Australian Government
Civil Aviation Safety Authority

DRAFT

ADVISORY CIRCULAR

AC 21-26
Certification conformity

v1.0 – August 2014
Project Number: CS 13/12

Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

Advisory Circulars should always be read in conjunction with the relevant regulations.

Audience

This Advisory Circular (AC) applies to:

- approved design organisations (ADO)
- authorised persons with design approval privileges
- designers of aircraft and aeronautical products
- designers of changes to aircraft and aeronautical products
- production authorisation holders.

Purpose

The purpose of this AC is to provide guidance on manufacturing and production conformity requirements for the purposes of airworthiness certification of aircraft and parts under Part 21.

For further information

For further information on this AC, contact CASA's Airworthiness and Engineering Standards Branch (telephone 131 757; email: airworthiness.standards@casa.gov.au).

Status

This version of the AC is approved by the Executive Manager, Standards Division.

Version	Date	Details
v1.0	August 2014	Initial issue

Unless specified otherwise, all subregulations, regulations, Divisions, Subparts and Parts referenced in this AC are references to the *Civil Aviation Safety Regulations 1998* (CASR).

Contents

1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

Acronym	Description
AC	Advisory Circular
APMA	Australian Parts Manufacturer Approval
CAD	Computer aided design
CAM	Computer aided manufacturing
CAR	*Civil Aviation Regulations 1988*
CASA	Civil Aviation Safety Authority
CASR	*Civil Aviation Safety Regulations 1998*
CNC	Computer numeric controlled
CP	Certification Plan
CVM	Conformity Verification Matrix
CVP	Conformity Verification Plan
FAI	First article inspection
NC	Numeric controlled
NDI	Non-destructive Inspection
PC	Production certificate
SCM	Software configuration management
SQA	Software quality assurance
STC	Supplemental Type Certification
TC	Type Certification
TD	Type design
TCB	Type Certificate Board

1.2 References

Regulations

Regulations are available on the ComLaw website http://www.comlaw.gov.au/Home

Document	Title
Part 21	Certification and airworthiness requirements for aircraft and parts

1.3 Forms

CASA's forms are available at http://www.casa.gov.au/forms

Form number	Title
CASA Form 724	Statement of Conformity
CASA Form 882	Conformity Inspection Record

2 Background

2.1 Introduction

2.1.1 The terms “Conformity Verification” and “Conformity Inspection” are sometimes used interchangeably although they are used for specific purposes within the production and manufacturing regulatory framework.

2.1.2 This document will provide guidance on the intent of “Conformity Verification” as applicable to Type Certificates (TC) and Supplemental Type Certificates (STC).

2.1.3 Regulations

a. Subregulations 21.033(2) (b), (c) & (d) – conformity requirements.
b. Subregulations 21.053(1)&(2) – Statement of Conformity.
c. Paragraph 21.132A(2)(b) – data supporting verification of conformity against manufacturing processes.
d. Subregulation 21.303(8) – Applicants’ conformity inspection requirements for Australian Parts Manufacturer Approval (APMA).

3 Conformity Verification

3.1.1 Conformity verification is the process used during the TC/STC review and assessment phase to make sure that the aircraft, aircraft engine, propellers or aeronautical products to be certified conforms to an approved design. It also ensures the consistency and repeatability of manufacture in accordance with approved processes until the issue of a production authorisation. The process is detailed in a Conformity Verification Plan (CVP), which includes a Conformity Verification Matrix (CVM).

3.2 Defining Conformity Verification Requirements

3.2.1 Conformity verification requirements are defined very early in the TC/STC review and assessment phase by the Manufacturing Specialist on the Type Certificate Board (TCB). Conformity verification requirements are determined and agreed jointly by CASA and the applicant (including third parties authorised by the applicant to act as conformity agents). The intent of this joint definition and agreement is to make sure that conformity requirements that are defined are measurable and can be tested for acceptability. During the TCB the skeleton framework of the CVP is developed using the Certification Plan (CP) as source data.

3.2.2 Conformity verification requirements must be defined against an approved/frozen design baseline.

3.3 Conformity Verification Plan / Conformity Verification Matrix

3.3.1 The CVP documents the process used to make sure that the aircraft, aircraft engine, propellers and aeronautical products to be certified conforms to an approved design. It also documents the process used to ensure consistency and repeatability of manufacture of the aircraft, aircraft engine, propellers and aeronautical products in accordance with approved processes until the issue of a production approval. The responsibility to manage the CVP rests with the manufacturing project officer.

