technical Orders
- maintenance manuals, including current list of life-limited parts
- AFM
- structural repair manuals
- illustrated parts catalogues
- continued airworthiness instructions for the aircraft.
- The alteration for the special purpose operation must be approved in accordance with the type certification procedures for major changes. The certification basis for this alteration could be provided by regulation 21.027 of CASR, or the appropriate airworthiness standards in accordance with regulation 21.101 of CASR, and any special conditions pursuant to regulation 21.016 of CASR, as necessary.
- The aircraft must comply with the applicable noise and emission requirements (administered by Airservices Australia) and it must be shown that no feature or characteristic makes the aircraft unsafe when operated under the limitations prescribed for its intended use.
- The aircraft must be in conformity with the data presented for both the basic aircraft and the alteration.
- There must be provisions for the continued airworthiness of the aircraft. When an AD is issued for a restricted category surplus military aircraft, all of the restricted category TC holders of that model should be listed on the AD as applicable.
- When issuing a restricted category TC for a surplus military aircraft, provisions for the continued airworthiness of the aircraft and the following notes must be incorporated into the TCDS:
 - This aircraft is prohibited from carrying cargo for compensation or hire. Carriage of cargo is limited to such cargo that is incidental to the aircraft owner/operator's business which is other than air transportation.

Note: This note applies to aircraft that have the special purpose 'carriage of cargo'.

- Restricted category aircraft may not be operated in a foreign country without the express written approval of that country.
- This aircraft has not been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation.

6.4 Restricted category - special purpose operations

Paragraph 21.025 (2) (k) of CASR provides for special purpose operations that are not already listed in subregulation 21.025 (2). Proposals for establishing new special purpose operations under subregulation 21.025 (2) (k) of CASR should be submitted to Aircraft Certification. Each proposal should include information, views and arguments to substantiate the need for the proposed special purpose operation for:

- evaluation of the proposal
- soliciting public comment
- making a determination.

6.5 Factors for multiple-category airworthiness certification

For aircraft operating with a CofA in two or more categories, Standard and Restricted, conversion instructions should be provided during the type certification program. When converting the aircraft from restricted to standard category, the continued airworthiness (including life-limited parts, ADs and corrosion or structural damage) must be addressed. Factors that may be important for this evaluation are:

- areas and types of operation conducted, including unusual operating environments and conditions
- surface conditions of the airports used
- nature of the cargo carried
- aircraft operations with maximum weights exceeding that of the standard category.

6.6 Type certification of surplus ADF operated military aircraft

Surplus military aircraft of the ADF may be type-certificated in normal, utility, acrobatic, commuter or transport categories if they meet the relevant type certification requirements.

6.6.1 Compliance for Australian-designed aircraft

For an aircraft that was designed and manufactured in Australia and operated and then declared surplus by the ADF, or an armed force of Canada, the UK or the USA, the applicant must show compliance with the appropriate regulations in effect when the aircraft was accepted for operational use by the ADF (refer to subregulations 21.027 (1) and (6) of CASR).

6.6.2 Compliance for foreign aircraft operated by the ADF

Under subregulation 21.027 (2) of CASR, the applicant must show compliance with the regulations governing the original civil aircraft TC for the surplus aircraft of the ADF that is a counterpart of a previously type-certificated civil aircraft. Some surplus military aircraft have civil counterparts and may be listed on the civil TCDS with information concerning modifications required to make them eligible under the civil TC.

6.6.3 Special conditions

Special conditions and later requirements may be imposed under subregulation 21.027 (5) of CASR.

6.6.4 Engines, propellers and related accessories approval

Engines, propellers and their related accessories will be approved for use on these aircraft if the applicant shows that on the basis of military qualification, acceptance and service record the product provides substantially the same level of airworthiness as would be provided by Parts 33 and 35 of CASR.

6.6.5 Equivalent level of airworthiness

CASA may relieve the applicant of strict compliance with appropriate civil aviation regulations under subregulation 21.027 (4) of CASR if the method of compliance proposed by the

applicant provides the same level of airworthiness as the CASRs. CASA may use ADF experience in making such a determination.

