
Type Acceptance Report

TAR 3/21B/21 – Revision 2

PIPER PA-34 SENECA Series

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Executive Summary

New Zealand Type Acceptance has been granted to the Piper PA-34 Seneca Series based on validation of FAA Type Certificate number A7SO. 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. 3/21B/21 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 The New Piper Aircraft, Inc (since July 14, 1995) Piper Aircraft, Inc. (since August 7, 2006)
Type Certificate:	A7SO
Issued by:	Federal Aviation Administration
Model:	PA-34-200 (Seneca)
MCTOW	4000 lb. (1814 kg.) 4200 lb. (1905 kg.) [s/n 34-7250215 through 7450220 or when Piper Kit 760-607 or 760-611 is installed]

Max. No. of Seats: 7

Noise Standard: Not Applicable

Engine: Lycoming L/IO-360-C1E6
Type Certificate: 1E10
Issued by: Federal Aviation Administration

Propeller: Hartzell HC-C2YK-2()...(F)(J)C7666A(-0)
Type Certificate: P920
Issued by: Federal Aviation Administration

Model: PA-34-220T (Seneca III)

MCTOW 4750 lb. (2160 kg.)
4407 lb. (1999 kg.) [with Piper Kit 764-099V or 766-203]

Max. No. of Seats: 7

Noise Standard: FAR 36 at Amendment 36-9

Engine: Continental L/TSIO-360-KB
Type Certificate: E9CE
Issued by: Federal Aviation Administration

Propeller: Hartzell BHC-C2YF-2()(L)()UF/F(J)C8459-8R
Type Certificate: P920
Issued by: Federal Aviation Administration

McCaughey 3AF32C508 or 509/(L)82NFA-6
Type Certificate: P57GL
Issued by: Federal Aviation Administration

Model: PA-34-220T (Seneca IV)

MCTOW 4750 lb. (2160 kg.)
4407 lb. (1999 kg.) [with Piper Kit 766-283 or 766-608]

Max. No. of Seats: 6

Noise Standard: FAR 36 at Amendment 36-9

Engine: Continental L/TSIO-360-KB
Type Certificate: E9CE
Issued by: Federal Aviation Administration

Propeller: Hartzell BHC-C2YF-2()(L)()UF/F(J)C8459-8R
Type Certificate: P920
Issued by: Federal Aviation Administration

McCauley 3AF32C508 or 509/(L)82NFA-6
Type Certificate: P57GL
Issued by: Federal Aviation Administration

Model: PA-34-220T (Seneca V)

MCTOW 4750 lb. (2160 kg.)
4407 lb. (1999 kg.) [with Piper Kit 766-632]

Max. No. of Seats: 6

Noise Category: FAR 36, Appendix G through Amendment 36-16

Engine: Teledyne Continental L/TSIO-360-RB
Type Certificate: E9CE
Issued by: Federal Aviation Administration

Propeller: Hartzell BHC-J2YF-C(L)UF/F(J)C8459(B)-8R
Type Certificate: P920
Issued by: Federal Aviation Administration

McCauley 3AF32C522 or 523/(L)82NJA-6
Type Certificate: P57GL
Issued by: Federal Aviation Administration

3. Type Acceptance Details

The application for New Zealand type acceptance of the Seneca III was from Mainland Air Services Ltd dated 2 December 2002. This follows the importation of aircraft serial number 34-48010 (to be registered ZK-JAS). (There has been one other PA-34-220T on the New Zealand register since 1990, but this aircraft [ZK-RSQ] is from a serial number range which uses a different flight manual.) The Seneca is an unpressurized retractable low wing all-metal six or seven-seat twin turbocharged piston-engine light aeroplane.

Type Acceptance Certificate No. 3/21B/21 was granted on 12 December 2002 to the Seneca III based on validation of FAA Type Certificate A7SO. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The application for New Zealand type acceptance of the Seneca V was from the importer of the first three aircraft, Massey School of Aviation, dated 25 March 2003. The first-of-type examples were serial numbers 3449112, 3449128 and 3449043 registered ZK-MBA, MBB and MBI respectively. Type Acceptance Certificate No. 3/21B/31 was granted on 8 July 2003 to the PA-34-220T Seneca V based on validation of FAA Type Certificate A7SO, and includes the Continental L/TsIO-360-RB engine covered by FAA Type Certificate No.E9CE. There are no special requirements for import into New Zealand.

