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# **Type Acceptance Report**

**TAR 4/21B/27**

**Convair 5800**



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## Executive Summary

New Zealand Type Acceptance has been granted to the General Dynamics Allison Convair 340/440 Model CV580 and CV5800 conversions, based on validation of Transport Canada Type Certificate A-220 and the applicable FAA and Transport Canada Supplemental Type Certificates covering the conversions. There are no special requirements for import.

The CV580/5800 Models are now eligible for the issue of an Airworthiness Certificate in the Standard Category in accordance with CAR §21.191(1), subject to any outstanding New Zealand operational requirements being met. (See Section 5 of this report for a review of compliance of the basic type design with the operating Rules.) The Convair 5800 STC is a “no passenger and no cargo STC”. To obtain the passenger or cargo configurations, subsequent FAA approved STCs must be installed.

## 1. Introduction

This report details the basis on which Type Acceptance Certificate No.4/21B/27 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 model(s) in New Zealand; and
- (b) Identify any special conditions for import applicable to any model(s) covered by the Type Acceptance Certificate; and
- (c) Identify any additional requirements which must be complied with prior to the issue of a NZ Airworthiness Certificate or for any subsequent operations.

## 2. Foreign Type Certificate Details

|                   |  |                  |
|-------------------|--|------------------|
| Manufacturer:     | General Dynamics Corporation, Convair Division     |                  |
| Model(s):         | 340 or 440   |                  |
| TC Holder:        | Kelowna Flightcraft Limited                        |                  |
| Type Certificate: | 6A6  | A-220            |
| Issued by:        | Federal Aviation Administration                    | Transport Canada |
| STC:              | CV580: SA4-1100                                    | SA00-140         |
|                   | CV5800: SA6088NM                                   | SA93-208         |
| Engine:           | Allison 501-D13D or H, or –D22G                    |                  |
| Propeller:        | CV580: Aeroproducts A6441FN-606A                   |                  |
|                   | CV5800: Hamilton Standard 54H60-164/A7121 B-2      |                  |
| MCTOW             | CV580: 54,600 lb. (58,156 lb. per PAC Dwg 9000057) |                  |
|                   | CV5800: 63,000 lb.                                 |                  |

Noise Standard: CV5800: FAR 36 Appendix C at Amendment 18 (Stage 3 – See AFM §1.33.1)

The certification basis of the original Convair 340/440 models was CAR 4b, effective July 20, 1950, and Amendment #1, #3 and #5, except smoke detectors are not installed in cargo compartments. For the original CV580 conversion Special Regulations 422B and 423 were added, while FAR 34 and FAR 36 and Special Condition 25-ANM-57 for HIRF and Lightning were included for the CV5800. This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1A, as CAR 4b is the predecessor of FAR 25, which is the basic standard for Transport Category Airplanes 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.

### 3. Type Acceptance Certificate

The application for New Zealand type acceptance of the CV5800 was from Air Freight NZ Ltd, dated 10 May 2004. The first-of-type example was serial no. 277, registered ZK-KFS. The CV5800 is a large pressurised twin-turboprop low-wing Transport Category airliner.

Type Acceptance Certificate No. 4/21B/27 was granted on 28 October 2004 to the CV5800 conversion based on validation of Transport Canada Type Certificate A-220 and FAA STC SA6088NM. There are no special requirements for import into New Zealand.

The CV5800 is a further conversion of the CV580, which was a major upgrade of the piston-powered Convair 340 and 440 aircraft to Allison 501-D (Series III) turbo propeller engines, derated to 4300 TSHP. There have been ten previous examples of the CV580 operating in New Zealand since ZK-FTA was registered in May 1989, although two have been lost in accidents and one exported. CV5800 changes consist of the following:

- Installation of 501-22G engines per STC SA4-1100 (original CV580 conversion)
- Installation of Hamilton Standard propellers per STC SA1825NM
- Lengthening the fuselage 14 ft. 3.0 inches (7'11" forward, 6'4" aft)

Type acceptance is required for the STC under NZCAR Part 21 Appendix D(2)(i), because a complete new Flight Manual is introduced. One of the limitations of the STC is that it is a “no passenger and no cargo STC”. To obtain a passenger or cargo configuration, subsequent FAA-Approved STCs must be installed.

