
Type Acceptance Report

TAR 99/19 – Revision 2

Piper PA-24 Comanche

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Executive Summary

New Zealand Type Acceptance has been granted to the Piper PA-24 Comanche Series based on validation of FAA Type Certificate no. 1A15. There are no special requirements for import.

Applicability is currently limited to the Models and/or serial numbers detailed in Appendix 1, which are now eligible for the issue of an Airworthiness Certificate in the Standard Category in accordance with NZCAR §21.177, 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.) 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).

1. Introduction

This report details the basis on which Type Acceptance Certificate No.99/19 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.

The report also notes the status of all models included under the foreign type certificate which have been granted type acceptance in New Zealand. Models covered by the type acceptance certificate issued under Part 21B are listed in Section 2 of this report. Models which were accepted prior to that under NZCAR Section B.9 are listed in Appendix 1.

2. ICAO Type Certificate Details

Manufacturer:	Piper Aircraft Corporation
Type Certificate:	1A15
Issued by:	Federal Aviation Administration
Model:	PA-24
MCTOW	2550 lb. [1156 kg]
Max. No. of Seats:	4
Noise Standard:	Not Applicable

Engine: Lycoming O-360-A1A
Type Certificate: E-286
Issued by: Federal Aviation Administration

Propeller: Hartzell HC92ZK-8D/8447A-12A
Type Certificate: P-892
Issued by: Federal Aviation Administration

McCauley 2D36C14/78KM-4
Type Certificate: P-901
Issued by: Federal Aviation Administration

Model: **PA-24-250**

MCTOW 2800 lb. [1270 kg] 1958-60 production model
2900 lb. [1315 kg] 1961-64 production model

Max. No. of Seats: 4

Noise Standard: Not Applicable

Engine: Lycoming O-540-A1 Series
Type Certificate: E-295
Issued by: Federal Aviation Administration

Lycoming IO-540-C1B5
Type Certificate: 1E4
Issued by: Federal Aviation Administration

Propeller: Hartzell HC82XK-1D/8433-7 or HC-A2VK-1/V8433N-7
Type Certificate: P-878
Issued by: Federal Aviation Administration

McCauley 2D36C28/80MM-6
Type Certificate: P-901
Issued by: Federal Aviation Administration

3. Type Acceptance Details

The PA-24 Comanche has already been type accepted in New Zealand and ZK-CYT has been registered here since 1969. However the Flight Manual, and hence model approval, only covered the serial number range 24-1684 through 24-3687. The application for NZ type acceptance for the earlier serial number range was from the owner dated 23rd November 1998. The first-of-type example was ZK-CWJ, a 1957 model serial no. 24-82. The PA-24 is a 4-6 seat retractable low-wing single-piston engine touring light aircraft.

Type Acceptance Certificate No. 99/19 was granted on 26 November 1998 to the 1957-59 Piper Model PA-24 based on validation of FAA Type Certificate number 1A15. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

This report was raised to Revision 1 to include the Model PA-24-250 under CAA Work Request number 9/21B/4. The application was from the importer, Mr Barry Payne, and the first-of-type example was serial number 24-3206 registered ZK-BAZ. Type acceptance was granted on 9 October 2008.

Revision 2 was issued to include another International Comanche Society Flight Manual, this time for the 1966-68 Piper PA-24-260. The applicant was Rural Aviation (1963) Ltd, owner of ZK-DAA. Type Acceptance was granted on 4 July 2012 under Work Request number 12/21B/10.

The Comanche was the first of Piper's single-engined range of aircraft to have all-metal monocoque construction and was their high-performance flagship until the advent of the Malibu. The PA-24 first flew on 24 May 1956 and received type certification in June 1957. Production ended in 1972 when tooling in the Lock Haven factory was damaged in a flood. It is considered a classic, with an active owner's group which provides technical support.

The PA-24 was the initial model followed a year later by the PA-24-250. (The PA-24 is almost universally known as the PA-24-180. The Export C of A for ZK-CWJ even called it that). Small numbers of a 400 hp version were produced in 1963-64 and in 1965 the 260 hp engine became standard. The fuselage was stretched with the 260B model to permit an extra row of seats in 1966, while the 260C model in 1969 introduced a new cowling and a further gross weight increase. There are a couple of major Airworthiness Directives on the type: One requires replacement of the undercarriage bungees every 3 years; while another mandates an inspection of the vertical fin attachment.

