Type Acceptance Report

TAR 11/21B/5 – Revision 2

AVIAT A-1 HUSKY Series

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Executive Summary

New Zealand Type Acceptance has been granted to the Aviat A-1 Husky Series based on validation of FAA Type Certificate number A22NM. 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 §21.191, 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 No. 11/21B/5 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. ICAO Type Certificate Details

TC Holder:	Aviat Aircraft Inc. (since February 27, 2012) [PC 704NM] Sky International Inc. (since January 10, 1996) White International Ltd (since December 3, 1992) Aviat Inc. (since April 4, 1991) Christen Industries
Type Certificate:	A22NM
Issued by:	Federal Aviation Administration
Max. No. of Seats:	2
Noise Standard:	FAR Part 36

Model: A-1

MCTOW: 1800 lb. [816 kg.]

Engine: Lycoming O-360-A1P or -C1G

Type Certificate: E286
Issued by: Federal Aviation Administration

Propeller: Hartzell HC-C2YK-1BF/F7666A

Type Certificate: P-920
Issued by: Federal Aviation Administration

Model: A-1A

MCTOW: 1890 lb. [857 kg.]

Engine: Lycoming O-360-A1P

Type Certificate: E286
Issued by: Federal Aviation Administration

Propeller: Hartzell HC-C2YK-1BF/F7666A

Type Certificate: P-920
Issued by: Federal Aviation Administration

Model: A-1B

MCTOW: 2200 lb. [998 kg.] – with Service Letter SL #3
2000 lb. [907 kg.]

Engine: Lycoming O-360-A1P

Type Certificate: E286
Issued by: Federal Aviation Administration

Lycoming O-320-D2A [Engine Option Group Configuration]

Type Certificate: E274
Issued by: Federal Aviation Administration

Propeller: Hartzell HC-C2YK-1BF/F7666A

Type Certificate: P-920
Issued by: Federal Aviation Administration

Sensenich 74DM6S8-0-58 [EOGC]

Type Certificate: P-886
Issued by: Federal Aviation Administration

Model: A-1C-180

MCTOW: 2200 lb. [998 kg.]
2250 lb. [1020 kg.] – IGW Variant

Engine: Lycoming O-360-A1P

Type Certificate: E286
Issued by: Federal Aviation Administration

Propeller: Hartzell HC-C2YK-1BF/F7666A; or HC-C2YR-1N/F7605; or HC-C2YR-1BF/F8477-4

Type Certificate: P-920
Issued by: Federal Aviation Administration

Model: A-1C-200

MCTOW: 2200 lb. [998 kg.]
2250 lb. [1020 kg.] – IGW Variant

Engine: Lycoming IO-360-A1D6

Type Certificate: E286
Issued by: Federal Aviation Administration

Propeller: Hartzell HC-C2YR-1BF/F8477-4

Type Certificate: P-920
Issued by: Federal Aviation Administration

MTV-15-B/205-58

Type Certificate: P.098
Issued by: European Aviation Safety Agency

3. Type Acceptance Details

The application for New Zealand type acceptance was from the type certificate holder, Sky International Inc., dated 5 August 2010. The first-of-type example was an A-1C-180 serial number 3032, registered ZK-TWA. The A-1 Husky Series is a single-engined strut-braced high-wing tandem two-seat light aircraft of traditional steel-tube and fabric construction.

Type Acceptance Certificate No. 11/21B/5 was granted on 10 December 2010 to the Aviat A-1 Series based on validation of FAA Type Certificate A22NM. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The 180 hp A-1 Husky was an all-new design by Christen Industries in the classic Piper Cub type configuration. It was first flown in 1986 and type certificated the following year. Since then some 450 examples have been delivered. The A-1A and A-1B versions had modified structure to permit an increase in all-up weight. The A-1B is also available in the "Engine Option Group Configuration", with or without flaps, which uses a 160 hp engine and fixed-pitch propeller and is only approved for day VFR operations. The A-1C was a further development with increased gross weight, with associated structural changes and new landing gear. It also had a revised wing design and different flap operating system.

This report was raised to Revision 1 to include the Increased Gross Weight (IGW) Variant of the A-1C-180 and A-1C-200, and record the change in Type Certificate holder. The IGW upgrade was achieved by engineering analysis, and no actual change was required to the aircraft. (Other than replacement of the airspeed indicator and Flight Manual.) There is also now an approved tow hook optional installation for the A-1C.