6.7 Noise certification

Noise certification for individual aircraft is required in Australia before the aircraft can legally operate in Australian territory. Aircraft noise is regulated through the Air Navigation (Aircraft Noise) Regulations, introduced in 1984 under the *Air Navigation Act 1920*.

Noise certification, or lack of such certification, has no legal impact on type certification or individual CofA issue. Whereas in some other countries, such as the USA, noise certification is an integral part of the type certification program. However, if an individual aircraft does not meet the Australian noise requirements, it is illegal for that aircraft to operate in Australian territory, even though the aircraft may have a valid CofA.

Prior to the processing of the first CofA for the type, the manufacturer/TC holder must complete formal noise testing for long-term operation of the type in Australia. Noise testing requirements for normal light aircraft are as contained in Chapter 10 of Annex 16, Environmental Protection to the Convention on International Civil Aviation (*the Chicago Convention*).

For CAO 101.55 aircraft, the requirements are laid down in subsection 9 of CAO 101.55. Airservices Australia will normally witness or carry out normal light aircraft noise testing, but this is not necessary for CAO 101.55 aircraft. However, all results must be passed to the Environment Monitoring Branch of Airservices, which will ultimately issue the noise certificate to the manufacturer/TC holder.

In the event that a long-term noise certification cannot be granted at the time of the initial application, then the Environment Monitoring Branch of Airservices Australia may, as an alternative, issue a 'Permission to Operate' under subregulation 9A (2) of the Air Navigation (Aircraft Noise) Regulations. This may be on a limited duration/restricted route basis and could be aligned to the terms of the experimental certificate of the test aircraft.

The applicant should contact the Manager of Environment Monitoring, Airservices Australia via environment@airservices.gov.au.

6.8 Flight Test

6.8.1 General responsibilities

CASA flight test personnel are responsible for completion of type certification flight tests and evaluation of engineering data on new or modified aircraft pertaining to performance, flight characteristics, operational qualities, equipment operations and the determination of operational limitations, procedures and information. Particular attention and emphasis are to be given to the entire system in which a flight crew and the aircraft must operate. The system includes not only the flight crew and the aircraft but airports, air navigation facilities, the air traffic system, the safety rules and operating procedures as well as environmental factors (i.e. weather).

Note: CASA conducts flight tests only for the purpose of verifying compliance with the applicable airworthiness standards. All experimental and developmental flight testing, and the flight testing to prepare the flight test reports submitted to CASA claiming compliance with the applicable airworthiness standards, is the responsibility of the applicant and the applicant's flight test personnel. The CASA test pilot is not the experimental or developmental test pilot.

6.8.2 Specific responsibilities

CASA flight test personnel are responsible for:

- reviewing the applicant's flight test report (refer to paragraph 21.035 (1) (d) of CASR)
- reviewing the applicant's objectives for the flight test to ensure a determination of compliance can be made
- determining that test instrumentation, other required equipment, including flight crew safety equipment and emergency egress provisions, and aircraft test configuration are acceptable for the proposed flight tests
- determining if flight test tasks may be delegated to an authorised person
- conducting the preflight briefing to obtain final agreement on test procedures, test cards and test sequence to ensure that the aircraft is ready for flight test, and to determine that the test environment, including weather considerations, is satisfactory for flight test
- conducting and directing flight tests in accordance with the TIA
- participating in the post-flight debriefing
- analysing and approving the flight test data
- reviewing and coordinating the AFM or revisions to the AFM
- preparing and coordinating the TIR
- ensuring that a flight test risk management process is followed (The CASA Flight Test and Evaluation Procedures Manual may be used as a guide.)

6.8.3 Specific qualifications

Qualification on test aircraft

For type certification testing of prototypes, the applicant is expected to provide, as a part of the flight test program, the necessary first pilot checkout qualification flight time for CASA flight test pilot(s) assigned responsibility for the project. If additional CASA pilots not assigned

directly to the project need qualification flight training in a manufacturer's prototype, or in first production models, arrangements will be made with the applicant.

