
Type Acceptance Report

RESTRICTED CATEGORY

TAR 17/21B/1 – Revision 1

Thrush S2R Series

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Executive Summary

New Zealand Type Acceptance has been granted to the Thrush Model S2R Series based on validation of FAA Type Certificate numbers A3SW and A4SW (Restricted Category). As a special requirement for import the Flight Manual must contain takeoff and landing performance data.

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 §21.191, 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).

NOTE: The information in this report was correct as at the date of issue. The report is only updated when an application is received to revise the Type Acceptance Certificate. For details on the current type certificate holder and any specific technical data, refer to the latest State-of-Design Type Certificate Data Sheet.

1. Introduction

This report details the basis on which Type Acceptance Certificate Number 17/21B/1 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 covers all models included on the State-of-Design type certificate which have been granted type acceptance in New Zealand. Appendix 1 details which models have been type accepted in accordance with the provisions of CAR Part 21B and which models were certificated prior to that under NZCAR Section B.9 and are now type accepted under the transitional arrangements of Part 21 Appendix A(c).

2. Aircraft Certification Details

(a) State-of-Design Type and Production Certificates:

Manufacturer: Thrush Aircraft Inc.
Quality Aerospace (up to July 9, 2003)
Ayres Corporation (up to November 26, 2001)
Rockwell International (up to November 28, 1977)
North American Rockwell Corporation (up to April 3,
1973)
Snow Aeronautical Company (up to February 18, 1970)

Type Certificate: A3SW (Normal Category) and A4SW (Restricted
Category)
Issued by: Federal Aviation Administration
Production Approval: FAA PC 5SO

(b) Models Covered by the Part 21B Type Acceptance Certificate:

(i) **Model:** S2R-T34

MCTOW: 6000 lb. [2721 kg] serial numbers 6000 thru 6049 and
T34-001 thru T34-450
10,500 lb. [4762 kg] s/n T34-451 and subsequent and for
s/n T34-273 thru T34-450 when
modified per Thrush Custom Kit CK-
AG-45

Max. No. of Seats: 1, or 2 with Dual Cockpit

Noise Standard: Not Applicable (Restricted Category)

Engine: Pratt & Whitney Canada PT6A-34, -34AG, -36
Type Certificate: E-6
Issued by: Transport Canada
Pratt & Whitney Canada PT6A-41, -41AG, -42
Type Certificate: E-12
Issued by: Transport Canada

Propeller: Hartzell HC-B3TN-3C or -3D / T-10282 or T-10282(N)+4
Type Certificate: P15EA
Issued by: Federal Aviation Administration

- (ii) **Model:** S2R-R1340
- MCTOW: 6000 lb. [2721 kg] – Normal Category
7860 lb. [3565 kg] – Restricted Category in AFM
- Max. No. of Seats: 1, or 2 with Dual Cockpit
- Noise Standard: Not Applicable (Restricted Category)
- Engine:** Pratt & Whitney WASP R1340 AN1 (S3H1 or S1H1)
Type Certificate: 5E-2
Issued by: Federal Aviation Administration
- Propeller:** Hamilton Standard 12D40 / 6101-12 or EAC AG100-2
Type Certificate: P-257
Issued by: Federal Aviation Administration
- (iii) **Model:** S2RHG-T65
- MCTOW: 10,500 lb. [4762 kg] – Restricted Category
- Max. No. of Seats: 1, or 2 with Dual Cockpit
- Noise Standard: Not Applicable (Restricted Category)
- Engine:** Pratt & Whitney Canada PT6A-65AG
PWC PT6A-60AG [s/n T65HG-013DC and up]
Type Certificate: E-12
Issued by: Transport Canada
- Propeller:** Hartzell HC-B5MP-3C / M10876AS or ANS
Type Certificate: P44GL
Issued by: Federal Aviation Administration
- (iv) **Model:** S2R-G10
- MCTOW: 6000 lb. [2721 kg]
- Max. No. of Seats: 1, or 2 with Dual Cockpit
- Noise Standard: Not Applicable (Restricted Category)
- Engine:** Honeywell TPE331-10
Type Certificate: E4WE
Issued by: Federal Aviation Administration
- Propeller:** McCauley 4HFR34C653-[X] / [X]-L106FA-0 or
McCauley 4HFR34C662-[X] / [X]-L108FA-0
Type Certificate: P3NE