Revision 2 was issued to include the higher weight aircraft modified by Service Letter #3, (See TCDS Note 30). Under SL3 Husky A-1B's, S/N 2285, 2288, and up, equipped with the Lycoming O-360-A1P (180 hp) or IO-360-A1D6 (200 hp) engine, are eligible for a gross weight increase from 2000 lb. to 2200 lb. with the replacement of certain structural components, including new horizontal stabilizer support tube, 5 leaf tail wheel spring, main landing gear change, tachometer indicing, and new approved flight manuals. The first-of-type example was Husky A-1B 180 serial number 2418 registered ZK-RBC. Type acceptance was granted on 24 August 2016.

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 A22NM

FAA Type Certificate Data Sheet no. A22NM at Rev. 27 dated September 10, 2016
- – Model A-1 approved May 1, 1987
- – Model A-1A approved January 28, 1998
- – Model A-1B approved January 28, 1998
- – Engine Option Group Configuration without Flap approved August 18, 2003
- – Engine Option Group Configuration with Flap approved October 21, 2005
- – Model A-1C-180 approved September 24, 2007
- – Model A-1C-200 approved September 24, 2007
- – Increased Gross Weight Variant approved January 27, 2012

(2) Airworthiness design requirements:

(i) Airworthiness Design Standards:
The certification basis of the A-1 Series is FAR Part 23, as amended by Revisions 23-1 through 23-31. This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Advisory Circular 21-1, as FAR 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 §21.23.

(ii) Special Conditions:
Nil

(iii) Equivalent Level of Safety Findings:
Nil

(iv) Airworthiness Limitations:
See ICA Chapter V – Airworthiness Limitations

(3) Aircraft Noise and Engine Emission Standards:

(i) Environmental Standard:
The Model A-1 has been certificated under FAR Part 36, including Amendments 36-1 through 36-12 (A-1/A/B), 36-24 (Engine Option Group) and 36-28 (A-1C).

(ii) Compliance Listing:
Report 44 Section 13. Noise level of Model A-1 at 1800 lbs gross is 65.86 dB(A). Noise level of Model A-1A at 1890 lbs gross weight was calculated at 67.14 dB(A). Report 44-1 Section 7.0 – Noise level of Model A-1B at 2000 lbs gross weight was calculated at 65.13 dB(A). (Data is not provided in the AFM for these models.)

Report A-1C-2200-401-2 Acoustical Test Report FAR Appendix G A-1C-180 Corrected Mean Noise Level: 80.2 dB(A) [both propeller types – See AFM §IV.D]

Report A-1C-2200-400-2 Acoustical Test Report FAR Appendix G A-1C-200 Corrected Mean Noise Level: 81.6 dB(A) [both propeller types – See AFM §IV.D]

Document AA-A1C-2250-220 – Husky A1C-2250 Noise Compliance Report
Noise level: A-1C-180: 80.2 dB(A) [Hartzell prop]; 80.24 dB(A) [MTV prop]
A-1C-200: 82.11 dB(A) [Hartzell prop]; 82.77 dB(A) [MTV prop]

Flight Manual Section IV-D – Husky A-1B 180 Noise Level at 2200 lb: 80.2 dB(A)

Flight Manual Section IV-D – Husky A-1B 200 Noise Level at 2200 lb: 81.6 dB(A)

(4) Certification Compliance Listing:

Report #20 – Section 1.3 Compliance Checklist (A-1)

Report #44 Phase 1 – Engineering Substantiation Husky A-1 at Increased Gross Weight 1890 lbs – Section 1.4 Compliance Checklist (A-1A)

Aviat Aircraft Report #44-1 – Engineering Substantiation of Husky A-1B (Husky A-1 at Increased [2000 lb] Gross Weight) – Section 1.4 Compliance Checklist

Aviat Engineering Report A-1C 2200-100 Appendix B – Compliance Checklist Project #AT3696DE-A – A-1C 2200 lbs. Gross Weight Increase

Document AA-A1C-2250-001 – Husky A1C-2250 Project Specific Compliance Plan – FAA Project No: TD4716DE-A

(5) Flight Manual: FAA-Approved Airplane Flight Manual Husky A-1
70191-001 – CAA Accepted as AIR 3147

FAA-Approved Airplane Flight Manual Husky A-1A
70450-001 – CAA Accepted as AIR 3148

FAA-Approved Airplane Flight Manual Husky A-1B
70455-001C – CAA Accepted as AIR 3149

FAA-Approved Airplane Flight Manual Husky A-1C 180
AFM #70455-004 – CAA Accepted as AIR 3145

FAA-Approved Airplane Flight Manual Husky A-1C 200
AFM #70455-005 – CAA Accepted as AIR 3146

FAA-Approved Airplane Flight Manual Husky A-1C-180 (Husky)
2,250 lb Maximum Gross Weight – Document AFM #70467-001 – CAA Accepted as AIR 3249

FAA-Approved Airplane Flight Manual Model A-1C-200 (Husky)
2,250 lb Maximum Gross Weight – Document AFM #70468-001 – CAA Accepted as AIR 3250