Familiarisation flight time on new models

Familiarisation flying may be arranged for additional CASA flight test pilots as a part of functional and reliability testing, production testing, or during extensive type testing provided it does not impose an additional burden on the manufacturer or interfere with the conduct of the required compliance tests.

Flight crew rating qualification during TC/STC tests

When determining compliance with the general controllability and manoeuvrability requirements, include the applicable flight crew competency tests and manoeuvres. These will be required for type certification projects that involve a new design or major STC projects that significantly modify flight characteristics or procedures. The required competency tests and manoeuvres are those which are required of a pilot to be competent to operate the aircraft in the kind of operation(s) and atmospheric conditions for which it will be approved.

Flight crew competency manoeuvres

The flight crew competency manoeuvres and minimum crew evaluation should be developed in coordination with any assigned flying operations inspector during the type certification program, to ensure satisfactory determinations of speeds, handling characteristics, procedures and systems operations for such manoeuvres and the adequacy of the proposed minimum flight crew.

Additional type ratings

During development of the type certification program, the appropriate flight test pilots shall receive additional certificate or type rating flight checks in the subject aircraft.

6.8.4 Actions prior to official type tests

Official flight tests

Official flight tests, including authorised person flight tests, will not be started until a TIA or an equivalent flight test authorisation has been issued. The CASA flight test pilot shall not fly a test aircraft without coordinating with the assigned CASA officer performing manufacturing inspection duties.

All official tests will be conducted in accordance with the restrictions and/or limitations stated in the TIA or the CofA that are necessary to safely conduct the tests and to determine compliance with the regulations applicable to the model being tested. The TIA may be phased or issued in increments to ensure basic airworthiness and systems safety has been established before proceeding to the next phase.

Conformity of test article with type design

Prior to starting any official approving flight tests, the responsible test pilot for the project and ground inspection personnel should verify that a conformity inspection has been conducted to ensure that the aircraft is in conformity with the type design appropriate for completion of the tests and in satisfactory airworthiness condition. Any non-conformities will be documented and flight tests will not be started until a release has been issued by the appropriate TIA issuing office and the flight test pilot has been notified.

Checkout on test aircraft

The assigned project test pilot(s) is/are to arrange with a responsible official of the applicant's organisation for an adequate and agreed upon checkout in the applicant's aircraft. The checkout must be completed prior to CASA pilot(s) conducting any official flight tests requiring action in an official flight test pilot capacity.

Command pilot

The pilot-in-command is the applicant's pilot (except for single place aircraft). The CASA pilot should emphasise the pilot-in-command responsibility as part of the preflight briefing.

Spin recovery parachutes

Spin recovery parachutes must be installed on all aircraft requiring spin testing for certification. Such installations may be required for other high angle of attack tests on aircraft where inadvertent spins or deep stalls are likely during testing.

Other types of spin recovery devices such as anti-spin rockets may be considered when proposed by the applicant. However, such systems have many unknown characteristics that would require considerable engineering research and wind tunnel testing. The tail-mounted spin recovery parachute system has been proven to be an effective spin recovery system and is the preferred system.

Further information is available in AC 21-47.

Emergency provisions

The project test pilot(s) should make sure all necessary safety equipment is provided and that all crew members are fully briefed and familiar with the use of this equipment. The pilot(s) should anticipate the possible emergencies that could occur for a particular test phase and outline crew duties in the event that an emergency is encountered.

Aircraft characteristics for air traffic control

The project test pilot should ensure that the applicant has provided specific aircraft identifier and performance information.

Risk management process

The TIA should reflect adherence with a risk management process (The CASA Flight Test and Evaluation Procedures Manual may be used as a guide).

6.8.5 Test flight planning

Each test flight should be carefully planned prior to actual flight. A written schedule of what will be done during the test should be agreed on by the applicant and CASA flight test personnel. The agreed schedule should indicate the applicable CASRs to which the flight tests are being conducted.