3.3.2 The CVM supports the CVP and is the document that details all the products that must conform. The CVP also records the agreement reached between the applicant and CASA on who will “recommend” and “find” conformity.

3.3.3 The CVP provides the conformity verification approach that will be followed by the applicant and CASA and, in essence, determines the policy of the specific project conformity verification requirements. The CVP should be submitted to CASA for review and approval four weeks before the first on-site verification. The CVP will be approved with a first issue of the CVM and, normally, the CVP will remain fairly stable while the CVM will evolve as verification progresses and non-conformities are noted. Appendix A provides guidance on the content of the CVP and Appendix B shows a typical CVM.

3.3.4 For complex projects, the CVM may be developed in phase/stage to allow the applicant to raise progressive “statements of conformity – Form 724”. As verification progresses, non-conformities will be managed via the CVM and extracts of fully completed CVMs (including non-conformities), will be attached to the applicant’s statement of conformity and CASA’s record of conformity inspections – Form 882.

3.3.5 The CVP, including CVM, is approved by CASA.

4 The Conformity Verification Process

4.1.1 The conformity verification process is shown at Appendix C. In summary, it consists of two Phases: Phase 1 and 2.

4.1.2 Phase 1 is CASA's authorisation of the manufacture and installation of the first set of products and addresses the verification of the first or first set of products to be manufactured and installed for the issue of a TC/STC. Noting that there is limited product manufacturing, the focus of Phase 1 is on conformity verification against the authorised design data.

4.1.3 Phase 1 conformity verification is against an approved design. If no further manufacture of products under APMA/PC is intended, only the CVP Phase 1 will be applicable. Phase 1 must be completed before the issue of a TC/STC. The conclusion of Phase 1 is a conformity recommendation to the TC/STC Project Manager.

4.1.4 Phase 2 addresses the verification of further products to be manufactured pending the issue of a Production Authorisation. Phase 2 is normally used either when the applicant intends to manufacture a limited number of products and will not apply for a Production Authorisation or foresees a significant delay between the issue of an STC/TC and the start of mass production. Phase 2 is akin to "production under type certificate only" but with a more structured approach to verification of all products listed in the CVM and a mutually agreed position on "recommendation" and "finding" of conformity. During Phase 2, emphasis will be placed on the identification and management of design changes to ensure that conformity is conducted against an "approved" baseline. Part 2 follows on from the design review of Part 1 and has the additional requirement of manufacturing process conformity.

4.2 The Conformity Verification Process – Phase 1

4.2.1 Step 1: the focus of the verification conducted under Phase 1 Step 1 is on conformity against design data; a limited conformity against manufacturing process is conducted for manufacture of the first item (or set) to allow installation for testing and verification. The applicant submits its statement of conformity (Form 724) at the completion of Phase 1 Step 1. The applicant should attach completed extracts of the CVM as supporting evidence when submitting the Form 724 to CASA.

4.2.2 Step 2: this step is the on-site verification of manufacturing and installation. During this phase CASA will review manufacturing process documentation including traceability of material and specialised processes. Subject to agreements reached during the TC and conformity verification meetings with the applicant, CASA may delegate some inspections to the applicant. The agreements are formally recorded in the CVM under headings of "recommending" and "finding" of conformity.

4.2.3 For most major projects where the applicant makes multiple statements of conformity (Form 724) linked to various stages of the project, CASA will also conduct multiple on-site verifications and raise multiple Conformity Inspection Records (Form 882). This is the iterative process shown at Appendix C before a conformity recommendation is made to the TC/STC Project Manager.

4.3 The Conformity Verification Process – Phase 2

4.3.1 Step 1 starts with a review of the current design data baseline with the baseline approved during Phase 1 noting that Phase 2 may lag the completion of Phase 1 considerably, that design may have evolved. The applicant and CASA will also conduct a review of Phase 1 non-conformities at this stage to make sure that these will not prevent further progress to Phase 2. Step 1 is concluded with the applicant submitting a Statement of Conformity (Form 724) to CASA.

4.3.2 Step 2 is the Conformity Verification of products against the manufacturing processes submitted to CASA to support manufacture beyond the prototype or the product(s) fitted under the TC/STC. For aeronautical products, the step 2 conformity can take the form of a First Article Inspection (FAI) the results of which are recorded in the CVP. Step 2 is conducted on-site.