Issued by: Federal Aviation Administration
Hartzell HC-B4TN-5NL / T10890N
Type Certificate: P40EA
Issued by: Federal Aviation Administration

(v) **Model:** S2R-T660

MCTOW: 12,500 lb. [5700 kg] – Restricted Category
14,150 lb. [6418 kg] – in accordance with AFM

Max. No. of Seats: 1, or 2 with Dual Cockpit

Noise Standard: Not Applicable (Restricted Category)

Engine: Pratt & Whitney Canada PT6A-60AG
PWC PT6A-45A, -45B, -45R (s/n T660-108 and up)
PWC PT6A-65AG, -65AR, -65B
Type Certificate: E-12
Issued by: Transport Canada

Pratt & Whitney Canada PT6A-67AG (s/n T660-109 and
up)

Type Certificate: E-21
Issued by: Transport Canada

Propeller: Hartzell HC-B5MP-3C / M10876ANS or M10876AS
Hartzell HC-B5MP-3F / M11276NS
Hartzell HC-B5MA-3D / M11276NS
Type Certificate: P44GL
Issued by: Federal Aviation Administration

(vi) **Model:** S2R-H80

MCTOW: 10,500 lb. [4762 kg] – Restricted Category

Max. No. of Seats: 1, or 2 with Dual Cockpit

Noise Standard: Not Applicable (Restricted Category)

Engine: GE Aviation Czech H80-100
Type Certificate: EASA.E.070
Issued by: European Aviation Safety Agency

Propeller: Hartzell HC-B4TW-3 / T10282N(S) or N or NS
Type Certificate: P40EA
Issued by: Federal Aviation Administration

- Notes: 1. Refer to FAA TCDS A3SW and A4SW for specific applicability of engine and propeller combinations to individual aircraft models.
2. Refer to Advisory Circular 21-1 Appendix 2 for the New Zealand type acceptance status of any engines and propellers listed above.

3. Application Details and Background Information

There have been many examples of the S2R Series in New Zealand prior to 1995 when Part 21 was introduced, and any examples of those particular model years or serial number ranges which were on the register on 1 July 1995 were therefore deemed to have a type acceptance certificate under the transitional arrangements of Part 21 Appendix A(c). The first application under Part 21B for New Zealand type acceptance was for the current production version of the Thrush Model S2R-T34. This was originally from the importer, Southern Aviation Ltd, dated 20 July 2016. The first-of-type example was serial number T34-389DC, registered ZK-DUZ. The S2R Series is a single-engine fixed undercarriage low-wing tailwheel configuration agricultural aircraft of all-metal construction with welded steel-tube fuselage. The hopper is located forward of the cockpit, which can be had in either single or dual (tandem) configuration.

Type Acceptance Certificate Number 17/21B/1 was initially granted on 23 September 2016 in the Restricted Category to later serial numbers of the S2R-T34 based on validation of FAA Type Certificates A3SW and A4SW. Specific applicability is limited to the coverage provided by the operating documentation supplied. As a special requirement for import the type certificate holder was requested to add takeoff and landing performance data into the Flight Manual.

Revision 1 to this report was issued to include the S2R-T34 with an approved MCTOW of 10,000 lb. following FAA approval of the Custom Kit. This was granted on 1 March 2017. The application was subsequently expanded after application from the manufacturer to include the other current in-production models: the S2R-T660, S2R-R1340, S2R-G10 and S2R-H80, under Work Request 17/21B/18. Specific applicability is limited to the coverage provided by the operating documentation supplied.

When ZK-DUZ was imported the operator requested validation of CASA STC SVA553, which approved operation at up to 10,500 lb MAUW. This was declined on the grounds that the structural load factor did not comply with the original certification basis using a CAM 8 overload factor, when the certificated MAUW at the time was 6000 lb. In support of this the manufacturer advised that all aircraft manufactured since 2003 had been produced to a common fuselage and wing configuration. (Confirmed in Report ER-538).