This report was raised to Revision 1 to include the 1973 Model PA-34-200 Seneca. The first-of-type example was serial number 34-7450082 registered ZK-XYZ. The opportunity was also taken to update the format and to amalgamate the previous separate reports for the Seneca III and V variants. Type acceptance was granted on 27 August 2007.

Revision 2 was issued to add the PA-34-220T Seneca IV. The applicant was the importer, and the first-of-type was serial number 3448048 registered ZK-BJM. The manufacturer also took the opportunity to apply for type acceptance of the Seneca V when equipped with both the EFIS options (Avidyne Entegra and Garmin G600). Type acceptance of all three variants was granted on 22 November 2010.

Introduced in 1972 the Seneca is basically a twin-engined version of the PA-32 Cherokee Six, initially with twin 200hp Lycoming engines and counter-rotating propellers. For the Seneca II in 1975 Piper changed to six-cylinder turbocharged Continental powerplant with other detail changes. In 1981 the new Seneca III had higher rated engines and MAUW increase, along with a new instrument panel, one-piece windshield and larger electrically-actuated flaps. The Seneca IV produced from 1994-97 in limited numbers had minimal changes, the most obvious one being new engine cowlings with “axisymmetric” inlets.

The Seneca V is a development of the Seneca IV with improved engines and a new engine instrumentation system. Specific major detail changes include new overhead switch/dome panel, sun visors and headliner; two-bladed Hartzell propellers fitted as standard; new variant engines with power increased to 220 bhp continuous; new 2” engine instruments arranged vertically with a separate digital display monitoring panel (DDMP); new shaped fibreglass cowling with axisymmetric inlets; battery relocated from the nose to the aft baggage compartment; right aft facing seat deleted and an entertaining/executive console installed as standard equipment; new interior colours and materials; and rudder trim tab is changed from an anti-servo to a servo tab with increased travel, to reduce SE climb forces.

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 No. A7SO – Model PA-34 Seneca series

FAA Type Certificate Data Sheet number A7SO at Revision 14 dated June 1, 2001

- Model PA-34-200 (Seneca) approved 7 May 1971
- Model PA-34-200T (Seneca II) approved July 18, 1974
- Model PA-34-220T (Seneca III) approved December 17, 1980
- Model PA-34-220T (Seneca IV) approved November 17, 1993
- Model PA-34-220T (Seneca V) approved December 11, 1996

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the PA-34-200 Seneca is Part 23 of the Federal Aviation Regulations effective February 1, 1965, as amended by 23-1 through 23-6 effective August 1, 1967, with three paragraphs updated to a later amendment status. For later variants of the Seneca the original certification basis was retained except that individual paragraphs were updated to various later amendment dates as listed on the TCDS. The same principle was applied to approval of the Avidyne Entegra in the Seneca V, plus the HIRF Special Condition. For the Garmin G600 installation FAR 23 at Amendment 23-59 was applied for installation specific items only.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1, as FAR Part 23 is the basic standard for Normal 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 NZCAR §21.23.

(ii) *Special Conditions:*

(PA-34-220T Seneca V with Avidyne Entegra Systems)

23-175-SC – Protection of Systems for High Intensity Radiated Fields (HIRF) – Each system that performs critical functions must be designed and installed to ensure there is no adverse effect on continued operational capability when exposed to external electromagnetic HIRF.

(iii) *Equivalent Level of Safety Findings:*

Nil

(iv) *Airworthiness Limitations:*

See the applicable Maintenance Manuals.

(3) Aircraft Noise and Engine Emission Standards:

(i) *Environmental Standard:*

The first Model PA-34 to have to meet noise requirements was the Seneca III/IV, which has been certificated under FAR Part 36 through Amendment 36-9. The Seneca V was shown to meet FAR 36 Appendix G through Amendment 36-16.