The Convair 340/440 was designed and manufactured by General Dynamics Corporation in San Diego under FAA type and production certificates. (Dataplates up to serial number 311 are CV340's and serial numbers 312 to 510 are CV440's.) In 1995 Type Certificate 6A6 was transferred to Tracor Corporation, and in 1998 it was transferred to Kelowna Flightcraft R & D Ltd. Effective January 1, 2001, responsibilities for the type design and continuing airworthiness (for State-of-Design under ICAO Annex 8) were formally transferred from the USA to Canada. (See letter reference AARD 5010-A144 dated Jan 24, 2001.) With the change of nationalities a new type certificate A-220 was issued by Transport Canada. In conjunction with the type certificate a number of STCs were also transferred, including that covering the CV580 conversion.

Development, engineering, and certification of the CV5800 under STC SA6088NM was done by General Dynamics Convair Division and FAA approved, while the actual manufacturing was done in Kelowna by Flightcraft and witnessed throughout by Transport Canada for the FAA. (Kelowna has for many years specialised in operation and conversion of the CV580 aircraft.) After approval of STC SA6088NM and the Flight Manual by the FAA, Transport Canada further approved a Canadian STC SA93-208 which includes a required AFM supplement Canops2 to the FAA approved AFM. In accordance with convention NZ type acceptance has been formally based on the current State-of-Design (Canada) approvals for the CV580. However the CV5800 was certified first in 1993 by the FAA, and the USA remains the State-of-Design for that particular STC. Therefore the FAA-Approved Flight Manual is used in NZ, and the Canops supplement is not required.

#### 4. 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 Aircraft Specification No. 6A6 at Revision 12 dated January 1, 2001

Transport Canada TC A-220, TCDS Issue No. 1 dated January 15, 2001

FAA STC Number SA4-1100 Detroit Diesel Allison Division, GMC – Conversion of Convair 340/440 for installation of Allison Model 501-D13D/H engines with Aero products A6441FN-606A propellers

FAA STC Number SA6088NM – Conversion into a Model CV5800  
TC Supplemental Type Approval No. SA93-208 – Conversion into CV5800

FAA STC Number ST00850NY – Installation of a Cargo Handling System  
TC Supplemental Type Approval No. SA95-94 – Cargo Handling System  
Kelowna Master Drawing List No. KF580-250000003 Rev.B dated 95/10/27

DoT Limited STC No. P-LSA97-016 – “Cargon” Cargo Interior Installation

(2) Airworthiness design requirements: Already held by the CAA.

(3) Certification compliance listing:

List of data (CV580): Reports APR-1 through APR-349, Allison Letters, PacAero Letters, AiResearch Reports.

CV5800 Stretch Report Listing – General Dynamics  
Reports DF-340/ZS-340/ZS-580/ZU-580 Series

CV5800 Reports List – TFSI CV-5800-01 thru -37

(4) Flight manual: FAA Approved Airplane Flight Manual for the Allison Prop-Jet Convair 340/440 – Pub. No. 1CC1-1 – CAA Approved as AIR 2366

FAA Approved Airplane Flight Manual for the Allison Convair 5800 Kelowna Flightcraft Doc. K999-AFM – CAA Accepted as AIR 2868

(5) Illustrated Parts Catalogue:

Parts Catalog – Allison Gas Turbine Prop-Jet Convair – Publication No. 1CC-4  
 Convair 5800 IPC Supplement – Kelowna Flightcraft Document No. K999-IPCS

(6) Maintenance manual and service data for aircraft, engine and propeller:

Maintenance Manual Allison Prop-Jet Convair – Publication No. 1CC2-1  
 Convair 5800 Maintenance Manual – Kelowna Flightcraft Doc. CV5800-AMM-1  
 Large Aircraft Maintenance Schedule Approval – Convair 131/5800 – April 03/02