4.3.3 For aircraft, aircraft engines and propellers, step 2 will record the full design and manufacturing processes, including an assessment of the manufacturing capability of the applicant.

4.3.4 For projects that lead into production approval, Part 2 includes most of the manufacturing process requirements to be satisfied for the issue of the production approval.

4.4 The Conformity Verification Process – Project Closure

4.4.1 As was the case for Phase 1 of the conformity verification process, there is an iterative process of identifying and correcting non-conformities raised during the applicant's conduct of verification and CASA review and recommendation of conformity. Normally, CASA will expect all non-conformities to be corrected before a TC/STC is issued. However, CASA may proceed with the issue of a TC/STC noting non-conformities as long as these do not impact the airworthiness of the aircraft, aircraft engine, propeller or aeronautical products. When non-conformities are "carried forward" in a CVM, CASA expects an engineering justification from the applicant.

4.4.2 The Conformity Verification process is closed by the issue of a Form 882 to the TC/STC Project Manager. Where the project has multiple stages, a Form 882 may be raised at the completion of each stage to close the project progressively.

5 Guidance for conducting conformity verification against approved design data

5.1.1 The FAI process for a given first part or prototype initially includes identification of the original source documents and their respective revision status. Purchase orders or equivalent documents must be examined to determine the basic requirements and the validity of the data called up by the customer. Relevant drawings and specifications must be subject to source substantiation to ensure that the current complete data is available for the inspection.

5.1.2 Product conformity is determined by inspecting the processed articles. The manufacturer should make a determination that the process operations are capable of producing articles in conformity with the design requirements. The method used in determining this fact should be measurable, as required by the process specification, and recorded.

5.2 Adequacy of Drawings and Related Change Records

5.2.1 Tests

a. Can the part be produced and inspected using the information on the drawing?
b. Are drawing tolerances practicable and attainable under production conditions? What evidence supports this?
c. Have all of the changes been correctly made to drawings submitted for CASA approval in the case of minor changes?
d. Does the drawing include all the characteristics necessary to inspect the part: the material to be used, the treatment of the material such as hardness, finish and special process specifications?
e. Does the drawing (or associated engineering data) include applicable test specifications?

6 Guidance for conducting conformity verification of manufacturing processes

6.1 Materials

6.1.1 Documented manufacturing processes must ensure the traceability of material throughout the manufacturing cycle.

6.1.2 Tests

a. Were raw materials used in the fabrication process in conformity with the design data?
b. Is evidence available to assure that chemical and/or physical properties were identified and checked as appropriate?
c. Is there documented evidence to show traceability from the raw material to the completed part?
d. Are there any parts or process deviations recorded against the submitted design data (including material review dispositions)?

6.2 Processes

6.2.1 In evaluating processes, CASA is primarily concerned with performance and conformity. Process performance should be capable of consistently producing articles that meet the specified requirements.

6.2.2 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 called for 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.

6.2.3 Tests

a. Is there a process specification for each special process?
b. Has the process specification been submitted for engineering review by the Authority?
c. Is the process being operated in accordance with the process specification? Are any deviations recorded?

6.3 Automated Production Processes

6.3.1 Modern production methods involve automatic machines such as milling machines, lathes, riveters, routers, and fabric cutters.

6.3.2 Traditionally, conformity inspection has been against clearly defined Type Design (TD) data, in the form of drawings and specifications. With numeric or computer numeric controlled (NC or CNC) machines, traditional conformity inspections may be difficult due to limited traditional TD data. In such cases, TD data includes the Computer Aided Design (CAD) models or other programmed (software) instructions which can be used to achieve and demonstrate conformity.

6.3.3 CASA must be satisfied that the applicant has the systems and ability to produce conforming parts.

6.3.4 Tests

a. Is the approved TD data (drawings, specifications, computer generated models and instructions) permanently stored and available for conformity inspections?
b. Is software used identifiable as to the package and the version?
c. Are computer programs used, such as CAD and Computer Aided Manufacturing (CAM programs, of proven validity?
d. Have operators of CAD and CAM programs demonstrated competencies in the use of the particular CAD package?
e. Have operators of NC or CNC machines demonstrated competencies in the use of the machine(s)?
f. Are manually-inserted CNC machine instructions related to approved drawings?