(ii) *Compliance Listing:*

Seneca III/IV – Corrected FAR 36 Appendix G Noise Level is 71.4 dB(A) with the 2-blade propeller and 74.2 dB(A) with the 3-blade propeller. (See AFM §4.53)

Seneca V – Corrected FAR 36 Appendix G Noise Level is 78.5 dB(A) with the 2-blade propeller and 75.6 dB(A) with the 3-blade propeller. The ICAO Annex 16 Chapter 10 noise levels are 79.9 dB(A) [2-blade] and 77.6 dB(A) [3-blade]. (See POH/AFM Section 4.53 Noise Level.)

(4) Certification Compliance Listing:

Piper Report VB-129 Structural Substantiation of the PA-34 Twin Cherokee

Piper Report VB-579 – Static Tests and Structural Analysis – PA-34-200T

Piper Report VB-578 – Basic Design Data and Structural Loads – PA-34-200T

Piper Report FT-92 – Flight Test Substantiation of the PA-34-200T (Seneca II)

PA-34-220T Structural Substantiation Summary, Report VB-1143 (Seneca III)

PA-34-220T Flight Test Certification, Report FT-151

Final Compliance Checklist for Changes in Type Design – Project 34-993-03 – Model: PA-34-220T (Seneca IV)

New Piper Report VB-1656 – Federal Aviation Regulation Part 23 Compliance Check List for PA-34-220T Seneca V S/N 3449001 & Up – dated 10 Dec 1996

New Piper Report VB-1923 – Project Specific Certification Plan – 700-00006-002 Primary Flight Display & 700-00030-005 Multi Function Display – PA-34-220T Seneca V

Piper Aircraft Inc. Report VB-2179 – Project Specific Certification Plan – For the Installation of Garmin G600 Avionics, GWX68 Weather Radar and Honeywell KTA-810 Traffic Avoidance Sensor in PA-34-220T

(5) Flight Manual: Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual – Seneca III PA-34-220T (SN 3448001 and up) – Piper Report VB-1257 – CAA Accepted as AIR 2816

Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual – Seneca V PA-34-220T (SN 3449001 and Up) – Piper Report VB-1638 – CAA Accepted as AIR 2834

FAA-Approved Airplane Flight Manual for Seneca (Piper Model PA-34-200) Serial Numbers 34-7450001 through 34-7450220 – Piper Report VB-563 – CAA Accepted as AIR 3012

Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual – Seneca IV PA-34-220T (SN 3448038 and Up) – Piper Report VB-1556 – CAA Accepted as AIR 3157

Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual – Seneca IV PA-34-220T (SN 3447001 and Up) – Piper Report VB-1615 – CAA Accepted as AIR 3158

Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual – Seneca V PA-34-220T (SN 3449311, 3449323 and up) – Piper Report VB-1930 – CAA Accepted as AIR 3161 *

Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual – Seneca V PA-34-220T [1999 KG] (SN 3449311, 3449323 and up) – Piper Report VB-1955 – CAA Accepted as AIR 3162 *

* Applicable to aircraft with Avidyne Entegra System installed

Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual – Seneca V PA-34-220T (SN 3449410 and up with Garmin G600 system) Piper Report VB-2186 – CAA Accepted as AIR 3159

Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual for Seneca V PA-34-220T [1999 KG] (SN 3449410 and up with Garmin G600 system) – Piper Report VB-2193 – CAA Accepted as AIR 3160

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

(i) *Maintenance Manual:*

Part Number 751-817 – PA-34-200 Seneca Service Manual

Part Number 761-751 – PA-34-220T Seneca III/IV Maintenance & Repair Manuals

Part Number 761-888 – PA-34-220T Seneca IV/V Maintenance & Repair Manuals

Existing Continental manuals cover all models of the -360 series.

Existing Hartzell manuals cover all compact non-feathering propeller models.