Subsequently Thrush re-certificated the Model S2R-T34 with a MAUW of 10,500 lb, and produced a Custom Kit which provides for the increased maximum weight capability to be retrospectively extended to some earlier serial numbers.

Aircraft Model History:

Rockwell purchased the S2D type certificate from Snow Aeronautical and produced it under the Ag Commander name. Rockwell then derived the S2R from the S2D by widening the fuselage from 38" to 46" to accept a larger 400 US gallon hopper, to be able to carry a greater volume of low density materials used by Rice growers, and adding flaps. This was marketed as the Thrush Commander. After Ayres took over the type certificate the Turbo Thrush S2R-T34 was developed for them by installation of a PT6A engine under STC, the first such turbine application for an agricultural aircraft. This was type certificated under A3SW in the Normal Category, but the manufacturer advises virtually none have been delivered in that category. All subsequent S2R derivatives (basically different turbine engine options) have been only certificated in the Restricted Category under A4SW, including the Dual Cockpit trainer originally approved by STC (all dual cockpit aircraft have a DC serial number suffix), and several using the TPE331 family (these were popular because overhauled engines were much less expensive than a new PT6A).

A further development by Ayres was the Model S2R-T65, which was fitted with a larger 500 US gallon hopper and 1300 shp PT6A-65 engine. This had an increased span wing but was initially approved at the original 6000 lb. gross weight. Later an improved wing with steel spar webs was tested and the S2RHG-T65 (High Gross) version was certificated with a MCTOW of 10,500 lb. Thrush also certificated a similar high gross S2RHG-T34 version with a 550 US gallon hopper and a MCTOW of 9500 lb. However Report ER-568 stated that performance was marginal and only a few were produced.

The first examples of the S2 Series in New Zealand were Snow S2D-600 Commanders serial numbers 600-1312D and 600-1313D, registered ZK-CPG and ZK-CPH respectively in January 1966. Two Rockwell S2R Thrush Commanders serial numbers 1799R and 1817R were registered ZK-DQA and ZK-DQB respectively in January 1974. The first turbine versions were Ayres S2R-T34 serial number T34-101DC registered ZK-WBQ in December 1994, and Ayres S2R-G10 Turbo Thrush serial number G10-110DC registered ZK-UDC in April 1995.

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) State-of-Design type certificate:

FAA Type Certificate Data Sheet no. A3SW at Revision 19 dated Dec 11, 2014
 – Model S2R-T34 approved (Normal Category) August 28, 1977
 – Model S2R-R1340 approved (Normal Category) May 6, 1980

FAA Type Certificate Data Sheet no. A4SW at Revision 38 dated July 21, 2017
 – Model S2R-T34 approved (Restricted Category) August 28, 1977

– Model S2R-R1340 approved (Restricted Category) May 6, 1980
 – Model S2RHG-T65 approved (Restricted Category) June 8, 1988
 – Model S2R-G10 approved (Restricted Category) January 12,

1993

– Model S2R-T660 approved (Restricted Category) March 13,

2000

– Model S2R-H80 approved (Restricted Category) October 9, 2012

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the S2D/S2R Series in the Normal Category under FAA Type Certificate A3SW is CAR 3 effective May 15, 1956, with Amendments 3-1 through 3-8. For the turbine powered models S2R-T11/15/34 this was expanded to include FAR 23, effective February 1, 1965, including Amendments 23-1 through 23-16, only as applies to the turboprop engine installation, and SFAR 27 effective January 1, 1975, including Amendment 27-1.

Under Type Certificate A4SW in the Restricted Category the certification basis is CAR 8 effective October 11, 1950. (Report ER-568 states certification under CAR 8 is only possible if the aircraft has first been shown to conform to the certification requirements of some other category.) Some models of the S2R, and all two-seat versions, are only covered by A4SW. (Two-seat aircraft have a DC suffix to their serial number.) The two-seat S2R-T34 was previously accepted in New Zealand on the basis of similarity with the normal category S2R-T34. The S2R-G10 was similarly accepted in New Zealand on the basis of a statement from the aircraft manufacturer that “*The Model S2R-G6, except for the power plant installation, is essentially identical, firewall aft, with the Model S2R-T34.*”