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) ICAO Type certificate:

FAA Type Certificate Number 1A15

FAA Type Certificate Data Sheet no. 1A15 at Revision 34 dated August 7, 2006

- Model PA-24 approved June 20, 1957
- Model PA-24-250 approved April 16, 1958
- Model PA-24-260 approved June 19, 1964

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the Piper Model PA-24 Comanche is CAR 3, effective November 1, 1949, including Amendments 3-1 through 3-12 effective April 13, 1954. This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1A, because CAR 3 is the predecessor to FAR Part 23 which is the basic standard for Normal 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.

(ii) *Special Conditions:*

Nil

(iii) *Equivalent Level of Safety Findings:*

Nil

(iv) *Airworthiness Limitations:*

Nil

(3) Aircraft Noise and Engine Emission Standards:

Not applicable.

(4) Certification Compliance Listing:

Piper Report 900 – Model PA-24 Substantiation at 2600 lb. and 180 hp

Piper Report 902 – Model PA-24 Proposed CAA Aircraft Specification

Piper Report 936 – Model PA-24 Type Inspection Report

Piper Report 982 – Type Inspection Report PA-24”250” – Installation of Lycoming Engine Model O-540 and Increase in Gross Weight from 2500 lbs. to 2900 lbs.

Piper Engineering Report 1000 – Substantiation of Piper Model PA-24 with Lycoming O-540 and Increased Gross Weight

Piper Engineering Report 1065 – Substantiation of Piper 1961 Model PA-24”250”

(5) Flight Manual:

The TCDS calls up the Model PA-24 Airplane Flight Manual – Piper Report 934 Approved June 19, 1957, and revised March 7, 1958. The applicant requested the use of an alternative Flight Manual that was produced by the International

Comanche Society and published by Aircraft Publications of Austin, Texas. It has been FAA Approved and includes all the information in Piper Report 934. The rest of the document appears very well produced in the GAMA Specification No.1 format, and contains detailed procedures and performance data and technical data that have been taken from original Piper publications. This document is accepted by the FAA as an alternative to the Flight Manual specified on the TCDS, and has therefore been accepted as the Flight Manual in New Zealand. It has the advantage of being readily available and covers the entire 180 hp serial number range, replacing three separate Piper manuals.

Aircraft Publications – Pilot's Operating Handbook and FAA Approved Flight Manual PA-24-180 – 2550 Pounds Gross Weight 1957 through 1964 – Applicable to Airplanes with Serial Numbers 24-1 thru 24-3687 – CAA Accepted as AIR 2643

Piper Report 997 – FAA-Approved Airplane Flight Manual for Model PA-24"250" s/n 24-1, 24-103 thru -2002 and 24-2004 thru -2298 – CAA Accepted as AIR 3053

Piper Report 1127 – FAA-Approved Airplane Flight Manual for PA-24"250" s/n 24-2003, 24-2299 thru -2562 and 24-2564 thru -2843 – CAA Accepted as AIR 3052

Piper Report 1179 – FAA-Approved Airplane Flight Manual Model PA-24"250" s/n 24-2563, 24-2844 and up – CAA Accepted as AIR 3050

Piper Report 1220 – FAA-Approved Airplane Flight Manual for the PA-24"250" with Fuel Injection s/n 24-2563, 24-2844 and up – CAA Accepted as AIR 3051

International Comanche Society, Inc. – Pilot's Operating Handbook and FAA Approved Flight Manual PA-24-250 – 2900 Pounds Gross Weight 1962 through 1964 (Fuel Injection Model Only) – Applicable to Airplanes with Serial Numbers 24-2563 and 24-2844 thru 24-3687, except 24-3642 – CAA Accepted as AIR 3057

International Comanche Society, Inc. – Pilot's Operating Handbook and FAA Approved Flight Manual PA-24-260B – 3100 Pounds Gross Weight 1966 through 1968 (Fuel Injection Model Only) – Applicable to Airplanes with Serial Numbers 24-4247 and 24-4300 thru 24-4803, except 24-4783 – CAA Accepted as AIR 3223

(6) Operating Data for Aircraft, Engine and Propeller:

(i) *Maintenance Manual:*

PA-24 Comanche Service Manual – Part Number 1753 516

(ii) *Current service Information:*

Piper Service Bulletins

(iii) *Illustrated Parts Catalogue:*

PA-24 Series Comanche Parts Catalog – Part Number 1752 464

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

See email from Piper Foreign Certification Liaison dated 14 August 2008

(8) Other information:

Piper Comanche Owner's Handbook – 753 529 (1960 Models PA-24-180 and -250)

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.