6.8.6 Hazardous flight tests

CASA flight test personnel are not authorised to participate in or conduct potentially hazardous flight tests until the applicant has successfully performed these tests and submitted a written report.

6.8.7 Certification flight hours

Certification flight test time is recorded by the CASA flight test crew (pilot and/or engineer) as part of the TIR. The TIR should include all flights during which a CASA crew member is conducting required evaluations, including flight to and from local test areas, flight in the traffic pattern, etc.

The TIR also includes time required to conduct or witness systems evaluations and other certification tests, regardless of whether a CASA pilot is at the controls. Initial pilot familiarisation may be considered official test time even though no specific tests are conducted.

Certification flight time does not include ferrying to remote areas or tests conducted for purposes other than determination of compliance, regardless of whether a CASA pilot is at the controls.

7. Type acceptance certificates

7.1 Background

Regulation 21.029A of CASR allows CASA to automatically issue an Australian TAC for an aircraft type that has a current TC issued to it by the NAA of one or more of the recognised overseas authorities listed in regulation 21.010A and 21.010B of CASR. Some of these countries may not use the term 'Type Certificate', but may use 'Type Approval Certificate', 'Certificate of Type Approval', 'Fiche de Navigabilite' etc.

The TAC is issued in respect of the aircraft type itself in recognition of the type and model being type-certificated by the recognised NAA. There is no TAC certificate holder. However, the original of the TAC is sent to the foreign TC holder as a courtesy. AC 21-30 provides applicants with guidance for the issue of a TAC using automatic acceptance procedures.

The foreign NAA that issued the original TC or equivalent document will be regarded as the relevant NAA for airworthiness control of the aircraft listed on that certificate.

Note: This automatic acceptance procedure does not apply in situations where the NAA of a recognised country has issued a TAC or similar document on the basis that the NAA of another country has issued a TC (refer to paragraph 21.041 (1) (b)).

Prior to the introduction of regulation 21.029A, CASA automatically issued a Certificate of Type Approval (CTA) under regulation 22A of CAR for certain aircraft from recognised countries.

Regulation 202.050 of CASR allows a CTA, that was issued under regulation 22A of CAR, was in force before 01 October 1988, and continues to be in force, to be recognised as if it was a TAC issued under regulation 21.029A of CASR (subregulation 202.050 (2) of CASR refers). Any CTA issued under regulation 22A of CAR (that is still in force) remains subject to any conditions imposed under that approval (refer to subregulation 202.050 (3) of CASR refers).

Note: There may be a requirement to amend or re-issue a CTA. Procedures for the conversion and re-issue of a CTA to a TAC are defined in section 7.2.7 of this manual.

7.1.1 CofA categories

CofAs will usually be issued in the same category available under the foreign TC, subject to a review by CASA of the foreign certification basis, including any special conditions, waivers, exemptions, equivalent safety determinations etc. made by the foreign NAA.

In cases where the category is not specified on the TCDS, CASA will nominate the category deemed appropriate under the TAC. In this case, a Type Acceptance Certificate Data Sheet (TACDS) must be raised and the category entered on the TACDS.

7.1.2 Approval of imported aircraft engines and propellers

TACs are not issued for aircraft engines or propellers. Further information is contained in AC 21-22.

7.2 TAC process

7.2.1 Responsibility for issue

TACs are issued only by Aircraft Certification and signed by the CASA Delegate. Applications on a completed CASA TAC or TC for Imported Aircraft Application (Form 735) may be lodged directly with Aircraft Certification in Canberra or, if lodged at a CASA office, should be forwarded to aircraft.certification@casa.gov.au. Alternatively, applications may be lodged by letter or email, provided that the application contains the information required by Form 735.

The application should state exactly which models are to be included on the TAC. These models must be included on the foreign TC. Each model included on the TAC must be covered by the data requirements.

A TACDS is only issued if there is important information to be conveyed beyond that contained in the TCDS associated with the original TC, or special conditions have been applied in accordance with regulation 21.029B of CASR.