Under A4SW for later production models the certification basis was updated to be the same as specified under TC A3SW, plus for components and areas affected by the change FAR §21.101; §21.25(a)(1); Part 23 Subpart C including Amendments 23-1 through 23-34; plus individual paragraphs of FAR 23 at the Amendment status specified on the TCDS, except those regulations found inappropriate for restricted category agricultural airplanes listed in FAA

Advisory Circular 21.25-1, dated December 1, 1997. Compliance with regulations was demonstrated in accordance with FAA Policy Memorandum ACE-110_19971201, dated December 1, 1997. This applies to the S2R-T34 serial numbers T34-451 and later, or as modified by Custom Kit CK-AG-45; S2R-T65; S2RHG-T65; S2RHG-T34; S2R-T660; and S2R-H80. For some models an ELOS regarding the landing weight being less than the takeoff weight was granted, and airspeeds are decreased at higher weights.

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 of FAR 23, which is the basic standard for Normal Category Airplanes called up under Part 21 Appendix C. There are no non-compliances, but one special condition has been prescribed by the Director under §21.23.

(ii) *Special Conditions:*

Nil

(iii) *Exemptions:*

S2RHG-T65:

Exemption 4898 – This was issued to permit certification of the Ayres S2RHG-T65 at 10,500 lb MAUW with a stall speed greater than the 70 mph maximum limit recommended by Appendix B of CAM 8. This was originally for the purpose of drug eradication programs for the Department of State. The aircraft has an overturn structure comprising 17 chromoly .083" wall thickness tubes designed for vertical and horizontal loads of 31,500 and 15,750 pounds respectively. The aircraft has a Spinks design TSO-C39 and MIL-5-5822 pilot seat and an American Safety TSO-C22f shoulder harness. Further it has the demonstrated ability to jettison 100% of the agricultural hopper weight within five seconds. The FAA agreed the ability to dump the hopper, the massive overturn structure, and the pilot restraint system combine to provide some compensation for the reduction in the level of safety due to the increase in stall speed. (For S/N T65HG-013DC and up, compliance with FAA Policy Memorandum ACE-110_19971201, dated December 1, 1997, Section 23.49, has been shown [61 knot stall speed met with hopper empty], in lieu of previously required Exemption No. 4898.)

(iv) *Equivalent Level of Safety Findings:*

S2R-T34, S2R-T660 and S2R-H80 (Restricted category)

ACE-04-05 – FAR 23.473(b) for a landing weight of 7,600 lbs. – In lieu of the 95% of MAUW in FAR23, for various S2R Models, which are restricted category agricultural or firefighting aircraft with hoppers, a lower design landing weight was established on the basis of a quick dump capability, which quickly reduces the airplane weight to below this design landing weight.

(v) *Airworthiness Limitations:*

See AMM Section 11 – Airworthiness Limitations.

For some Models see the Structural Limitations Section on the TCDS.

(3) Aircraft Noise and Engine Emission Standards:

(i) *Environmental Standard:*

The S2R Series approved under A3SW have been certificated for fuel venting against SFAR 27 effective January 1, 1975, including Amendment 27-1.

The S2R Series approved after January 1, 1980 are limited to the special purposes of FAR §21.15(b)(1) agricultural and §21.25(b)(2) fire-fighting, unless they are shown to meet the noise requirements of FAR Part 36. (Only some serial numbers of the S2R-T660 have been shown to meet this for the purpose of §21.25(b)(4) patrolling.)

(ii) *Compliance Listing:*
Not applicable.

