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TABLE OF CONTENTS

- 1.0 INTRODUCTION..... 2**
- 1.1 Purpose 2
- 1.2 Applicability 2
- 1.3 Description of Changes..... 2
- 2.0 REFERENCES AND REQUIREMENTS 2**
- 2.1 Reference Documents 2
- 2.2 Cancelled Documents 2
- 3.0 BACKGROUND..... 2**
- 4.0 ACCEPTABLE MEANS OF COMPLIANCE 3**
- 4.1 General 3
- 4.2 Documentation 3
- 4.3 Engine Build..... 3
- 4.4 Test 3
- 4.5 Post Test 3
- 5.0 REPORT FORMAT AND REVIEW PROCESS..... 3**
- 5.1 Report Format 3
- 5.2 Review Process 4
- 6.0 CONTACT OFFICE 4**

1.0 INTRODUCTION

This Advisory Circular (AC) is provided for information and guidance purposes. It may describe an example of an acceptable means, but not the only means, of demonstrating compliance with regulations and standards. This AC on its own does not change, create, amend or permit deviations from regulatory requirements, nor does it establish minimum standards.

1.1 Purpose

The purpose of this AC is to provide guidance and acceptable means by which compliance may be shown with section 533.90 of the *Airworthiness Manual (AWM)* dealing with initial maintenance inspection.

1.2 Applicability

This document applies to Transport Canada Civil Aviation (TCCA) personnel, delegates, and the aviation industry.

1.3 Description of Changes

This document, formerly AC 533-001, Issue 01, has been reissued as AC 533-001, Issue 02. With the exception of minor editorial changes and updated references, the content is unaltered.

2.0 REFERENCES AND REQUIREMENTS

2.1 Reference Documents

It is intended that the following reference material be used in conjunction with this document:

- (a) Chapter 533 of the *Airworthiness Manual (AWM)*—*Aircraft Engines*.

2.2 Cancelled Documents

Not applicable.

3.0 BACKGROUND

- (1) With a single engine test, the inevitable occurrences during the test that require explanations, debate or hardware replacement can render the result somewhat inconclusive.
- (2) This AC proposes an alternative procedure, which is intended to generate a broader, more comprehensive database for demonstrating compliance while obviating the economic burden of additional tests. This procedure applies by prior agreement with TCCA. The manufacturer will be required to demonstrate adequate capability to document data in a disciplined and traceable manner.
- (3) Previously, the development and accelerated mission endurance running normally undertaken by manufacturers, in addition to the certification program, could not be utilised because of the questionable accuracy of the performance data and hardware traceability. Within strict limitations, these concerns can now be addressed by using a computer based tracking system to identify and monitor engine build standards and performance during a designated development period. The potential advantages of this approach include:
 - (a) Engine build samples, which can be more closely related to the final type design;
 - (b) An increased variety of test conditions, thus ensuring adequate representation of the anticipated service conditions;
 - (c) A more balanced portrayal of the engine durability and design integrity on which to base the initial maintenance inspection recommendations;
 - (d) The possibility that any occurrence on a given engine test can be reviewed in the context of the total available samples, as with normal service practice; and

- (e) A positive advantage for the manufacturer to maximize the accumulated mission endurance running time and thereby establish a substantial margin of experience before the engine is introduced into service.

4.0 ACCEPTABLE MEANS OF COMPLIANCE

4.1 General

- (1) The applicant shall designate engine builds and specific tests to be reported in substantiation of compliance with section 533.90 of the AWM. For parts and/or subassemblies previously used in a type certified engine, the relevant service experience may be used to supplement designated test data.
- (2) The applicant will declare certain engine strips as a "major teardown" and make the designated parts and assemblies available for examination by TCCA.
- (3) To be eligible for consideration under this AC, the data shall have to be collected from engines substantially conforming to the final type design. The minimum acceptable running time on a given engine build will be subject to prior agreement with TCCA.

4.2 Documentation

- (1) The applicant shall utilise a secure computer database to compile engine build standard and performance history with individual part traceability. The retrieval of stored data can be part based with serial numbers of applicable engine builds, their running time and totals. However, it is essential for TCCA review purposes, that the data should be retrievable on an engine build and performance basis.
- (2) There shall be a fully defined and TCCA approved procedure on what, how and where the necessary data is compiled and authenticated. Authentication can be based on established principles of Quality Auditing (QA). The QA procedure will define the audit frequency, categories of deficiencies, and corrective action. TCCA will conduct audits on the overall process.

4.3 Engine Build

- (1) At each engine build, a list of designated engine parts and assemblies will be prepared. A full history of these parts must be compiled, verified and cross-referenced. A build specification check of designated parts and assemblies is required. This can be undertaken at the post test strip.
- (2) An engine build data file will contain compiled test data and a strip condition summary along with a specification check record.
- (3) A photograph catalogue will be compiled for certain designated components, and cross-referenced to the strip condition summary.

4.4 Test

During engine testing, an accurate record of running time shall be made and entered in official Engine Test Log Sheets. In addition, during every engine test, simultaneous to the recording process, the engine performance will be monitored and recorded.

4.5 Post Test

At the end of a test, the applicant shall inspect the hardware and prepare a Quality Assurance Inspection Report (QAIR), which will be made available for TCCA review.

5.0 REPORT FORMAT AND REVIEW PROCESS

5.1 Report Format

- (1) An engineering report will be submitted to TCCA. In addition to test data evidence and related experience referred to above, the applicant shall include an accomplishment summary of their QA reports. The applicant will ensure compliance with the procedure previously agreed with TCCA.

Non-compliance with the procedure will be classified as minor, major or critical deficiencies and reported.

- (2) A finding of compliance may be made by TCCA following accomplishment of an acceptable corrective action in response to non-compliance items and satisfactory disposition of QAIRS.

5.2 Review Process

TCCA may witness any tests or view any documents pertaining to this procedure. All documents referred to in this procedure shall be retained for TCCA review during such time as the applicable part numbers remain on an Engineering Approved Part List.

6.0 CONTACT OFFICE

For more information please contact the:
Manager, Policies and Procedures (AARTC)

Phone: (613) 990-3923
Fax: (613) 952-3298
E-mail: martin.Thieringer@tc.gc.ca

Suggestions for amendment to this document are invited and should be submitted via the Transport Canada Civil Aviation Issues Reporting System (CAIRS) at the following Internet address:

<http://www.tc.gc.ca/wcms-sgcw/civilaviation/cairs-755.htm>

or by e-mail at: CAIRS_NCR@tc.gc.ca

“Original Signed by D.B. Sherritt, Dated 2009/05/22”

D.B. Sherritt
Director, Standards
Civil Aviation