Specific reference on the TACDS may be required for restricted category aircraft, as the purposes of regulation 21.025 of FAR do not directly align with regulation 21.025 of CASR.

7.2.2 Establishment of a project

The following steps occur when an application for issue of a TAC is received in Aircraft Certification:

Clerical Administrator

1. Enter the task on the section database of certification tasks and allocate the project control number.
2. Acknowledge receipt of the application to the applicant in writing.
3. Raise a file (note that similar to TC or STC applications, the TAC number is not allocated at this stage).

Manager Aircraft Certification

1. Assign the project a priority.
2. Nominate a Project Manager.

Project Manager

1. Request the Airworthiness Library to advise what data, if any, is already held by the Authority.
2. Advise the applicant in writing:
 - That the project has commenced
 - The name and contact details of the Project Manager
 - To direct all correspondence on the project to the Project Manager.
3. Complete the Notification of Application for a Type Acceptance Certificate.

7.2.3 TAC numbers

A common register of TAC numbers is maintained by Aircraft Certification for TACs issued under regulation 21.029A of CASR. This is held as a shared drive and can be accessed by appropriate staff.

The TAC number is not assigned until the TAC is ready to be issued. This is because:

- uncontrolled use of the TAC number could lead to a perception that the TAC has been issued
- if the project were to lapse, or never reach fruition, there would be gaps in the register.

When the TAC is ready to be issued, the Project Manager obtains the TAC number from Initial TACs for gliders are issued by the Gliding Federation of Australia under authority delegated by CASA.

7.2.4 TAC format

The TAC is prepared using the CASA template for the Type Acceptance Certificate (Form 984). TACs are printed on the current CASA approved certificate paper.

The TAC is signed and dated by the delegate and stamped with the rubber seal in red ink after signing.

7.2.5 TACDS format

The TACDS is prepared using the CASA template for the Type Acceptance Certificate Data Sheet (Form 985)

The TACDS is printed on CASA letterhead and any continuation sheets are printed on the current CASA approved certificate paper.

7.2.6 Amendment to a TAC

Any person may apply for another model to be added to an existing TAC. Only data relevant to the new model will be required.

Although only data relevant to the new model will be required, the data set for previously approved models should be reviewed, and if any deficiencies are identified they should be rectified by the current TC holder.

Amendment of a TAC is accomplished by re-issuing the TAC under the same number with a new issue number. Revisions to any TACDS or are indicated by a revision number, with a black change bar in the right-hand margin alongside the actual change.

7.2.7 Amendment to a CTA

There may be a requirement to amend or re-issue a CTA that was issued under regulation 22A of CAR. Although there is no provision to re-issue a CTA under our current regulations, it is recognised as a TAC under regulation 202.50 of CASR and can be re-issued by conversion to a CASR 21.029A TAC.

When a CTA is converted to a TAC, and does not include any additional models, a basic re-assessment process should be undertaken to confirm that it still meets the minimum requirements of regulation 21.029A of CASR, AC 21.30 and the guidelines in this manual.

If a new TAC number is required, it should be consistent with that of the current TAC numbering system in this manual. The new TAC should also include a textual reference to the superseded CTA number (if changed), and an additional statement indicating that any CofAs that were processed under the old CTA still remain valid.

A Certificate of Type Approval Data Sheet (CTADS) that was issued under regulation 22A of CAR, can also be reissued, when still required, as a TACDS under the extended provisions of regulation 21.029A of CASR. The layout, where possible, should be consistent with that of the current guidelines in this manual. There will be occasions where the limited information on a CTADS may not be able to be transferred to the new TACDS using the current guidelines. In this instance, the information transferred should reflect that of the superseded CTADS as closely as possible. If the sole reason for issuing a CTA with a CTADS was to reference a flight manual number, a TACDS will no longer be required as a part of the new TAC approval.

When a CTA is to be re-issued to include additional models, the application should be processed in accordance with regulation 21.029A of CASR, AC 21-30 and section 7.2 of this manual.