(4) Certification Compliance Listing:

ER-337 – Ayres Corporation Seat Assembly P/N 19690 Structural Substantiation

ER-438 – Structural Analysis of the Hooker Harness Restraint System Attachment to the Ayres Thrush Pilots Seats (All Models)

Engineering Report ER-516 – Configuration Definition for Thrush Model S2R-T34, S/N T34-273 and On

ER-559 – Type Certificate Compliance Checklist S2R-T34 GTOWT Increase

Engineering Report ER-568 – Certification Path Analysis for S2R-T34 – Rev.C

ER-569 – Structural Substantiation: S2T-T34 GTOWT Increase

ER-580 – Company Flight Test Report – Thrush S2R-H80 at 10,500 lbs Takeoff Gross Weight – FAA Project Number AT12888AT-A

(5) Flight Manual:

Ayres Turbo Thrush S2R-T34 (Dual Cockpit) Flight Manual – Dated August 25, 1980 – Serial Numbers T34-033DC and Subsequent – CAA Accepted as AIR 2512

NOTE: The original Flight Manual contained no takeoff and landing performance data. At CAA request the manufacturer added Flight Manual Supplement AFMS S2R-T34_NZ_PERF_IR, which was approved by the FAA on behalf of the CAA.

FAA-Approved Turbo Thrush Airplane Flight Manual for the Model S2R-T34 Single and Dual Cockpit – Serial number T34-273 and subsequent – Feb 16, 2012 – CAA Accepted as AIR 3360

NOTE: This includes FAA Approved Restricted Category Airplane Flight Manual Supplement – Model S2R-T34 Single & Dual Cockpit (Serial Numbers T34-273 thru T34-445 (TBD) Modified Per CK-AG-45 for 10,500# Maximum Weight, and Serial Numbers T34-446 and Subsequent Certified at Factory for 10,500# Maximum Weight) – #T34AFMS_RC-002

Ayres S2R-G10 Airplane Flight Manual – Restricted Category – Serial Numbers G10-101 and subsequent – Dated Jan 12, 1993 – CAA Accepted as AIR 2527

NOTE: The manufacturer was advised takeoff and landing performance data was required to be provided. They supplied two takeoff charts covering distance from brake release to liftoff and to 50' height, and two landing charts covering distance from 50' and from touchdown to stop. (The charts apply to aircraft fitted with 68 nozzle spray system and pump and give data for a gross weight range of 5000 - 11000 lb.) The CAA requested this information be formally incorporated into the Flight Manual, and this was done by Ayres and issued as a

“Manufacturer’s Data Supplement to the Model S2R-G10 AFM for Airplanes Exported to New Zealand.”

Thrush Model S2R-G10 Airplane Flight Manual – Single and Dual Cockpit – Serial Number G10-169 and subsequent – March 25, 2010 – CAA Accepted as AIR 3917

Thrush Model S2R-R1340 Airplane Flight Manual – Single and Dual Cockpit – Serial No R1340-036 & subsequent – Nov 29, 2007 – CAA Accepted as AIR 3918

Thrush Model S2RHG-T65 Airplane Flight Manual – Dual Cockpit – Serial Number T65HG-013DC and subsequent – 10/28/05 – CAA Accepted as AIR 3919

Thrush Model S2R-T660 Airplane Flight Manual – Single Cockpit – Serial Number T660-109 and subsequent – Mar 05, 2004 – CAA Accepted as AIR 3920

Thrush Model S2R-T660 Airplane Flight Manual – Dual Cockpit – Serial Number T660-114DC and subsequent – Aug 12, 2005 – CAA Accepted as AIR 3921

Thrush Model S2R-H80 Airplane Flight Manual – Single and Dual Cockpit – Serial Number H80-101 and subsequent – Mar 19, 2015 – CAA Accepted as AIR 3922

(6) Operating Data for Aircraft:

(i) *Maintenance Manual:*

Document T15/34-2 – Ayres Turbo Thrush S2R-T15/T-34 Maintenance Manual Issued 25 October 1990 Revised July 1991

Turbo Thrush Aircraft Maintenance Manual – Single Cockpit and Dual Cockpit – Model S2R-T34 Serial Numbers T34-273 & Up – Manual Number: T34-2

Aircraft Maintenance Manual – Single Cockpit and Dual Cockpit – Model S2R-G10 Serial Numbers G10-169 & Up – Dated 26 March 2010

Aircraft Maintenance Manual – Single and Dual Cockpit – Model S2RHG-T65 Serial Numbers T65HG-011 & Up, T65HG-013DC & Up – Manual: T65HG-2

Aircraft Maintenance Manual – Single Cockpit & Dual Cockpit – Model S2R-T660 Serial Numbers T660-109 & Up and T-660-114DC & Up – Manual: T660 - 3

