
Type Acceptance Report

TAR 0/21B/19

Fairchild SA227-DC

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Introduction

This report details the basis on which Type Acceptance Certificate No.0/21B/19 was granted in the Standard Category in accordance with NZCAR Part 21 Subpart B.

Specifically the report aims to:

- (a) Record the airworthiness certification standard used for type acceptance of the applicable model in New Zealand;
- (b) Summarise any outstanding requirements which must be complied with for the issue of a NZ Airworthiness Certificate to any models covered by the Type Acceptance Certificate.

Foreign Type Certificate Details

Type Certificate: A18SW

Issued by: Federal Aviation Administration

Manufacturer: Fairchild Aircraft, Inc.

Model: SA227-DC

Engines: Garrett TPE731-12UA/H/R-701G

Propellers: McCauley 4HFR34C663/652()/()-L106L/KA-0

MCTOW 16,500 lb.

Noise Category: FAR Part 36 Subpart G [*Takeoff noise level 80.9 db(A)*]

The certification basis of the SA227-DC is FAR Part 23 through Amendment 23-34, plus SFAR 27 through Amendment 5 (equivalent to FAR Part 34 effective September 10, 1990.)

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, as FAR 23 is the basic standard for Commuter Category Airplanes called up under Part 21 Appendix C. There are no non-compliances and no special conditions have been prescribed by the Director under §21.23.

Type Acceptance Application

The application for New Zealand type acceptance was from Inglis Aircraft Limited dated 7th April 2000. The first-of-type example of the SA227-DC was serial number DC-868B, which is to be operated by Origin Pacific Airways on a DHL freight contract as ZK-JSV.

Type Acceptance Certificate No.0/21B/19 was granted on 22 May 2000.

The Metro 23 is a development of the Metro III incorporating any changes required by re-certification under the FAR 23 Commuter category rules. (Necessitated by the expiry of SFAR 41 manufacturing approvals.) The SA-227DC and SA-227CC are the two versions

of the Metro 23 and are identical except for the different engine variant fitted. The SA227-CC version has the 1000 shp (dry takeoff rating) TPE331-11 while the SA227-DC has the more powerful 1100 shp TPE331-12 series engine. (The -12 installation is identical to that which was previously approved on the SA227-BC Metro III, except for the addition of a Reserve Power System and a change to the CAWI [continuous achohol- water injection] system.)

The SA227-CC model had been previously type accepted by the CAA in October 1994, when two examples were imported and are still operated by Airwork (NZ) Ltd. (See TA Report No. 3/94.) The Metro 23 was FAA approved in June 1990 initially at a MAUW of 16,100 lb., although this was increased to 16,500 lb. for all production aircraft.

Type Data

The type data requirements of NZCAR Part 21B Para §21.43 have been satisfied by supply of the following documents:

- (1) Type certificate: FAA Type Certificate No. A18SW Models SA227-CC and SA227-DC
FAA TCDS No. A18SW at Revision 2 dated November 14, 1996
FAA TCDS No. E4WE TPE-331 series at Rev.30 dated Oct 31, 1997
FAA TCDS No.P3NE McCauley 4HFR34C(6--) at Rev.11 Sept.4, 1996
- (2) Airworthiness design requirements: Already held by the CAA
- (3) Certification compliance listing:
Fairchild Aircraft Report No. UNPF-R1269 – FAA Compliance Checklist SA227-DC
Dated 1 February 1994 – Note as the SA227-DC is defined as the SA227-CC airplane with TPE331-12 engines, the checklist only includes the rules relating to the power plant change.
- (4) Flight manual: FAA Approved Airplane Flight Manual Fairchild Model SA227-DC Document AFM 6DC P/N 27-10054-113 – CAA Accepted as AIR 2697
- (5) Illustrated Parts Catalogue: IPC on microfiche already held by the CAA
- (6) Maintenance manual and service data for aircraft, engine and propeller:
Already held by the CAA – (The maintenance documentation for the SA227 Commuter Category series is applicable to both the SA227-CC and SA227-DC.)
The CAA already held the following on microfiche:
Service Information; Structural Repair Manual; Maintenance Manual; Tool and Equipment Manual; Servicing and Recovery Manual; Instructions for Continued Airworthiness, Airframe Airworthiness Limitations Manual ST-UN-M003
(contains

Inspection Schedule and Retirement Lives for life-Limited Components).

(7) Agreement from manufacturer to supply updates of data in (4):

Email from Karen Palmer dated 9 May 2000.