6.4 Non-destructive Inspection (NDI) Method Evaluation

6.4.1 The procedure for evaluating an NDI method must provide for the manufacturer to demonstrate to CASA's satisfaction that the NDI method used has the capability to detect the allowable defect size and location specified by the engineering data, that the inspection results are repeatable, and that instruments required to perform the inspection meet the procedural acceptability requirements.

6.5 Critical and Major Characteristics

6.5.1 The critical and major characteristics of the product being manufactured must be identified and their specific requirements noted and managed.

6.5.2 Tests

a. Has the manufacturer identified and inspected all the critical and major characteristics?
b. Does the manufacturer have a record of these inspections?
c. Does witnessing the re-inspection and surveillance indicate that the above inspections were accurate and adequate?
d. Are there any deviations recorded against the approved design data (including material review disposition)?

6.6 Workmanship

6.6.1 The impact of workmanship on the finished product must be determined and managed, especially when manufacturing is primarily manual.

6.6.2 Tests

a. Does workmanship contribute to the safety of the product?
b. Have criteria been established to identify acceptable production techniques and practices?

6.7 Adequacy of Inspection Records

6.7.1 Progressive inspections contribute to the “airworthiness” of the finished product. Furthermore, the results of progressive inspections provide the production authorisation holder with substantiation of technical integrity and support the final release of the product.

6.7.2 Tests

a. Do the inspection records show all inspections that are conducted?
b. Do they show who conducted the inspection?
c. Do they indicate the results of the inspection and disposition of unsatisfactory conditions?
d. Are procedures adequate to ensure re-inspection of any parts that are reworked?

6.8 Material Review Action

6.8.1 Products that depart from approved design data or specifications must be subjected to material review actions to ensure that the correct decisions are made regarding their fitness for purpose.

6.8.2 Tests

a. Is the material review procedure documented and adequate to ensure disposition of non-conformities?
b. Is there adequate corrective action for observed non-conformities to prevent recurrence?
c. Have all considerations been reviewed and recorded for the use of “Previously Produced Parts”, including design evolution, ongoing actions, engineering deviations and waivers.

6.9 Software

6.9.1 Tests

a. Are all software products, including version description documents, source codes, object codes, documentation, test procedures, loaded hardware/firmware, properly identified, including revision levels, when compared to the hardware and software engineering drawings?
b. Are there records which indicate that the object code was compiled from released source code by approved procedures?
c. Have all software problem reports been properly dispositioned?
d. Do the records indicate that all software products, including support software and procedures, have been placed under configuration control?
e. Have the verification and acceptance tests been successfully executed to approved test procedures and results recorded? Are there records that indicate that the object code was compiled from released source code by approved procedures?
f. Do records indicate technical acceptance of the software prior to loading into the system or product?

g. Are there any indications of non-compliance with the software manufacturer's procedures?
h. How is the hardware/software integration managed and how is the hardware ID updated with an update of software?
i. Does the software successfully execute the initialisation procedure?
j. Does the software life cycle data match the safety system assessment requirements? Is the software robust? Is deactivated or dead code addressed in the software design assurance activities?
k. Is there adequate life cycle data which documents that the Software Requirements Data, Trace Data and Executable Object Code meet the traceability requirements and provides satisfactory Software Verification Results?
l. Have all software product problems been properly identified, recorded and corrective actions taken, documented in the Problem Report life cycle data?
m. Are software configuration management (SCM) process activities recorded in the SCM Records? Has the software verification cases and procedures been satisfactorily implemented and results documented in the Software Verification Results life cycle data? Does the software life cycle data meets the objectives as required by the Software Configuration Management process?
n. Are there any indications of non-compliance with the software plans and standards as documented in the Problem Reports life cycle data?
o. Are the results of Software Quality Assurance (SQA) process activities recorded in the SQA Records?
p. How is the procedures and methods for loading the software into the target hardware managed? Is there an effective means to demonstrate that the software loaded onto the target hardware matches the approved software?

6.10 Test Articles

6.10.1 Prior to initiating conformity activity for test articles, the manufacturer and CASA must establish and document the parameters of the test article configuration and test equipment configuration.

6.10.2 The conformity of the test article and test set-up, such as for static, endurance, operational, pressure, environmental tests, should be established as appropriate to determine conformity.

6.10.3 In all cases, the approved engineering data should include appropriate instructions and reference to the manufacturer's agreed test plan.

