
Type Acceptance Report

TAR 19/21B/7

CFM56-5A Series

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Executive Summary

New Zealand Type Acceptance has been granted to the CFM56-5A Series turbofan engines based on validation of EASA Type Certificate number E.067 and FAA type certificate number E28NE. There are no special requirements for import.

Applicability is limited to the Models and/or serial numbers detailed in Appendix 1, which are now eligible for installation on a NZ-registered aircraft. Additional variants or serial numbers approved under the foreign type certificate can become type accepted after supply of the applicable documentation, in accordance with the provisions of NZCAR §21.43(c).

NOTE: The information in this report was correct as at the date of issue. The report is generally only updated when an application is received to revise the Type Acceptance Certificate. For details on the current type certificate holder and any specific technical data, refer to the latest revision of the State-of-Design Type Certificate Data Sheet referenced herein.

1. Introduction

This report details the basis on which Type Acceptance Certificate No.19/21B/7 was granted in the Standard Category in accordance with NZCAR Part 21 Subpart B.

Specifically, the report aims to:

- (a) Specify the foreign type certificate and associated airworthiness design standard used for type acceptance of the product in New Zealand; and
- (b) Identify any special conditions for import applicable to any model(s) covered by the Type Acceptance Certificate.

The report also notes the status of all engine models included under the State-of-Design type certificate that have been granted type acceptance in New Zealand.

2. Product Certification Details

(a) State-of-Design Type and Production Certificates:

Type Certificate Holder: CFM International, S.A.

Type Certificate: E.067
Issued by: European Aviation Safety Agency

Type Certificate: E28NE
Issued by: Federal Aviation Administration

Manufacturer: General Electric
Production Approval: FAA PC 108

Manufacturer: Safran Aircraft Engines (Formerly SNECMA)
Production Approval: FR.21G.0007

(b) Models Covered by the Part 21B Type Acceptance Certificate:

- (i) **Models:** CFM56-5,
CFM56-5A1/F, CFM56-5A3,
CFM56-5A4, CFM56-5A4/F
CFM56-5A5, CFM56-5A5/F

3. Application Details and Background Information

The application for New Zealand type acceptance of the CFM56-5A Series was from the type certificate holder dated 31 May 2018. The CFM56-5 is a high by-pass ratio axial-flow twin-spool turbofan, including a one-stage fan; three-stage low pressure compressor; nine-stage high pressure compressor; single annular combustion chamber; single-stage high pressure turbine; four-stage low pressure turbine; and a dual channel full authority digital engine control unit.

Type Acceptance Certificate Number 19/21B/7 was granted on 14 September 2018 to the CFM56-5A Series based on validation of EASA Type Certificate E.067 and FAA Type Certificate E28NE. There are no special requirements for import into New Zealand.

The CFM56 Series was developed as a joint venture between General Electric Aviation of the USA and SNECMA of France, with GE developing the high pressure compressor, combustor and high pressure turbine, and SNECMA developing the fan, low pressure compressor and low pressure turbine. The engine first ran in 1974 and initial applications were retrofitting of older turbojet powered transports.

The CFM56-5 was developed specifically for the Airbus A320 and was certificated in 1987. The CFM56-5 is the Basic model, while the CFM56-5A1/F (originally certified as the CFM56-5A2, but that designation was changed at the request of the manufacturer) was the Basic model for the A320. It is the same as the CFM56-5 except that EGT limits were increased through introduction of hot section modifications. The CFM56-5A3/4/5 are all models with different takeoff thrust ratings, ranging from 22,000 to 26,500 pounds, but are physically identical. The designation is defined by the thrust rating, which is determined (or changed) by the ID plug.

GE Aviation and SNECMA both manufacture the engines under their own type certificate under licence from the type certificate holder, CFM International, who is responsible for type certification and customer support. The individual engine comes under the State-of-Design type certificate for whichever country in which it is produced. Engine variants produced under either type certificate are identical and interchangeable.

