Type Acceptance Report

TAR 1/21B/17

Cessna 441 Conquest

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Introduction

This report details the basis on which Type Acceptance Certificate No.1/21B/17 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 that 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:	A28CE
Issued by:	Federal Aviation Administration
Manufacturer:	Cessna Aircraft Company
Model:	441
Engines:	Garrett TPE331-8 Series
Propellers:	Hartzell HC-B3TN-5/T10178B-11 or McCauley 3GFR34C601/93JA-3
MCTOW	9850 lb.
Noise Category:	FAR Part 36, as amended by 36-1 through 36-6

The certification basis of the Cessna Model 441 is FAR Part 23 effective February 1, 1965, as amended by 23-1 through 23-14 except FAR 23.1385(c) as amended through 23-21; plus Special Conditions 23-74-CE-9. Findings of equivalent safety were made for FAR 23.1189(a), 23.1545 and 23.1583(a). Compliance with ice protection has been demonstrated per FAR 23.1419 at Amendment 23-14. In addition, for Serial Numbers 441-0173 on compliance with FAR 25.1447(c)(2) at Amendment 25-41 is required.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, as FAR 23 is the basic standard for Normal Category Airplanes called up under CAR 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 the aircraft importer, Garden City Helicopters, dated 2nd April 2001. The first-of-type example was a 1980 model serial number 441-0141 ex-VH-CFD. It was registered as ZK-NFD and is to be used as an air ambulance.

Type Acceptance Certificate No.1/21B/17 was granted on 26 April 2001.

The Cessna 441 is an 8-11 seat executive aircraft based on a scaled-up Model 421 but with an all-new high aspect ratio bonded wing and AirResearch TPE331 turboprop engines flat rated to 635 shp. The original prototype first flew in 1975 and manufacture ceased in 1984 after construction of serial number 362. There were two basic production series. At s/n 173 Cessna introduced SK441-36 under which the maximum operating altitude was increased from 33 to 35,000 feet, quick-donning oxygen masks were introduced and additional avionics options offered. (This can be retrofitted per SL No. PJ81-1.) From s/n 195 on the lighter McCauley propeller was fitted as standard. The Model 441 experienced some initial problems in service, with at least one in-flight structural break-up due to tailplane failure. Cessna developed a series of fixes including strengthened tailplane attachments and dual elevator trim tab actuators. These changes were retrofitted to the entire fleet and standard from s/n 109 onwards.

Type Data

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

(1) Type certificate: FAA Type Certificate A28CE Model 441 issued August 19, 1977
FAA TCDS A28CE at Revision 11 dated August 15, 1999

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

(3) Certification compliance listing:

Report DM 441-0 Model 441 Type Inspection Report – Basic Aircraft Configuration

Cessna Report No. S-441-110 – Model 441 – Structures Data Summary (Incl. Rev.M)

Cessna Report No. S-441-99 – Model 441 – Structural Substantiation Supplement I

S-441-110 Model 441 – Elevator System and Rudder Trim Tab Actuator Improvements

FAA Special Conditions 23-74-CE-9 Covering Flight Conditions (additional trim and performance requirements); Airframe Conditions (cockpit smoke evacuation); and Special Propulsion Conditions (fuel outlet and strainer, fire detector system, engine restart envelope).

Three findings of equivalent safety were made during Cessna 441 type certification:
FAR 23.1189(a) – A firewall shutoff valve was not required provided hydraulic system components on the engine side of the firewall were fireproof and flexible hoses met specified fire resistance criteria.
FAR 23.1545 and 23.1583(a) – IAS permitted instead of CAS provided both values are given in the POH/AFM and all placards to meet certification requirements are consistent with instrument markings.