(8) Other information:

FAA Letter dated January 6, 2000 about incorrect propeller model numbers on TCDS

Metro 23-12 Model SA227-DC Model Specification – Reissue dated Jan. 19, 1998

Fairchild Drawing 27K10002 - Fwd Escape Hatch/Cargo Conversion - Rev.A 28-2-00

Fairchild Drawing 27K14065 – Cargo Net Instl Kit – Rev.A dated 19-9-94

Additional New Zealand Certification requirements

Compliance with the following additional NZ requirements has been reviewed and were found to be covered by either the original certification requirements or the basic build standard of the aircraft, except as noted:

Civil Aviation Rules Part 26

Subpart B - Additional Airworthiness Requirements

Appendix B - All Aircraft

| PARA: | REQUIREMENT: | MEANS OF COMPLIANCE: |
|-------|---|---|
| B.1 | Marking of Doors and Emergency Exits | FAR §23.811(b) for Commuter Category |
| B.2 | Crew Protection Requirements - CAM 8 Appdx. B # .35 | Agricultural Aircraft – <i>Not Applicable</i> |

Appendix C - Air Transport Aircraft - More than 9 Pax

| PARA: | REQUIREMENT: | MEANS OF COMPLIANCE: |
|-------|--|---|
| C.1 | Doors and Exits | FAR §23.807(b) and §23.807(d)(2) |
| C.2.1 | Additional Emergency Exits - per FAR 23.807(b) @ 10.5.93 | Metro 23 has one emergency exit on port side and 2 on starboard side of size 20 x 28 inch – See FM page 6B-13 |
| C.2.2 | Emergency Exit Evacuation Equipment – Descent means | FAR §23.807(d)(1) – SA227s exit less than 2m from the ground |
| C.2.3 | Emergency Exit Interior Marking - Size/self-illuminating | FAR §23.811(b) for Commuter Category |
| C.3.1 | Landing Gear Aural Warning - Automatic Flap Linking | FAR §23.729(f) – See Flight Manual page 6B-30 |

Civil Aviation Rules Part 91

Subpart F - Instrument and Equipment Requirements

| PARA: | REQUIREMENT: | MEANS OF COMPLIANCE: |
|-----------------|---|--|
| 91.505 | Shoulder Harness if Aerobatic; >10 pax; Flight Training | Shoulder harness fitted as std – see Model Specification §20.1 |
| 91.507 | Pax Information Signs - Smoking, safety belts fastened | Fitted as Standard – See Flight Manual page 6B-15 |
| 91.509 Min. VFR | (1) ASI (2) Machmeter (3) Altimeter (4) Magnetic Compass (5) Fuel Contents (6) Engine RPM (7) Oil Pressure * Fitted as standard – See Flight Manual pages 6B-48 and 49 | FAR §23.1303(a) N/A FAR §23.1303(b) FAR §23.1303(c) FAR §23.1305(a) FAR §23.1305(d)(e) * FAR §23.1305(b) * (8) Coolant Temp (9) Oil Temperature (10) Manifold Pressure (11) Cylinder Head Temp. (12) Flap Position (13) U/C Position (14) Ammeter/Voltmeter N/A - Turbine engaged FAR §23.1305(c) * N/A - Turbine engaged N/A - Turbine engaged FAR §23.699(a)(2) FAR §23.729(e) FAR §23.1351(d) – Both fitted as standard – See FM page 6B-11 |
| 91.511 Night | (1) Turn and Slip (2) Position Lights | Fitted as std – See DS §19.3 #2 FAR §23.1385 – See FM #6B-40 |
| 91.517 | (1) Gyroscopic AH | Fitted as std – See DS §19.3 # (3) Anti-collision Lights (4) Instrument Lighting (5) OAT FAR §23.1401 – See FM #6B-42 FAR §23.1381 – See FM #6B-41 Fitted as std – See DS §19.3 #24 |

| | | | | |
|-------------------------------|--|---|--|---|
| IFR | (2) Gyroscopic DI (3) Gyro Power Supply (4) Sensitive Altimeter | Fitted as std – See DS §19.3 # FAR §23.1331(a)(3) Bendix-King KEA 346 std fit | (6) Time in hr/min/sec (7) ASI/Heated Pitot (8) Rate of Climb/Descent | Fitted as std – See DS §19.3 #1 Fitted as std – See FM page 6B-44 Fitted as std – See DS §19.3 #4 |
| 91.519 | IFR Communication and Navigation Equipment | | Standard Fairchild Avionics Package per Model Specification is: dual Collins VHF22A COM – top & bottom mounted antennae; dual Collins VIR32 NAV with all-weather blade antenna; Collins ADF60A; Collins DME42; dual RMI and EHSI | |
| 91.523 Emergency Eqpmt. | (a) More Than 10 pax - First Aid Kits per Table 7 - Fire Extinguishers per Table 8 (b) More than 20 pax - Axe readily acceptable to crew (c) More than 61 pax - Portable Megaphones per Table 9 | | To be determined on an individual aircraft basis 2 hand-held fire extinguishers fitted as std – See FM page 6B-16 <i>N/A – maximum 19 passengers</i> (Available as option 27-90656) <i>N/A – Less than 61 passengers</i> | |
| 91.529 | ELT - TSO C91a after 1/4/97 (or replacement) | | Artes ELT-110-4 Fitted as std – See Flight Manual page 6B-51 | |
| 91.531 | Oxygen Indicators - Volume/Pressure/Delivery | | Cabin altitude warning system fitted as std – See FM page 6B-6 | |
| 91.535 Press. A/c | (1) Flight Crew Member On-Demand Mask; 15 min PBE (2) 1 Set of Portable 15 min PBE (3) Crew Member - Pax Oxygen Mask; Portable PBE 120L (4) Spare Oxygen Masks/PBE (5) Min Quantity Supplemental Oxygen (6) Required Supplemental/Therapeutic Oxygen Above FL250 - Quick-Donning Crew On-Demand Mask | | Diluter-demand masks and smoke goggles fitted as std for crews 1 x portable pbe fitted as local modification in NZ N/A – no cabin crew carried Cockpit equipment fitted meets requirement 115 cu. ft. oxygen bottle available as optional equipment per 27-83036 (Standard bottle 50 cu.ft.) N/A – Maximum Operating Pressure Altitude – 25,000 feet | |
| 91.541 | SSR Transponder and Altitude Reporting Equipment | | Standard Avionics Package includes dual Collins TDR90 Tx | |
| 91.543 | Altitude Alerting Device - Turbojet or Turbofan | | Bendix-King KAS 297A Altitude Alerter fitted as standard | |
| 91.545 | Assigned Altitude Indicator | | <i>N/A – see above</i> | |
| A.15 | ELT Installation Requirements | | To be determined on an individual aircraft basis (ELT re-located by Horizon Air Support under Mod.No.Q1225) | |