Teledyne Models L/TSIO-360-RB Overhaul Manual – Publication X30596A

Teledyne Models L/TSIO-360-RB Maintenance Manual – Publication X30645A

(ii) *Current service Information:*

Part Number 762-332 Service Bulletins and Service Letters

(iii) *Illustrated Parts Catalogue:*

Part Number 753 816 – Parts Catalog PA-34-200 Seneca

Part Number 761-750 – PA-34-220T Seneca III/IV IPC

Part Number 761-887 – PA-34-220T Seneca IV/V IPC

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

Piper Letter dated Dec 4 2002 from L J Dicken, Assistant Manager Aircraft Certification Services, states “The New Zealand CAA has been placed on the mailing list to receive future updates of this manual (VB-1257)”.

CAA 2171 from New Piper Director, Aircraft Certification Service, dated 20/6/03

Email from Piper Publications Department dated 31 October 2007 (Seneca I)

Piper provides CAA updates to all publications through the website
<http://www.piper.com/pages/publications.cfm>

(8) Other information:

Piper Report VB-1586 Aircraft Model Specification Model PA-34-220T Seneca V
Project No. 34-994-18 at Revision C dated 23 April 1996

Piper Report VB-1138 PA-34-220T – Electrical Load Analysis, Battery Analysis
Custom Avionics Drawings CA34-49043, CA34-49112 and CA34-49128

Drawing D101150 – Modifications – Seneca V Aircraft

Drawings 104400 and R100644 – Complete Airplane Seneca V

Drawings of approved antenna locations – 36754 (DME), 37864 (Transponder),
87275 (VHF Comm), 100676 (ADF) & 101062 (GPS)

Drawing 39408 – General Arrangement PA34-220T

Drawing 39401 – Three View PA34-220T

5. Additional New Zealand Requirements

Compliance with the retrospective airworthiness requirements of NZCAR Part 26 has been assessed as they are a prerequisite for the grant of an airworthiness 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 – CAM 8 Appdx. B # .35	Not Applicable – Agricultural Aircraft only