(4) Flight manual: Model 441 POH and FAA Approved AFM – Document D1561-13PH

– CAA Accepted as AIR 2734 (S/N 441-0001 through 441-0172)

Model 441 POH and FAA Approved AFM – Document D1586-13PH

– CAA Accepted as AIR 2735 (S/N 441-0173 and On)

(5) IPC: Model 441 Parts Catalogue P674-2-12AF

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

Model 441 Maintenance Manual – D2518-14-13AF
Model 441 Wiring Diagram Manual – D2519-10-13AF

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

Cessna provided updates to the AFM/MM/WRD and IPC on request

(8) Other information:

Cessna Model 441 Conquest Equipment List – 15 August 1977 S/N 441-001 & on
Cessna Model 441 Conquest Equipment List – 27 October 1978 S/N 441-071 & on
Cessna Model 441 Conquest Equipment List – 5 November 1980 S/N 441-195 & on
Cessna Model 441 Conquest Equipment List – 16 July 1981 S/N 441-260 & on
Cessna Model 441 Conquest Equipment List – 1 August 1984 S/N 441-340 & on

Additional New Zealand Certification requirements

Compliance with the following additional NZ requirements has been reviewed and was 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	***To be determined on an individual aircraft basis***
B.2	Crew Protection Requirements - CAM 8 Appdx. B # .35	N/A – Agricultural aircraft only

Appendix C - Air Transport Aircraft - More than 9 Pax

The Model 441 has a type certificated seating capacity of 11, but the two front seats in the Flight Manual are designated crew seats. Therefore CAR Part 26 Appendix C is not applicable and the 441 does not need to be maintained by a Part 145 organization per CAR 43.53(b)(1).

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 standard – see POH Page 7-90	
91.507	Pax Information Signs - Smoking, safety belts fastened		N/A – Cabin has direct communication with flight compartment	
91.509 Min. VFR	(1) ASI	FAR §23.1303(a) – Fitted as Std. See POH Page 7-36	(8) Coolant Temp (9) Oil Temperature	N/A - Turbine engined FAR §23.1305(c) - Fitted as Std. See POH Page 7-74
	(2) Machmeter (3) Altimeter	N/A FAR §23.1303(b) – See POH 7-36	(10) Manifold Pressure (11) Cylinder Head	N/A - Turbine engined N/A - Turbine engined
	(4) Magnetic	FAR §23.1303(c) – Fitted as Std.	Temp.	FAR §23.699(a)(2) – Fitted as