Civil Aviation Rules Part 125

Subpart F - Instrument and Equipment Requirements

| PARA: | REQUIREMENT: | MEANS OF COMPLIANCE: |
|---------|---|--|
| 125.355 | Seating and Restraints | FAR §23.785 |
| 125.357 | Additional Instruments (Powerplant and Propeller) | FAR §23.1305 |
| 125.359 | Night Flight | Landing light, Pax compartment |
| 125.361 | IFR Operations | Speed, Alt, spare bulbs/fuses |
| 125.361 | SE IFR Requirements – If Applicable | Operational requirement - To be determined as required |
| 125.363 | Emergency Equipment (Part 91.523 (a) and (b)) | Operational requirement - To be determined as required |
| 125.365 | Public Address and Crew Member Intercom System | Baker B1035 Audio Control/Amplifier fitted as standard |
| 125.367 | Cockpit Voice Recorder – Appendix B.3 – TSO C84/123 | Loral Model A100 Fitted as standard – See Model Spec. |
| 125.369 | Flight Data Recorder – Appendix B.4 requires TSO C124 | Loral Model F1000 Fitted as standard – See Model Spec. – 18 parameters per FAR 135 Appendix. F (See FAC letter CAA-NZ-1) |
| 125.371 | Additional Attitude Indicator | AIM 520-3A stand-by ADI fitted as standard |
| 125.373 | Weather Radar – Appendix B.6 requires TSO C63 | N/A – MCTOW ≤ 5700 kg – Bendix-King RDR 2000 std fit |
| 125.375 | Ground Proximity Warning System – Appendix B.7 requires TSO C92 | Sundstrand Mark IV GPWS part of standard avionics package - Optional fit per Fairchild Drawing 27-88105, SB CC7-34-001 |
| 125.377 | HUMS | N/A – Only applicable to single-engined aircraft |

Freight Configuration

The Metro 23 is certificated under Amendment 34 of FAR 23 that introduced the Commuter Category to replace the old FAR 135 Appendix A/SFAR 41 rules. Under §23.807(d)(1)(i) an aircraft with a total passenger seating capacity of less than fifteen must have an emergency exit on both sides of the cabin. The previous FAR version only required a second exit for a seating capacity of more than five occupants. Thus in the freight version the Metro III only needs one exit while the Metro 23 requires two. Fairchild Kit 27K10002 Fwd Escape Hatch/Cargo Conversion details changes required to convert the Metro 23 into the all-freight (Expeditor) approved configuration. This calls up the additional exit installed opposite the main door, for use when the full-width impenetrable

cargo barrier is installed per Kit 27K14065. Because this exit can only be factory fitted, OPAL was granted an exemption (0/EXE/71) for 12 months to enable its installation to be scheduled. (Airwork was similarly granted 0/EXE/80).

Summary

Type Acceptance Certificate No. 0/21B/19 has been granted to the Fairchild SA227-DC and all serial numbers are now eligible for the issue of a New Zealand Airworthiness Certificate in the Standard Category in accordance with NZCAR §21.177, subject to any outstanding operational requirements noted above being met.

Attachments

The following documents form attachments to this report:

Photographs First-of-Type example Serial Number DC-868B, ZK-JSV
Three-view drawing Fairchild Model SA227-DC “Metro 23-12”
Copy of FAA Type Certificate/Type Certificate Data Sheet A18SW

Sign off

David Gill
Team Leader Airworthiness

Date: 12 June 2000