4. NZCAR §21.43 Data Requirements

The type data requirements of NZCAR Part 21B Para §21.43 have been satisfied by supply of the following documents, or were already held by the CAA:

(1) State-of-Design type certificate:

- EASA Type Certificate E.067 (replacing DGAC Type Certificate No. M15)
- EASA Type Certificate Data Sheet E.067 Issue 02 dated 17 April 2018
- FAA Type Certificate E28NE issued 27 August 1987
- FAA Type Certificate Data Sheet No.E28NE at Revision 7 dated May 17, 2013
 - Model CFM56-5 approved 27 August 1987
 - Model CFM56-5A3 approved 5 February 1990
 - Model CFM56-5-A1/F approved 15 October 1992
 - Models CFM56-5A4, -5A4/F, -5A5, -5A5/F approved 27 February 1996

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

FAA TC E28NE – The certification basis of the CFM56-5A Series was 14 CFR Part 33, effective February 1, 1965, with Amendments 33-1 through 33-10.

EASA TC E.067 – For the initial CFM56-5 model the certification basis was JAR-E at Change 6 (28 August 1981 – based on BCAR Section C, Issue 13) as amended by BCAR Paper N° C791 (18 April 1984). For all subsequent CFM56-5A models, this was updated to JAR-E Change 6 (28 August 1981 – based on BCAR Section C, Issue 13) as amended by BCAR Paper N° C791 (18 April 1984) and NPA-E-10 "Approval of Engines and Associated Equipment". Two Special Conditions were applied to the CFM56-5A4 and CFM56-5A5 Series models.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1A, because JAR E is equivalent to FAR 33, which is the basic standard for Aircraft Engines called up under Part 21 Appendix C. There are no non-compliances and no additional special conditions have been prescribed by the Director under §21.23.

(ii) *Special Conditions:*

SC No 1 (EASA CFM56-5A4/5 models) – Birds Ingestion: Medium Bird – It shall be demonstrated by engine and rig test or be shown by analysis, based on rig and/or engine test evidence, that the engine can meet the proposed revised Medium Bird requirements to address the two and a half pound Medium Bird threat discussed at the Authorities/Industry meeting at Gatwick on 30/31 May 1991. Proposed bird weights in relation to inlet size for the engine and rig tests were defined.

SC No 2 (EASA CFM56-5A4/5 models) – Water and Hail Ingestion (Inclement Weather) – It shall be demonstrated by engine test or be shown by analysis based on testing of similar engine types that the engine can meet the hail and water ingestion threats defined in AIA "Advisory Circular proposal" PC 338-1.

(iii) *Equivalent Level of Safety Findings:*

Nil

- (iv) *Airworthiness Limitations:*
See Chapter 5 Airworthiness Limitations section of the applicable Shop Manual
- (3) Environmental Certification:
 - FAA TC E28NE – The CFM56-5/A Series complies with the fuel venting and emissions requirements of SFAR No. 27-5.
 - EASA TC E.067 – ICAO Annex 16, Volume II, First Edition, 18th February 1982.
- (4) Certification Compliance Listing:
 - CFM56-5 Compliance Check List dated 21 August, 1987
- (5) Flight Manual: N/A
- (6) Operating Data for Engine:
 - (i) *Maintenance Manual:*
 - CFM56-5A Engine Shop Manual – TP.SM.7
 - CFM56-5A Standard Practices Manual – SP.02
 - CFM56-5A Consumable Products Manual – CPM.03
 - CFM56-5A Illustrated Tools & Equipment Manual – ITEM.10
 - CFM56-5A Non-Destructive Test Manual – NDTM.11
 - (ii) *Current service Information:*
 - CFM56-5A Service Bulletins
 - (iii) *Illustrated Parts Catalogue:*
 - CFM56-A Illustrated Parts Catalog – PC.10
- (7) Agreement from manufacturer to supply updates of data in (5), and (6):
 - CFM now provides access through the Customer Web Center
<https://cwcportal.cfm56.com>
- (8) Other information:
 - Installation Manual – CFM 2026
 - Specific Operating Instructions – TP.OI-11

Attachments

The following documents form attachments to this report:

- Copy of EASA Type Certificate Data Sheet Number E.067
- Copy of FAA Type Certificate Data Sheet Number E28NE

Sign off

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David Gill
Team Leader Airworthiness

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Checked – Greg Baum
Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
CFM56-5A Series	CFM International S.A.	19/21B/7	14 September 2018