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 - Agricultural Aircraft	CAM 8 Appendix B Section .35 – Not Applicable

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	Seating and Restraints – Safety belt/Shoulder Harness	<i>To be determined on an individual basis as applicable</i>
91.507	Pax Information Signs – Smoking, safety belts fastened	<i>To be determined on an individual aircraft basis</i>
91.509 Min. VFR	(1) ASI (2) Machmeter (3) Altimeter (4) Magnetic Compass (5) Fuel Contents (6) Engine RPM (7) Oil Pressure	CAR §3.655(a)(1) N/A CAR §3.655(a)(2) CAR §3.655(a)(3) CAR §3.655(b)(1)(i) CAR §3.655(b)(1)(v) CAR §3.655(b)(1)(ii)
		(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 – Air cooled engine CAR §3.655(b)(1)(iii) CAR §3.655(b)(2)(iii) CAR §3.655(b)(2)(i) Spring-loaded lever positions Warning lights CAR §3.687
91.511	Night VFR Instruments and Equipment	<i>Operating Rule – Compliance to be determined by operator</i>
91.513	VFR Communication Equipment	<i>Operating Rule – Compliance to be determined by operator</i>
91.517	IFR Instruments and Equipment	<i>Operating Rule – Compliance to be determined by operator</i>
91.519	IFR Communication and Navigation Equipment	<i>Operating Rule – Compliance to be determined by operator</i>
91.523	Emergency Equipment (a) More Than 9 pax - First Aid Kits per Table 7 - Fire Extinguishers per Table 8 (b) More than 20 pax - Axe readily accessible to crew (c) More than 61 pax - Portable Megaphones per Table 9	Not Applicable – Less than 10 passenger seats Not Applicable – Less than 10 passenger seats Not Applicable – Less than 20 passenger seats Not Applicable – Less than 61 passenger seats
91.529	ELT - TSO C126 406 MHz after 22/11/2007	<i>Operating Rule – Compliance to be determined by operator</i>
91.531	Oxygen Indicators - Volume/Pressure/Delivery	<i>Operating Rule – Compliance to be determined by operator</i>
91.533	Oxygen for Non-Pressurised Aircraft	Not Fitted as Standard
91.541	SSR Transponder and Altitude Reporting Equipment	<i>Operating Rule – Compliance to be determined by operator</i>
91.543	Altitude Alerting Device – Turbojet or Turbofan	Not Applicable – Not turbo jet or turbofan powered
91.545	Assigned Altitude Indicator	<i>Operating Rule – Compliance to be determined by operator</i>
A.15	ELT Installation Requirements	<i>To be determined on an individual aircraft basis</i>

Civil Aviation Rules Part 135

Subpart F – Instrument and Equipment Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
135.355	Seating and Restraints – Shoulder harness flight-crew seats	<i>Operating Rule – Compliance to be determined by operator</i>
135.357	Additional Instruments (Powerplant and Propeller)	Aircraft is fitted with all the instruments required by FAR §23.1305; reversible propeller not fitted
135.359	Night Flight	<i>Operating Rule – Compliance to be determined by operator</i>
135.361	IFR Operations	<i>Operating Rule – Compliance to be determined by operator</i>
135.363	Emergency Equipment (Part 91.523 (a) and (b))	<i>Operating Rule – Compliance to be determined by operator</i>
135.367	Cockpit Voice Recorder	N/A – Only for 2-crew helicopters with more than 10 pax
135.369	Flight Data Recorder	Not Applicable – Less than 10 passenger seats
135.371	Additional Attitude Indicator	Not Applicable – Not turbo jet or turbofan powered

Attachments

The following documents form attachments to this report:

Photographs first-of-type example PA-24 serial number 82 ZK-CWJ
Photographs first-of-type example PA-24-250 serial no. 3206 ZK-BAZ
Three-view drawing Piper Model PA-24 Comanche
Copy of FAA Type Certificate Data Sheet No. 1A15

Sign off

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David Gill
Team Leader Airworthiness

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Checked – Peter Gill
Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
PA-24-260 (s/n 4300-5034)	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
PA-24 (s/n 1684-3687)	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
PA-24 (s/n 1-1683)	C W Johnston	99/21B/19	26 November 1998
PA-24-250	B W Payne	9/21B/4	9 October 2008