(7) Agreement from manufacturer to supply updates of data in (4), (5) and (6):

CAA 2171 form from Jay-Dee Aircraft Supply Co. dated 17 April 1989  
 CAA 2171 – Convair Division Manager, Kelowna Flightcraft dated Sept. 8, 2004

(8) Other information:

Pacific Airmotive Report Number APR-70-D – Electrical Load Analysis Allison Prop-Jet Convair – dated 18 August 1967  
 PacAero Engineering Corporation Report Number APR-80 – Allison Prop-Jet Convair Equipment List – dated 4/11/60  
 CV5800 Electrical Load Analysis – Document No. KF050392-2 dated 5 March 92  
 Flight Manual CV5800 Part II – Description (Unapproved Sections)

## 5. Additional New Zealand Requirements

Compliance with the retrospective airworthiness requirements of NZCAR Part 26 is a prerequisite for the grant of a type acceptance certificate. The CV5800 (approved for all-cargo configuration only) has been assessed as follows:

### 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                | <i>To be determined on an individual aircraft basis</i> |
| B.2   | Crew Protection Requirements - CAM 8 Appdx. B # .35 | Not Applicable – Agricultural Aircraft only             |

##### Appendix C – Air Transport Aircraft - More than 9 Pax

| PARA: | REQUIREMENT:   | MEANS OF COMPLIANCE:                                 |
|-------|--|--|
| C.1   | Doors and Exits  | CAR 4b354(b) and (e); CAR 4b.362(g)                  |
| C.2.1 | Additional Emergency Exits - per FAR 23.807(b) @ 10.5.93 | Meets CAR 4b Certification requirements per para (c) |
| C.2.2 | Emergency Exit Evacuation Equipment – Descent means      | Not Applicable to All-Cargo Configuration            |
| C.2.3 | Emergency Exit Interior Marking – Size/self-illuminating | Not Applicable to All-Cargo Configuration            |
| C.3.1 | Landing Gear Aural Warning – Automatic Flap Linking      | CAR 4b.334(e)(2)                                     |

##### Appendix D – Air Transport Aircraft - More than 19 Pax

| PARA: | REQUIREMENT:  | MEANS OF COMPLIANCE:                      |
|-------|---|---|
| D.1.1 | Exit Types - Shall be per FAR 25.807 @ 29.03.93     | CAR 4b.362(b) has equivalent provisions   |
| D.1.2 | Floor Level Exits – Definition                      | Meets CAR 4b Certification requirements   |
| D.2.1 | Additional Emergency Exits – Must meet requirements | Not Applicable to All-Cargo Configuration |



|        |   |  |
|--------|---|--|
| D.2.2  | Emergency Exit Access   | Not Applicable to All-Cargo Configuration  |
| D.2.3  | Emergency Exit Operating Handles – Markings/Lighting  | Not Applicable to All-Cargo Configuration  |
| D.2.4  | Emergency Exit Evacuation Equipment – Descent means   | Not Applicable to All-Cargo Configuration  |
| D.2.5  | Emergency Exit Escape Route - Must be slip resistant  | Not Applicable to All-Cargo Configuration  |
| D.2.6  | Emergency Lighting<br>(a) Switch Provisions; Uninterrupted Power; Last 10 min.<br>(b) Descent Illumination – Automatic and Independent  | Not Applicable to All-Cargo Configuration  |
| D.2.7  | Emergency Interior Lighting – independent supply; min. illumination; incl. floor proximity escape path markings   | Not Applicable to All-Cargo Configuration  |
| D.2.8  | Emergency Exterior Lighting – in effect 30.04.72 or later   | Not Applicable to All-Cargo Configuration  |
| D.2.9  | Emergency Exit Interior Marking - Clear; instructions; signs above routes, by exits, on bulkheads; Meet provisions in effect 30.4.72, or later; Min. brightness 250 microlamberts   | Not Applicable to All-Cargo Configuration  |
| D.2.10 | Emergency Exit Exterior Markings – 2” contrasting band; opening instructions in red or bright chrome yellow;  | <i>To be determined on an individual aircraft basis</i>  |
| D.3    | Lavatory Fire Protection  | Not Applicable to All-Cargo Configuration  |
| D.4    | Materials for Compartment Interiors – T/C after 1.01.58:<br>(b) Manufactured 20/8/88 - 20/8/90 – Meet heat release requirements of FAR 25 at 20.08.86 increased to 100/100<br>(c) Seat cushions (except flightdeck) must be fireblocked | Not Applicable – No crew or passengers carried in CV5800 in all-cargo configuration<br><br>Not Applicable – No passenger seats in CV5800 |
| D.5    | Cargo and Baggage Compartments – T/C after 1.01.58:<br>(a) Each C or D compartment greater than 200 cu ft shall have liners of GFRS or meet FAR 25 in effect 29.03.93<br>(c) Liners shall be separate from the aircraft structure       | Not Applicable – Cargo compartment of CV5800 is classified as Class E  |