Aircraft Maintenance Manual – Single and Dual Cockpit – Model S2R-R1340 Serial Numbers S2R-R1340 S/N 036 & up – Issued January 1, 2008

Aircraft Maintenance Manual – Single and Dual Cockpit – Restricted Category –
Model S2R-H80 Serial Numbers H80-101 & Subsequent – Manual #H80-1MM

(ii) *Current service Information:*

Custom Kits, Service Bulletins, Service Information and Service Letters

(iii) *Illustrated Parts Catalogue:*

Model S2R IPC – Serial numbers 1416 and subsequent
(An updated document is currently under preparation)

Document T34-1 – Ayres Turbo Thrush Parts Manual and Technical Data

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

Thrush Aircraft provides website access to CAA for technical manuals at
<http://www.thrushaircraft.com/en/support/manuals.html>

(8) Other information:

Engineering Report ER-566 – Model S2R-T34 Electrical Load Analysis – Rev.A

Thrush Aircraft Custom Kit CK-AG-45 – Field Conversion of S2R-T34 Aircraft –
10,500 Lbs Maximum Gross Take-Off Weight Increase – Eligibility: T34-273 -
T34-450, With or Without DC Suffix – Revision IR 12/01/2016

5. New Zealand Operational Rule Compliance

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	S2R Series has been certificated under A4SW to CAR 8

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	AmSafe or Hooker 4-point harness fitted as std (See ER-438)
91.507	Pax Information Signs – Smoking, safety belts fastened	Not Applicable – Less than 10 passenger seats
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) N/A – Turbine engine N/A – Turbine engine Flaps visible from cockpit N/A – Fixed undercarriage CAR §3.687
91.511	Night Instruments and Equipment	Operational Requirement – Compliance as applicable
91.513	VFR Communication Equipment	Operational Requirement – Compliance as applicable
91.517	IFR Instruments and Equipment	N/A – Not Instrument Flight Rules approved
91.519	IFR Communication and Navigation Equipment	N/A – Not Instrument Flight Rules approved
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	Operational Requirement – Compliance as applicable
91.531	Oxygen Indicators – Volume/Pressure/Delivery	Not fitted
91.533	Oxygen for Non-Pressurised Aircraft	Not Applicable – Maximum operating altitude 12,000 ft.
91.541	SSR Transponder and Altitude Reporting Equipment	Operational Requirement – Compliance as applicable
91.543	Altitude Alerting Device - Turbojet or Turbofan	Not applicable – piston-powered aircraft
91.545	Assigned Altitude Indicator	Not applicable – Not Instrument Flight Rules approved
A.15	ELT Installation Requirements	<i>To be determined on an individual aircraft basis</i>

Civil Aviation Rules Part 137 – Subpart F – Instrument and Equipment

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
137.255	Seating and Restraints – Shoulder harness required	CAM 8 paragraph .52(c)
137.257	Additional Instruments – Slip indicator required	<i>To be determined on an individual aircraft basis</i>
137.259	Additional equipment	See Appendix D compliance statements
	Appendix B – Overload Weight Determination NOTE: Only the S2R-T34 and S2R-R1340 have	Models S2R-T34, S2R-G10 and S2R-R1340: Design load factor is 3.8 – Maximum Recommended Weight Increase per CAR Part 137 Appendix B Fig.2 is 131% → For MCTOW of 6000 lb, Ag Operating Weight = 7860 lb. The TCDS states satisfactory operation in the Restricted Category has been demonstrated for the following conditions: S2R-T34 – 8,500 lb (@ 2500', 45°F, Vne 126