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 and co-pilot seats are fitted with inertial reel shoulder harness and safety belts – See VB-1536 Appendix A-4
91.507	Pax Information Signs - Smoking, safety belts fastened	Not Applicable – Less than 10 passenger seats
91.509 Min. VFR	(1) ASI See VB-1586 Appendix A-2 (2) Machmeter N/A – No Mach limitations (3) Altimeter FAR §23.1303(b) – Fitted as Std. See VB-1586 Appendix A-2 (4) Magnetic Compass FAR §23.1303(c) – Fitted as Std. See VB-1586 Appendix A-2 (5) Fuel Contents FAR §23.1305(a)(1) – Fitted as Standard – See VB-1586 §4.2.1.4 (6) Engine RPM FAR §23.1305(a)(4) – Fitted as Standard – See VB-1586 §4.2.1.4 (7) Oil Pressure FAR §23.1305(a)(2) – Fitted as Standard – See VB-1586 §4.2.1.4	(8) Coolant Temp N/A – Air-cooled engines (9) Oil Temperature FAR §23.1305(a)(3) – Fitted as Std. – See VB-1586 §4.2.1.4 (10) Manifold Pressure FAR §23.1305(b)(3) – Fitted as Std. – See VB-1586 §4.2.1.4 (11) Cylinder Head Temp. FAR §23.1305(b)(1) – Fitted as Std. – See VB-1586 §4.2.1.4 (12) Flap Position FAR §23.699(a)(2) – Fitted as Std. – See VB-1586 §4.3.4.3 (13) U/c Position FAR §23.729(e) – Fitted as Std. See VB-1586 Appendix A-2 (14) Ammeter/Voltmeter FAR §23.1351(d) – Fitted as Std. See VB-1586 Appendix A-2
91.511 Night	(1) Turn and Slip See VB-1586 Appendix A-2 (2) Position Lights FAR §23.1385 – Fitted as Std. See VB-1586 Appendix A-3	(3) Anti-collision Lights FAR §23.1401 – Fitted as Std. (4) Instrument Lighting See VB-1586 Appendix A-4 FAR §23.1381 – Fitted as Std. See VB-1586 Appendix A-3
91.517 IFR	(1) Gyroscopic AH HSI fitted as Standard – See Report VB-1586 Appendix A-3 (2) Gyroscopic DI ADI fitted as Standard – See Report VB-1586 Appendix A-3 (3) Gyro Power Supply FAR §23.1331(a)(3) (4) Sensitive Altimeter Fitted as Standard (with dual scale) – See VB-1586 App. A-2	(5) OAT Fitted as standard – See Report VB-1586 §4.2.1.4.a (DDMP) (6) Time in hr/min/sec PCR 300i DV Clock fitted as Std See VB-1586 Appendix A-2 (7) ASI/Heated Pitot Heated AN pitot head fitted as Standard – See VB-1586 (8) Rate of Climb/Descent Fitted as Standard – See Report VB-1586 Appendix A-3
91.519	IFR Communication and Navigation Equipment Standard IFR Bendix/King Avionics package comprises: Dual KX-165 Nav/Comm with Localiser/glideslope; KLN-90B GPS; KN-62A DME; Narco ART-850 Altitude Reporter; KFC-150 Flight Control System slaved autopilot	
91.523 Emrgcy 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	<i>To be determined on an individual aircraft basis if used on Air Transport operations</i> Not Applicable – Less than 20 passenger seats Not Applicable – Less than 61 passenger seats
91.529	ELT – TSO C126 after 1 July 2008	<i>Operational requirement – To be determined as applicable</i>
91.531	Oxygen Indicators - Volume/Pressure/Delivery	See Flight Manual Section 9 Supplement 1
91.533	Oxygen for Non-pressurised Aircraft >30 min above FL100 - Supplemental for crew, 10% Pax - Therapeutic for 3% of Pax Above FL100 - Supplemental for all Crew, Pax - Therapeutic for 1% of Pax - 120l PBE for each crew member	Scott Aviation Products Ambassador Mark III fixed oxygen system available. This comprises a 77 cu. ft. oxygen cylinder (1850 psi fully charged), a supply gauge, an ON-OFF flow control knob, a pressure regulator, six plug-in receptacles and six oxygen masks. The FM Supplement gives duration figures for 1-6 persons at FL100-FL250.
91.541	SSR Transponder and Altitude Reporting Equipment	KT-71 Digital TX part of standard IFR package

91.543	Altitude Alerting Device - Turbojet or Turbofan	Not Applicable – Not turbojet or turbofan powered
91.545	Assigned Altitude Indicator	<i>Operational requirement – To be determined as applicable</i>
A.15	ELT Installation Requirements	<i>To be determined on an individual aircraft basis</i>

Note: The above Rule compliance was established for the Seneca V Model using VB1586.

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	FAR §23.785
135.357	Additional Instruments (Powerplant and Propeller)	FAR 23 is an Appendix C airworthiness standard
135.359	Night Flight Landing light, Passenger compartment	Fitted as Standard – See Report VB-1586 Appendix A-3
135.361	IFR Operations Speed, Altitude, spare light bulbs/fuses	<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	Not Applicable – Only required for 2-crew large helicopters
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 Seneca V s/n 3449112 ZK-MBA
- Three-view drawing Piper Model PA-34-220T Seneca III
- Three-view drawing New Piper Model PA-34-220T Seneca V
- Copy of FAA Type Certificate Data Sheet Number A7SO

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-34-200 Seneca (1973)	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
PA-34-200 Seneca (1972)	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
PA-34-200T Seneca II	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
PA-34-220T Seneca III	Mainland Air Services Ltd	3/21B/21	12 December 2002
PA-34-220T Seneca V	Massey University	3/21B/31	8 July 2003
PA-34-200 Seneca (1974)	Roc On Aviation Limited	8/21B/7	27 August 2007
PA-34-220T Seneca IV	Skyline Trust Limited	11/21B/9	22 November 2010
PA-34-220T Seneca V	Piper Aircraft Inc.	11/21B/15	22 November 2010
(with Avidyne Entegra or Garmin G600 EFIS)			