Compliance with the following additional NZ operating 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 91

### Subpart F – Instrument and Equipment Requirements

| PARA:  | REQUIREMENT:  | MEANS OF COMPLIANCE:   |
|--------|---|--|
| 91.505 | Shoulder Harness if Aerobatic; >10 pax; Flight Training   | Pilot/Co-Pilot shoulder harness fitted iaw STC SA874WE   |
| 91.507 | Pax Information Signs - Smoking, safety belts fastened  | Not Applicable – All cargo configuration   |
| 91.509 | (1) ASI<br>Min. VFR<br>(2) Machmeter<br>(3) Altimeter<br>(4) Magnetic Compass<br>(5) Fuel Contents<br>(6) Engine RPM<br>(7) Oil Pressure  | CAR 4b.612(a)<br>CAR 4b.603(j) – N/A<br>CAR 4b.612(b)<br>CAR 4b.612(c)<br>CAR 4b.613(b)<br>CAR 4b.612(c)<br>CAR 4b.612(c)  |
| 91.511 | (1) Turn and Slip<br>Night<br>(2) Position Lights   | (8) Coolant Temp<br>(9) Oil Temperature<br>(10) Manifold Pressure<br>(11) Cylinder Head Temp.<br>(12) Flap Position<br>(13) U/c Position<br>(14) Ammeter/Voltmeter<br><br>(3) Anti-collision Lights<br>(4) Instrument Lighting<br>CAR 4b.637<br>CAR 4b.630 |
| 91.513 | VFR Communication Equipment   | <i>Operational requirement – compliance as applicable</i>  |
| 91.517 | (1) Gyroscopic AH<br>IFR<br>(2) Gyroscopic DI<br>(3) Gyro Power Supply<br>(4) Sensitive Altimeter   | (5) OAT<br>(6) Time in hr/min/sec<br>(7) ASI/Heated Pitot<br>(8) Rate of Climb/Descent<br>CAR 4b.603(d)<br>CAR 4b.603(e)<br>CAR 4b.603(c)<br>CAR 4b.603(c)   |
| 91.519 | IFR Communication and Navigation Equipment  | <i>Operational requirement – compliance as applicable</i>  |
| 91.523 | (a) More Than 10 pax - First Aid Kits per Table 7<br>- Fire Extinguishers per Table 8<br>Eqmpt.<br>(b) More than 20 pax - Axe readily acceptable to crew<br>(c) More than 61 pax - Portable Megaphones per Table 9  | Not Applicable to All-Cargo Configuration  |
| 91.529 | ELT - TSO C91a after 1/4/97 (or replacement)  | <i>To be determined on an individual aircraft basis</i>  |
| 91.531 | Oxygen Indicators - Volume/Pressure/Delivery  | <i>Operational requirement – compliance as applicable</i>  |
| 91.535 | (1) Flight Crew Member On-Demand Mask; 15 min PBE<br>Press. A/c<br>(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 Supplement Oxygen<br>(6) Required Supplemental/Therapeutic Oxygen Above FL250 - Quick-Donning Crew On-Demand Mask | <i>Operational requirement – compliance as applicable</i><br><br>Not Applicable – Maximum Operating Altitude – 25,000 ft.  |
| 91.541 | SSR Transponder and Altitude Reporting Equipment  | <i>Operational requirement – compliance as applicable</i>  |
| 91.543 | Altitude Alerting Device - Turbojet or Turbofan   | Not Applicable – Not turbojet or turbofan powered  |
| 91.545 | Assigned Altitude Indicator   | <i>Operational requirement – compliance as applicable</i>  |
| A.15   | ELT Installation Requirements   | <i>To be determined on an individual aircraft basis</i>  |