6.10.4 When witnessing tests, CASA must determine that the instructions and agreed test plan are followed.

6.10.5 Prototype parts or parts made using different methods or processes cannot be considered part of the first production run unless full traceability can be shown for the differences between the standard manufacturing processes and the "unique" part manufacturing process.

6.11 Structural Test Articles - Aircraft

6.11.1 When conforming structural tests during fabrication and assembly, CASA must ensure that the final design submitted for CASA inspection reflects all changes that have been found necessary as a result of previous tests. CASA must ensure that such changes are incorporated into the production drawings to make sure that subsequent production articles conform to the tested articles.

6.11.2 Products/assemblies destined for structural testing should be clearly identified to make sure that they are not used in production.

6.12 Flight Test Articles - Aircraft

6.12.1 Determining conformity of flight test articles, including system checks, should begin during fabrication. It is important that flight test articles conform to the data specified in the design data on which the manufacturer's statement of conformity is based.

6.13 Endurance Test Articles - Engines and Propellers

6.13.1 In addition to conformity of production, endurance test conformity inspections are conducted on aircraft engines and propellers. These tests will be part of the CASA approved specifications.

6.13.2 At the conclusion of the endurance test, during the teardown inspection, CASA should spot-check conformity of major and critical parts by witnessing the manufacturer's inspections, paying particular attention to critical characteristics. Further details on the conduct of conformity inspection of endurance test are provided at Appendix D.

7 Submission of Statement of Conformity

7.1.1 Applicants must submit their Statement of Conformity (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 and hidden inspections, the Statement of Conformity should be submitted to the Authority prior to the start of conformity inspections. The Statement of Conformity should be signed by an authorised person.

7.1.2 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:

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

Executive Manager
Standards Division

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Appendix A

Conformity verification plan

A.1 Conformity verification plan (CVP)

A.1.1 Purpose of the CVP

A.1.1.1 The CVP must establish clear agreement of who will conduct conformity inspection, what will be conformed, when and where inspections will take place, and how conformity inspections will be recorded and submitted to the relevant authorities. The CVP should focus on:

a. verifying the conformity of critical and major characteristics of materials, parts, and assemblies to the approved design data
b. evaluating processes to assure production of consistent and uniform products conforming to the approved design data
c. recording of non-conformities from the design data and their disposition
d. observing tests of important functional parameters of systems, modules, components and completed products.

A.1.2 Amendment Process

A.1.2.1 The CVP should contain a brief description of how it will be updated throughout the project to account for design changes, changes of manufacturing processes and changes of inspection requirements.

A.1.3 Contents of CVP

A.1.3.1 As a guide, a CVP should contain details of the sections described in the following paragraphs.

A.1.3.2 **Purpose of CVP**. The purpose of the document is to seek CASA acceptance for the conformity inspection process, define responsibilities, and set a timeline in support of the project. The document covers aspects of conformity inspection of details parts, assemblies, final assemblies, and test set up by the applicant and verification of conduct of conformity by CASA in support of Type Certification/STC for the project.

A.1.3.3 **Review and Approval Process**. This document will be a dynamic document and will be updated as the project evolves both in terms of authorised design data and manufacturing processes. The document is owned by the applicant, will be regularly reviewed by the applicant and CASA, and updated as required and approved by CASA.

A.1.3.4 Associated Documents:

a. Project Certification Plan/Project Definition Plan/Project Compliance Plan
b. CASA Type Certification Procedures Manual
c. CASA Production Approval Procedures Manual

A.1.3.5 **General Description of the Project**. This section will provide a brief description of the project and be extracted from Project Certification Plan/Project Definition Plan.

A.1.3.6 **Brief Introduction of the Certification Program**. Key points extracted from the Project Certification Plan/Project Definition Plan.

A.1.3.7 **Responsible Persons**. Names and contact details of the key responsible persons from the applicant, engineering organisation, approved suppliers, and CASA with their respective responsibilities listed therein.

A.1.3.8 **Design Data used for Conformity Inspections and Control of Design Data**. Provide a description of the design data and approval status for use in conformity inspection of parts, assemblies, installations or test setups. If there are multiple drawings and documents, reference may be made to a master drawing list. Brief reference should be made as to how the design data will be controlled and how the conformity requirements will be maintained as design data changes

A.1.3.9 **Manufacturing Locations**. List the locations where manufacturing, assembly, installation and testing is proposed to be carried out.