	<p>been type certificated in the Normal Category, and can apply Appendix B provisions.</p>	<p>mph CAS The FAA advised the S2R-T34 is legally operated in the US under its CAR 8 certification basis at up to 31% over the 6,000 lb weight = 7,860 lbs. At 10,000 lb Flight Load Factor is 3.27 g. – For S/N T34-451 and up, or when fitted with Custom Kit CK-AG-45, this is the baseline certified weight in the Restricted Category and does not include any overload. No overload in accordance with CAR 8 is authorized. Model S2R-T660: At 12,500 lb. MAUW the Design Load Factor is 3.17 g. At 14,150 lb. MAUW the Design Load Factor is 2.8 g. The S2R-T660 was originally approved in March of 2000 at a takeoff weight of 12,500 lbs. and this would be the weight FAA consider to be fully certified. CAR 8 is not part of the certification basis for the S2R-T660 so the Restricted Category certified weight is the legal operating weight. Later the company applied for an increased takeoff weight of 14,150 lbs. for operations at lower speeds and a decreased load factor. “FAA AIR-100 memorandum dated September 26, 1991, allows certification of single engine restricted category small airplanes at gross weights up to 19,000 lb. Many regulations were excepted from the certification basis of a previous applicant (Air Tractor AT-802A) at the higher weights. Certification of the AT-802A included the allowance of using reduced airspeeds at weights above 12,500 lb. provided it was not possible to over stress the airplane at maximum weight, i.e. the airplane will stall before it experiences structural failure. That also required the load factor to be in excess of 2.5g’s in all cases. The Ayres proposed certification basis was agreed on the same principle. The MAUW of the S2R-T660 may be increased from 12,500 lb. to 14,150 lb. if operated in accordance with the limitations shown in the AFM including airspeed indicator marking changes (for example, Vne is decreased from 219 to 160 mph). Models S2RHHG-T65 and S2R-H80 Design Load Factor is 3.27 g. – The S2R-H80 meets its certification basis at the 10,500 pound weight, which the FAA consider to be the fully certified weight and the legal operating weight in the Restricted Category. There is no CAR 8 in the certification basis, and therefore no overload provision.</p>
Appendix D – Instruments and Equipment Airworthiness Design Standards		
D.1	Seating and Restraints – Ultimate fwd inertia load of 12g	From previous acceptance – Seat and restraint system has been tested to 12g ultimate load factor. See Report ER-313
D.2	Hopper permitted maximum load	Revoked
D.3	Hoppers and spray tanks – 12g fwd/1.5 rear/1.0 sideways	Satisfactory by Inspection. (Hopper is located within the fuselage steel frame and mounted similarly fore and aft.)
D.4	Hopper upper level contents – Indication, density allowance	Hopper has viewing port visible in the cockpit
D.5	Jettison gear – 80% of maximum load in 5 seconds – simple to operate, single action required	Operational Requirement – Compliance as applicable
D.6	Markings/Placards – hopper or tank maximum loadings – representative jettison times – pax location, flight limitations	To be determined on an individual aircraft basis

NOTES: 1. A Design Rule reference in the Means of Compliance column indicates the Design Rule was directly equivalent to the CAR requirement, and compliance is achieved for the basic aircraft type design by certification against the original Design Rule.

2. The CAR Compliance Tables above were correct at the time of issue of the Type Acceptance Report. The Rules may have changed since that date and should be checked individually.

3. Some means of compliance above are specific to a particular model/configuration. Compliance with Part 91/137 operating requirements should be checked in each case.

Attachments

The following documents form attachments to this report:

- Three-view drawing Thrush Model S2R-T34 Single Cockpit
- Copy of FAA Type Certificate Data Sheets Number A3SW and A4SW

Sign off

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 David Gill
 Team Leader Airworthiness