If, during the re-assessment process, any unusual or unique circumstances are identified, the Principal Engineer - Certification (Programs) should be notified by email at aircraft.certification@casa.gov.au

Amendment of a CTA is accomplished by re-issuing the CTA under the same number with a new issue number. Revisions to any CTADS or are indicated by a revision number, with a black change bar in the right-hand margin alongside the actual change.

7.2.8 Supply of certification data

The data, as listed in subregulation 21.029A (b) of CASR, supporting the application should be supplied by the applicant at the time of application, or, if it is not available at that time, a covering letter should be supplied giving the reasons and details of when the data will be available. Such data must be supplied before the TAC is issued.

Provision of a copy of the current TC and TCDS would satisfy the requirement that the type design has been approved by the NAA of the recognised country by issue of a TC or equivalent document. In some cases, only a copy of the TCDS is available. This is sufficient provided that it is accompanied by a statement from the NAA that issued the TC to the effect that the TC is still valid but not available.

In unusual circumstances, suitable statements from the relevant NAA as to the aircraft specifications and limitations may suffice.

If the TC has been transferred, a copy of any transfer page is also required—e.g. for restricted category.

Note: Where the aircraft includes a new type/model of engine and/or propeller, the data associated with the engine and/or propeller is also required.

Project Manager

The Project Manager is responsible for:

- ensuring that the data is supplied and passed to the Airworthiness Library for cataloguing and storage

- sighting evidence that the holder of the foreign TC has undertaken to continue to supply service bulletins and instructions for the continuing airworthiness of aircraft of that type and any amendments of those documents to CASA
- ensuring that the AD Cell has arranged with the relevant NAA for the supply of all ADs issued by that NAA in respect of that aircraft type. This is required for CofA issue, but is arranged as part of the certification.

If the application relates to a variant of an aircraft type for which there is already a TAC in force, then only data peculiar to the variant need be supplied. The TAC will be amended to include the new variant.

A recommendation for issue of the TAC should not be made until the Project Manager is satisfied that arrangements for the supply of documentation and ADs is satisfactory.

7.2.9 Supply of certification data for an aircraft type previously approved

The Project Manager is to confirm that the documents required, particularly a copy of the AFM required under regulation 54 of CAR, are already held by CASA when an application for TAC issue is received for an aircraft type and model that is:

- currently on the Aircraft Register (ACR) but approved under previous legislation; or
- approved under previous or current legislation and returning to the ACR.

Documents already held by CASA do not need to be duplicated prior to issue of the TAC.

However, these may not be the current issue, and it is the responsibility of the applicant for the provision of any required current issues.

In the case of an aircraft type/model returning to the ACR, current information may be required, or old valid information may need to be obtained from archives.

7.2.10 Issue of a TAC subject to conditions

CASA may, under subregulation 21.029B (1) of CASR, issue a TAC subject to a condition if there are reasonable safety grounds, provided the condition(s) is substantially the same as a condition imposed by the NAA of a recognised country on the corresponding foreign TC.

CASA may also issue a TAC subject to other conditions, provided there are reasonable grounds for believing that issuing the certificate without imposing conditions or taking other measures would constitute a significant threat to aviation safety (refer to subregulation 21.029B (2) of CASR for further detail).

In unusual situations, if the Project Manager determines there may be a need for a review of any unusual or novel features, or a review of any special conditions applied by the relevant NAA, the Project Manager is to liaise with the appropriate Airworthiness Specialists. For example, the supply of service documents and AFM in the English language, either as approved by the relevant NAA or as certified translations.

7.2.11 Refusal to issue a TAC

The liaison referred to above may result in a recommendation that CASA refuses to issue a TAC because of reasonable safety grounds (refer to regulation 21.029C of CASR for more detail).

7.2.12 Suspension or cancellation of a TAC

The delegate is to assess any information received that may lead to suspension or cancellation of a TAC in conjunction with a Project Manager and airworthiness specialists (if necessary), using CASA's coordinated enforcement process.