A.1.3.10 **Approval Process for Suppliers and List of Approved Suppliers (if any)**. List all the suppliers names, location and product/service being provided for the project.

A.1.3.11 **Incoming Material Inspections**. List the company procedure for conduct of incoming material inspection, acceptance tests, and acceptable documents relevant to the project.

A.1.3.12 **Tooling Inspection and Control**. List the company procedure for inspection of tools to provide traceability to the design data, process for regular check/calibration and repair/rework. Alternatively, refer to an existing section of the Quality Manual or the Fabrication/Production Inspection System.

A.1.3.13 **Special Processes involved in Manufacture and Controls Exercised**. List the special processes to be used in the manufacture, process qualification, approval of operators and process controls. Alternatively, refer to the Quality Management System and existing section of the Quality Manual or the Fabrication/Production Inspection System.

A.1.3.14 **Applicant Conformity/First (test or prototype) Article Inspection of Detailed Parts**. A brief description of how the parts conformity will be conducted, by whom and when.

A.1.3.15 **Applicant Conformity Inspection and Recording for Assemblies**: A brief description of how the conformity will be conducted, by whom and when. Refer to a Conformity Verification Matrix (table/spread sheet- see attached example) which lists the conformity inspection required, the sequence of inspections and the authorities for recommending and finding conformance. If inspection records are not fully recorded in the table, provide a brief description of related recording documents, forms to be used for recording the conformity, details to be recorded and retention of those records.

A.1.3.16 **Applicant Conformity Inspection and Recording for Major/Final Assembly/Installation**. A brief description of how the conformity will be conducted, by whom, when etc. A brief description of recording documents, forms to be used for recording the conformity, details to be recorded and retention of those records. This should include how the CASA conformity Inspection stages will be identified and recorded. The applicant's responsible person for co-ordinating with CASA and the persons responsible to submit Statement of Conformity should be identified

A.1.3.17 **Test Set Up Conformity**. A brief description of how the conformity will be conducted, by whom and when. A brief description of recording documents, forms to be used for recording the conformity, details to be recorded and retention of those records.

A.1.3.18 **Recording of Discrepancies, Non-conformities or Deviation**. A brief of how the non-conformities observed during conformity inspection will be recorded. Alternatively, refer to an existing section of the Quality Manual or the Fabrication/Production Inspection System.

A.1.3.19 **Disposition Process for Discrepancies, Non-conformities and Deviation**. Brief description of how non-conforming parts will be discarded or quarantined for rework. Alternatively, refer to an existing section of the Quality Manual or the Fabrication/Production Inspection System.

A.1.3.20 **CASA Conformity Tracking by the Applicant**. The applicant process for tracking of CASA conformity inspections. This could refer to the conformity verification matrix.