FAA-Approved Airplane Flight Manual Husky A-1B 180
2,200 lbs Gross Weight with Incorporation of Service Letter #3 – Document AFM #70555-004 – CAA Accepted as AIR 3362

FAA-Approved Airplane Flight Manual Husky A-1B 200
2,200 lbs Gross Weight with Incorporation of Service Letter #3 –
Document AFM #70555-005 – CAA Accepted as AIR 3363

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

(i) Maintenance Manual:
Instructions for Continued Airworthiness Husky A-1 and A-1A – 70192-002

Instructions for Continued Airworthiness Aviat Model A-1B – 70192-004

Aviat Aircraft Inc. Instructions for Continued Airworthiness Models A-1C-180 & A-1C-200 – 70192-006D.doc

Aviat Aircraft Inc. – A-1C 180 & A-1C 200 Supplemental Instructions for Continued Airworthiness – Gross Weight Increase to 2,250 lb

(ii) Current service Information:
Service Bulletins and Service Letters are available at www.aviataircraft.com

Service Letter No. 3 (Engineering Aspects are FAA Approved) – Kits available for the Husky A-1B Increased Gross Weight to 2200Lbs. with additional propellers – Models Effected: S/N 2285, 2288, and up

(iii) Illustrated Parts Catalogue:
Aviat Aircraft Inc. A-1 Husky Parts Catalog

Husky A-1B 200 Parts Manual – STC SA10463SC Serial #2000 & up – 70154-008

Aviat Aircraft Inc. A-1C-180 Husky Parts Catalog

Aviat Aircraft Inc. A-1C-200 Husky Parts Catalog

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

CAA 2171 from Sky International Inc. Engineering Representative dated 5-8-2010

Email from Aviat Aircraft Inc. Engineering Manager dated 14 September 2016

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	***To be determined on an individual aircraft basis***
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	Seating and Restraints – Safety belt/Shoulder Harness		FAR Part 23 para §23.785 *	
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	FAR §23.1303(a) N/A – No mach no. limitations FAR §23.1303(b) FAR §23.1303(c) FAR §23.1305(a) FAR §23.1305(d) * FAR §23.1305(b)	(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 FAR §23.1305(c) * FAR §23.1305(h) * FAR §23.1305(f) * FAR §23.699(a)(2) N/A – Fixed undercarriage FAR §23.1351(d)
91.511 Night	(1)Turn and Slip (2) Position Lights	***Operational requirement*** FAR §23.1385	(3) Anti-collision Lights (4) Instrument Lighting	FAR §23.1401 FAR §23.1381
91.513	VFR Communication Equipment		***Operational requirement – compliance as applicable***	
91.517	IFR Instruments and Equipment		***Operational requirement – compliance as applicable***	
91.519	IFR Communication and Navigation Equipment		***Operational requirement – compliance as applicable***	
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		 ***Operational requirement – compliance as applicable*** ***Operational requirement – compliance as applicable*** 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		***Operational requirement – compliance as applicable***	
91.533	Oxygen Equipment for Non-Pressurised Aircraft:		Not fitted as standard. (No maximum height operating limit in Flight Manual)	
91.541	SSR Transponder and Altitude Reporting Equipment		***Operational requirement – compliance as applicable***	
91.543	Altitude Alerting Device - Turbojet or Turbofan		Not Applicable – Piston-engine powered	
91.545	Assigned Altitude Indicator		***Operational requirement – compliance as applicable***	
A.15	ELT Installation Requirements		***To be determined on an individual aircraft basis***	

* Fitted as Standard – See Vendor Supplied Component List – A-1C ICA Section §1 1.0

See also Kinds of Operating Equipment List in the Flight Manual Section 1 – Limitations and the List of Standard and Optional Equipment in Section 6

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.

Attachments

The following documents form attachments to this report:

Photographs first-of-type example Aviat Aircraft Model A-1C-180 ZK-TWA
Sky International Engineering Drawing 38000 – A-1C Husky Utility Aircraft
Copy of FAA Type Certificate Data Sheet Number A22NM

Sign off

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David Gill	Checked – Jason Ashworth
Team Leader Airworthiness	Acting Team Leader Design

Appendix 1

List of Type Accepted Variants:

Model:	*Applicant:*	*CAA Work Request:*	*Date Granted:*
A-1, A-1A, A-1B			
A-1C-180, A-1C-200	Sky International Inc.	11/21B/5	10 December 2010
A-1C-180 / A-1C-200 (IGW)	Aviat Aircraft Inc.	13/21B/24	9 July 2013
A-1B (2200 lb with SL#3)	H J Alexander	17/21B/4	24 August 2016