CASA may suspend or cancel a TAC if it considers that it is necessary to do so in the interests of aviation safety. An inability on the part of the foreign TC holder to provide ongoing technical support for the aircraft type may constitute grounds for such suspension or cancellation.

If the foreign TC on which the TAC is based is suspended or cancelled by the foreign NAA, the delegate must consider the effect on Australian aircraft.

7.2.13 Exercise of powers for special conditions, suspension and cancellation

Only the Director of Aviation Safety has the power to:

- issue a TAC subject to a condition that is not substantially the same that has been imposed by the NAA of a recognised country
- refuse to issue a TAC
- suspend or cancel a TAC.

In all the cases of imposing special conditions, refusal to issue, suspension or cancellation, CASA must first consult with and consider the views of the applicant, the NAA that issued the foreign TC and the manufacturer.

In these unusual cases, the Project Manager is responsible for the negotiations between, the appropriate airworthiness specialists, the applicant, the manufacturer and the relevant NAA, and for the preparation of a report for the delegate. All correspondence and the final decision must be properly documented. In some cases, an issue paper may be required.

7.2.14 Multiple airworthiness certification

If multiple category certification, for example normal and restricted category, is listed on the one foreign TCDS, then only one TACDS will be required.

If separate foreign TCs have been issued for each category, then separate TACs are to be issued.

7.2.15 Additional TAC application in respect of another foreign TC

An application may be received for the issue of a TAC in respect of the TC issued by a recognised NAA and a TAC has already been issued for the type/model in respect of a different foreign TC.

The Project Manager is to determine if any additional data other than the additional TC and TCDS is required, and to advise the applicant whether or not data will be required.

The process is the same as an issue of a TAC, with a separate TAC issued.

Note: No two countries TC references are to appear on the same TAC.

7.3 Issue of the TAC

7.3.1 Recommendation for issue of a TAC

When the Project Manager is satisfied that all of the requirements for issue of a TAC have been met, the Project Manager is to provide the delegate with a summary of the documents received and a recommendation for issue of the TAC.

7.3.2 Records management and documentation

All correspondence and documentation must be handled the same as an issue of TCs.

Project Manager

Upon issue of the TAC, the Project Manager is responsible for the following actions:

1. Completing the details of the TAC in the Type Acceptance Certificate Register on the Aircraft Certification shared drive.
2. Adding details to the Approved Aircraft Certification Basis database on the CASA Intranet
3. Adding the words 'Signed by (name)' in the signature block of the electronic copy of the TAC.
4. Forwarding the original of the TAC and any TACDS to the foreign TC holder.
5. Forwarding a copy of the TAC and any TACDS to the applicant:
6. Placing a copy of the TAC and any TACDS on:
 - the file for the project
 - the folder of issued TACs and TACDSs.
7. Providing the Airworthiness Library with details of file references and project numbers, and also ensuring that any data to be retained by CASA are delivered to the Aviation Information Section to be catalogued and stored.
8. Ensuring that the applicant provides any required MMEL, including the establishment of an update service. This is required for aircraft of appropriate categories from countries other than the USA and Canada where Internet access has been provided to MMELs.
9. Supplying the ACR Controller with the information currently required for the ACR.

8. Type certificates for aircraft imported from a non-recognised country

8.1 Background

Applying for a TC for an imported aircraft that has not been type-certificated by the NAA of a recognised country under regulation 21.029 of CASR, the applicant should consider the following before collating further material in support of the application:

- A person applying for a TC under regulation 21.029 of CASR must submit to CASA a comprehensive range of documentary information (i.e. designs, drawings, specifications etc.) in respect of the aircraft to which the application relates.
On the basis of the assessment of that information, and other evidence that may be required, CASA must then be fully satisfied that the aircraft conforms to any applicable design standards and is suitable for aeronautical purposes.
- Type certification for an aircraft involves a considerable amount of time and effort and a commensurate measure of expense for the applicant and CASA with no guarantee that a TC will necessarily be issued at the conclusion of the process. Managing type certification matters from a great distance can only be expected to exacerbate the difficulties and delays ordinarily encountered in the processing of a domestic application under regulation 21.013A of CASR.
- The best course of action may be to seek civil certification from one of the recognised countries. The applicant would then be in a position to apply for a TAC under the expedited procedures set out in regulation 21.029A of CASR.