	Compass (5) Fuel Contents (6) Engine RPM (7) Oil Pressure	See POH Figure 7-1 FAR §23.1305(a) - Fitted as Std. See POH Page 7-25 FAR §23.1305(d)(e) - Fitted as Std. See POH Page 7-74 FAR §23.1305(b) - Fitted as Std. See POH Page 7-74	(12) Flap Position (13) U/C Position (14) Ammeter/Voltmeter	Std. See POH Figure 7-1 #17 FAR §23.729(e) – Fitted as Std. See POH Figure 7-15 FAR §23.1351(d) – Both fitted as standard – See POH Fig. 7-1 #1 NOTE: POH refers to D1561-13
91.511 Night	(1)Turn and Slip (2) Position Lights	Fitted as std – See POH page 7-37 FAR §23.1385 – See POH page 7-31	(3) Anti-collision Lights (4) Instrument Lighting	FAR §23.1401 – See POH page 7-31 FAR §23.1381 - See POH page 7-33
91.517 IFR	(1) Gyroscopic AH (2) Gyroscopic DI (3) Gyro Power Supply (4) Sensitive Altimeter	HSI fitted as std – See POH p.7-36 FDI fitted as std – See POH p.7-36 FAR §23.1331(a)(3) EA-401A Standard Equipment.	(5) OAT (6) Time in hr/min/sec (7) ASI/Heated Pitot (8) Rate of Climb/Descent	Fitted as std – See POH Fig.7-1 #2 Fitted as std – See POH Fig.7-1 Fitted as std – See POH Page 7-34 Fitted as std – See POH Page 7-36
91.519	IFR Communication and Navigation Equipment		***Operational requirement – To be determined as applicable***	
91.523 Emergcy 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*** ***To be determined on an individual aircraft basis*** ***N/A – maximum 19 passengers*** ***N/A – Less than 61 passengers***	
91.529	ELT - TSO C91a after 1/4/97 (or replacement)		***To be determined on an individual aircraft basis***	
91.531	Oxygen Indicators (1) Amount of oxygen in each supply and whether supplied Visual/aural warning of cabin altitude above 10,000 AMSL (2) For individual dispensing units, amount available/delivery		NON-COMPLIANCE - POH states a warning light comes on when the cabin pressure altitude exceeds approximately 11,500 feet. There is a separate cabin altitude indicator. Oxygen system has a single supply bottle with pressure indicator	
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 Supplement Oxygen (6) Required Supplemental/Therapeutic Oxygen Above FL250 - Quick-Donning Crew On-Demand Mask - Supplemental O_2 Masks for all Pax/Crew - Supplemental Mask in Washroom/Toilet Above FL300 - Total Outlets Exceed Pax by 10% - Extra Units Uniformly Distributed - Automatically Presented Above FL140 - Manual Means of Deploying Pax Masks		For s/n 173 on (and aircraft incorporating SK441-36) Pilot and co-pilot oxygen masks are quick-don diluter-demand permanent type masks which are provided with 70 psig oxygen directly from the regulator. (See POH Page 7-88) Passenger masks are regulated continuous-flow dilution type. Oxygen flow to pax masks is indicated by inflation of a green bag within the oxygen flow bag or by an in-line flow indicator in the plastic supply line. ***Note the standard 11 cubic foot system is for emergency use only and provides only 10.5 minutes duration oxygen supply for an emergency descent.*** *(For aircraft without SK441-36 duration varies from 13.2 to 19.2 mins. for descent from FL330 or FL100 cabin.)* Above 14,500 feet a barometric switch automatically actuates the overhead pax. oxygen door solenoids to deploy drop masks at each passenger seat location. Can also be manually deployed.	
91.541	SSR Transponder and Altitude Reporting Equipment		***Operational requirement – To be determined as applicable***	
91.543	Altitude Alerting Device - Turbojet or Turbofan		N/A – Not turbojet or turbofan powered	
91.545	Assigned Altitude Indicator		***Operational requirement – To be determined as applicable***	
A.15	ELT Installation Requirements		***To be determined on an individual aircraft basis***	

Civil Aviation Rules Part 135

Subpart F - Instrument and Equipment Requirements

PARA:	REQUIREMENT:		MEANS OF COMPLIANCE:
135.355	Seating and Restraints – Shoulder harness for flight-crew seats		FAR 23.785
135.357	Additional Instruments (Powerplant and Propeller)		FAR 23.1305
135.359	Night Flight	Landing light, Pax compartment	***Operational requirement – To be determined as applicable***
135.361	IFR Operations	Speed, Alt, spare bulbs/fuses	***Operational requirement – To be determined as applicable***
135.363	Emergency Equipment (Part 91.523 (a) and (b))		***Operational requirement – To be determined as applicable***
135.367	Cockpit Voice Recorder		N/A – Applies to helicopters with more than 10 passenger seats
135.369	Flight Data Recorder		N/A – Applies to helicopters with more than 10 passenger seats
135.371	Additional Attitude Indicator		N/A – Not turbo jet or turbofan powered

Summary

Type Acceptance Certificate No. 1/21B/17 has been granted to the Cessna Model 441 and all serial numbers are now eligible for the issue of a New Zealand Airworthiness Certificate in the Standard Category in accordance with CAR §21.177. This is subject to any outstanding operational requirements noted above being met, particularly the CAR Part 91 oxygen equipment requirements for pressurised aircraft.

Attachments

The following documents form attachments to this report:

Photographs first-of-type example serial number 441-0141 ZK-NFD
Three-view drawing Cessna Model 441 Conquest
Copy of Type Certificate/ Type Certificate Data Sheet A28CE

Sign off

David Gill
Team Leader Airworthiness Date: 26 April 2001