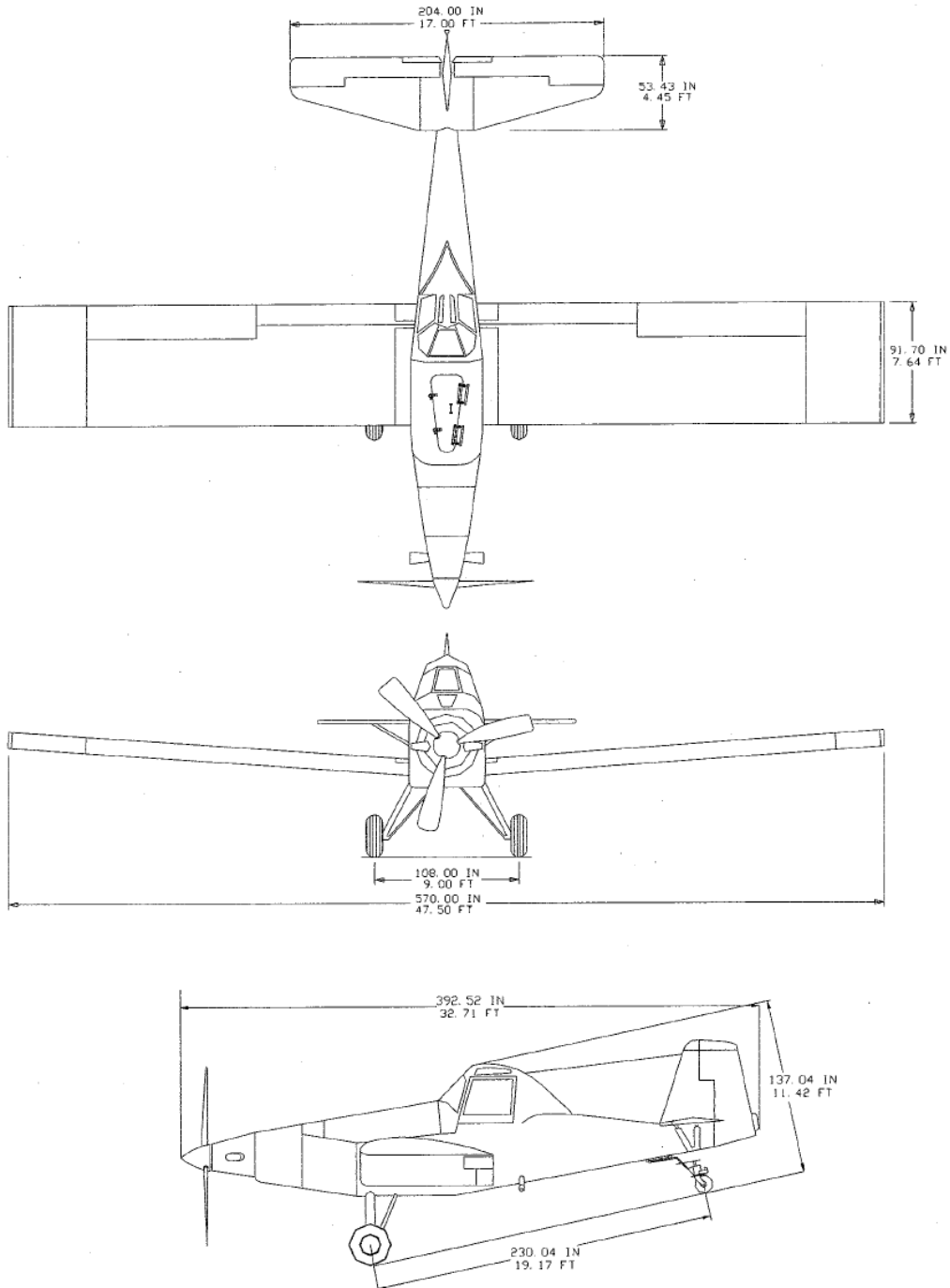
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 Checked – Greg Baum
 Team Leader Product Certification

Appendix 1**List of Type Accepted Variants:**

<i>Model:</i>	<i>TC No:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
S2R-T34*	A3SW	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
S2R-G10*	A4SW	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
S2R-T34*	A3SW	Southern Aviation Ltd	17/21B/1	23 September 2016
S2R-T34*	A4SW	Thrush Aircraft Inc.	17/21B/18	1 March 2017
S2R-R1340*	A3SW	Thrush Aircraft Inc.	17/21B/18	20 September 2019
S2RHG-T65*	A4SW	Thrush Aircraft Inc.	17/21B/18	20 September 2019
S2R-T660*	A4SW	Thrush Aircraft Inc.	17/21B/18	20 September 2019
S2R-H80*	A4SW	Thrush Aircraft Inc.	17/21B/18	20 September 2019

* Serial number applicability is determined by coverage of the Airplane Flight Manual

**THRUSH AIRCRAFT INC – MODEL S2R-T34 TURBO THRUSH
AIRCRAFT MAINTENANCE MANUAL**



Attachment: 3-View Drawing S2R-34 (SC)