## Civil Aviation Rules Part 121

### Subpart F – Instrument and Equipment Requirements

| PARA:   | REQUIREMENT:   | MEANS OF COMPLIANCE:  |
|---------|--|---|
| 121.355 | Additional Instruments (Powerplant and propeller)                          | FAR Part 25 is a Part 21 Appendix C standard  |
| 121.357 | Additional Eqpt: Windscreen Wiper, Door, Key, Placard                      | <i>Operational requirement – compliance as applicable</i>   |
| 121.359 | Night Flight – Landing Light, Light in each pax cabin                      | <i>Operational requirement – compliance as applicable</i>   |
| 121.361 | IFR Operations   | Speed, Alt, spare bulbs/fuses   |
| 121.363 | Flights over water   | Liferafts   |
| 121.365 | Emergency Equipment  | Per §91.523 and EROPS kit   |
| 121.367 | PBE  | TSO C99 cockpit equipment<br>TSO C115 cabin equipment   |
| 121.369 | Pax Address, Intercom  | Meets FAR § 121.318 and 319.  |
| 121.371 | Cockpit Voice Recorder<br>Appendix B.5 requires TSO C84/C123               | <i>Operational requirement – compliance as applicable</i><br>(P/N 93-A100-10 fitted as standard.)           |
| 121.373 | Flight Data Recorder<br>Appendix B.6 requires TSO C124                     | <i>Operational requirement – compliance as applicable</i><br>(FDR upgraded to 11-parameter per P-LSA97-094) |
| 121.375 | Additional Attitude Indicator  | Fitted as standard  |
| 121.377 | Weather Radar<br>Appendix B.8 requires TSO C63                             | Honeywell P/N 7008470 Basic Required Equipment for CV5800 (See STCDS SA6088NM)                              |
| 121.379 | Ground Proximity Warning System<br>Appendix B.9 requires TSO C92           | Honeywell Mark VI Enhanced GPWS installed in accordance with Transport Canada STC No. SA04-108              |
| 121.381 | Terrain Awareness and Warning System<br>Appendix B.10 requires TSO C151a/b | Not Applicable until 1 January 2007   |
| 121.383 | Airborne Collision Avoidance System<br>Appendix B.11 requires TSO C119b    | Honeywell TCAS II system installed in accordance with Transport Canada STC No. SA04-107                     |

## Attachments

The following documents form attachments to this report:

Photographs first-of-type example CV5800 serial no. 277 ZK-KFS  
 Three-view drawing General Dynamics Convair Allison 340/5800  
 Copies of applicable FAA and Transport Canada TCDS and STC

## Sign off

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 David Gill  
 Team Leader Airworthiness

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 Checked – AWE3  
 Date: 28 October 2004

## Appendix 1

### List of Type Accepted Variants:

| Model: | Applicant:   | CAA Work Request: | Date Granted:   |
|--------|--|-------------------|-----------------|
| CV580  | Advisory Circular 21-1.2/NZCAR Part 21 Appendix A(c) |                   |                 |
| CV5800 | Air Freight NZ Limited                               | 4/21B/27          | 28 October 2004 |