Note: Further guidance is available in AC 21-31.

This may be the most appropriate course and is one to which the applicant should be urged to give serious consideration before committing further effort and expense in connection with the pending application.

8.1.1 Processing an application

Should the applicant continue with the application after the preliminary advice as to the possible difficulties and expense, the application is to be referred to the Principal Engineer - Certification (Programs) to be considered on an individual case basis as to:

- the priority to be assigned
- the data required to be submitted
- any team visit required to the manufacturer's facility.

A Project Manager is to be appointed by the Principal Engineer - Certification (Programs) and the project is to be managed as a TC project as described in Chapters 2 and 3 within the parameters set by the Principal Engineer - Certification (Programs) .

The original of a TC issued under regulation 21.029 of CASR is sent to the foreign TC holder as a courtesy.

9. Costing type certification

9.1 Background

Section 97 of the *Civil Aviation Act 1988 (the Act)* allows prescribed fees to be payable to CASA in advance of work to be done. In the case of TCs, STCs and TACs, an hourly fee specified in the [Schedule of Fees](#) in the *Civil Aviation (Fees) Regulations 1995*, is charged.

The regulatory certification of aircraft is a relatively costly affair, but it is important for all to realise that the major proportion of costs would be required, irrespective of oversight and issue of a TC or STC by CASA, as:

- proper configuration management systems are required of all technically competent design/manufacturing organisations if their management values the principles of accountability and public safety.
- there is no possibility of export sales unless the manufacturer can provide to foreign NAAs what is expected for Australian certification in regard to data, proof of compliance etc. Some NAAs require more information (with attendant higher costs) than is required in Australia.

9.2 Costs of certification

9.2.1 TC, amended TC and STC costs

The relevant costs of certification associated with the issue of TCs, amended TCs and STCs may be broadly grouped as follows:

- Costs incurred by the organisation (regardless of CASA's cost recovery):
 - test specimens/samples/coupons
 - drawings
 - specifications
 - prototype build
 - aircraft/component/sub-component ground tests
 - flight tests
 - test report compilation
 - analysis report compilation
 - compilation of compliance summary
 - compilation of any type record
 - fulfilling further overseas regulatory authority requirements if export is involved
 - requested liaison with foreign NAAs.
- Costs paid to CASA (costs attributable to CASA's cost recovery policy):
 - any technical assistance requested by the applicant
 - witnessing of specific certification tests
 - data assessment and approval
 - conformity inspections

- certification ground inspection
- certification flight review
- project management
- administration activities.

Additional costing considerations include the following:

- The time spent by CASA personnel in providing initial advice to the applicant, setting the certification basis and preparing cost estimates, will not be charged, but the hourly flat rate for CASA staff in assessing data, checking compliance, witnessing certification tests, resolving problems and administration activities up to the point of completion of the program, must be charged. Any research by CASA or training of CASA officers to progress the application will not be charged to the applicant.
- Production/quality control aspects need to be well under way before TC issue. Costs associated with the involvement of CASA in production/ quality control aspects, although not certification costs, are amounts which may need to be charged to the applicant. These are also reflected in the Schedule of Fees and Charges.
- The cost estimate is greatly influenced by the capabilities and experience of the applicant. Applicants coordinated through an organisation holding design approval could expect that involvement by CASA and therefore, cost-recovery will be significantly less than for an inexperienced applicant.

The cost-recovery applied by CASA is for the hours worked by all staff in processing an application. The application is easily processed when completed as outlined in AC 21-30 and all required data is initially submitted. If the data package is incomplete, or other problems are encountered, the application will take longer to process and cost-recovery charges will be correspondingly higher.