Appendix B

Sample conformity verification matrix

B.1 Sample Conformity Verification Matrix

CONFORMITY VERIFICATION MATRIX - C0001 Type Certification

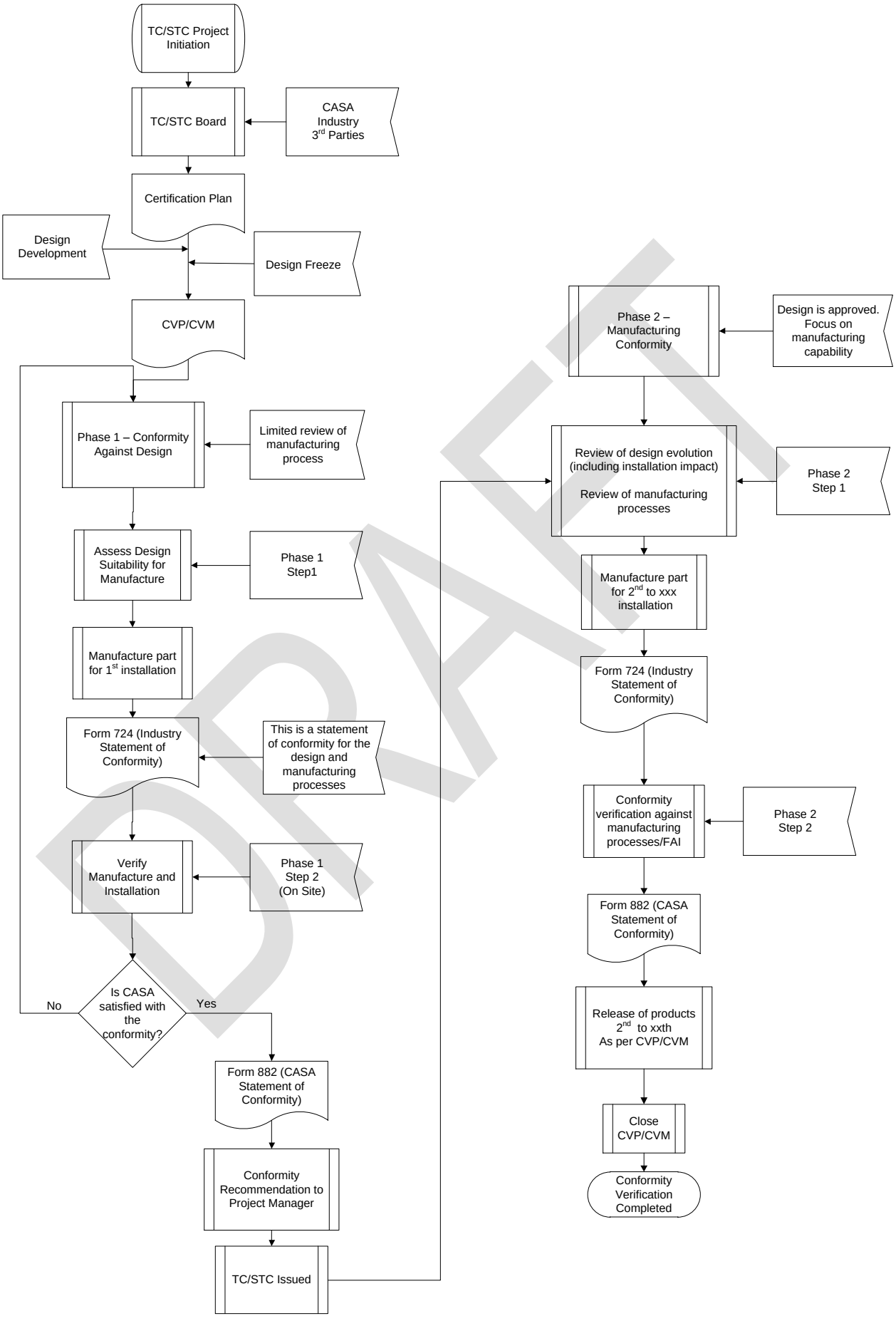
CASA Ref				EF13/XXXXXX
Parent Equipment				C0001
Project Phase				Wing Conformity - Phase 1

				Step 1 - Conformity Against Authorised Design Data							Step 2 - Conformity Against Manufacturing Process						
Part/ Assy No	Sub-Assy	Description	Design Data	Proposed Method of Conformity	Recommending	Date	Sig	Finding	Date	Sig	Proposed Method of Conformity	Recommending	Date	Sig	Finding	Date	Sig

Appendix C

Conformity verification process flowchart

C.1 Conformity Verification Process Flowchart



Appendix D

Conformity requirements after endurance tests

D.1 Conformity requirements after endurance tests

D.1.1 The following inspections are required following tear down after endurance tests:

a. Verify that the manufacturer carefully notes the appearance of subassemblies during the teardown and before complete disassembly. The manufacturer should specifically note any abnormal leakage in valves, seals, and fittings; 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; and any other condition which may not be noticeable after complete disassembly and cleaning.

b. Verify indications of fretting, chafing, metal pickup, corrosion, distortion, interference between moving parts, and cracks. Highly finished surfaces should be checked for condition and any discolouration 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, burning or local collapse.

c. Verify that both ferrous and nonferrous stressed parts are inspected for incipient failures by suitable non-destructive testing methods such as magnetic particle inspection, x-ray, penetrant, ultrasonics, in accordance with the test plan.

d. 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 manufacturer should record the results in a suitable manner.

e. On completion of the above steps for certification of an engine or propeller, the manufacturer's inspection report should be submitted to CASA as part of the applicant's statement of conformity. The report should contain the results of the inspection and give a comprehensive description of all defects, failures, wear or other unsatisfactory conditions including photographs as required. The report should also describe how non-conforming parts are identified.

D.1.2 Particular attention should be given to any detail design feature which does not appear to comply with the applicable regulation. Particular attention should be given to tolerances, clearance, interference, ventilation, drainage, compatibility with other installations, and servicing and maintenance requirements.