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# **Type Acceptance Report**

**TAR 15/21B/10**

**SCHLEICHER ASH 31 Mi**



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## Executive Summary

New Zealand Type Acceptance has been granted to the ASH31Mi based on validation of EASA Type Certificate number A.538. 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.15/21B/10 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

Manufacturer:	Alexander Schleicher GmbH & Co
Type Certificate:	A.538
Issued by:	European Aviation Safety Agency
Model:	ASH 31 Mi
MCTOW	630 kg [1389 lb.] – 18.0 m span wingtips 700 kg [1543 lb.] – 21.0 m span wingtips
Noise Standard:	ICAO Annex 16
<b>Engine:</b>	Austro Engine IAE50R-AA
	Type Certificate: EASA.E.085
	Issued by: European Aviation Safety Agency
<b>Propeller:</b>	AS2F1-1/R153-92-N1
	Type Certificate: EASA.P.004
	Issued by: European Aviation Safety Agency

### 3. Type Acceptance Details

The application for New Zealand type acceptance of the ASH31Mi was from Mr Ross Gaddes, dated 6 October 2014. The first-of-type example was serial number 2x, registered ZK-GRU. The Schleicher ASH31Mi is a single-seat all-composite self-launching 18m span Standard Class powered glider with mid mounted wing with flaps and T-tail. With the optional 21m span winglets the glider can also operate in the Open Class. The Austro Engines IAE50R is a Wankel-type rotary powerplant using a liquid-cooled housing and a forced air cooled rotor which drives a two-blade fixed-pitch composite propeller.

Type Acceptance Certificate Number 15/21B/10 was granted on 2 December 2014 to the Schleicher ASH31Mi based on validation of EASA Type Certificate A.538, and includes the IAE50R-AA engine based on validation of EASA Type Certificate E.085. Specific applicability is limited to the coverage provided by the operating documentation supplied. There are no special requirements for import into New Zealand.

The ASH31Mi is a development of the ASH26E with an all-new four-piece wing using the aerodynamic developments previously introduced on the ASG29. The Austro Engines (formerly Mid-West) IAE50R-AA engine is basically the same as used on the ASH26E (and ASH25M) except that it is fuel-injected.

#### 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:

EASA Type Certificate Number A.538

EASA Type Certificate Data Sheet no. A.538 at Issue 01 dated 25 January 2012  
– Model ASH 31 Mi approved 25 January 2012

EASA Type Certificate Number E.085

EASA Type Certificate Data Sheet no. E.085 at Issue 01 dated 4 April 2011  
– Model AE50R approved 18 December 1992  
– Model IAE50R-AA approved 26 September 2001

(2) Airworthiness design requirements:

(i) *Airworthiness Design Standards:*

The certification basis of the ASH31Mi is the Certification Specifications for Sailplanes and Powered Sailplanes, CS22, issued 24 September 2008, plus compliance with the Standards for Structural Substantiation of Sailplane and Powered Sailplane Components Consisting of Glass or Carbon Fibre Reinforced Plastics issued July 1991, and the Guideline for the analysis of the electrical system for powered sailplanes, I334-MS 92, issued 15 September 1992.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, as CS 22 is the successor to JAR 22, which is the basic design standard for Gliders 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. The ASH31Mi is approved for Day VFR operations.

The certification basis of the AE50R engine is JAR-22 H, Change 4, dated 13 September 1982, including Orange Paper 22/90/1. For the IAE50R-AA this was upgraded to JAR-22 H, Change 5, dated 28 October 1995 plus AMJ20X-1 (Section 3 of JAR-E Change 9) as a Special Condition.

(ii) *Special Conditions:*

For the IAE50R-AA engine:

AMJ20X-1 – Certification of Aircraft Propulsion Systems Equipped with Electronic Controls – This provides guidance on various precautions to be observed (Protection, monitoring, power supply, EMI) and on the Inter-relation between engine/propeller and aircraft certification.

(iii) *Equivalent Level of Safety Findings:*

CS 22.335(f) calculation of  $V_D$  according to OSTIV – The use of  $C_{Dmin}$  leads to an unrealistic high  $V_D$  (Design Maximum Speed) because minimum drag is achieved at a much lower speed. An iterative method determining actual  $C_D$  from calculated  $C_L$  was used to find a  $V_D$  at which the sink rate achieved is around 7.8 m/s, which is the value originally intended by OSTIV. A proposed revision to CS-22 along these lines has been submitted to EASA. This changes CS 22.335(f) from using  $C_{Dmin}$  to using the  $C_D$  in a steady dive at  $V_D$  at MAUW, with wing flaps in whichever en-route position is permitted.

CS 22.585(a) reduction of the spec. factor for use of textile towing rope according to LBA-note dated 09.12.2004 – According to NPA from 28.12.2004 the factor of 1.2 \* Qnom is no longer necessary for textile aero towing ropes. With that the load of the nose tow hook may also be lower. The flight manual states that textile ropes have to be used for aero tow. (See Section 2.14) (The factor of 1.2 was adequate for steel wires.)

(iv) *Exemptions:*

Nil

(v) *Airworthiness Limitations:*

See Maintenance Manual Section 4.3 Airworthiness Limitations

(3) Aircraft Noise and Engine Emission Standards:

(i) *Environmental Standard:*

ICAO Annex 16, Volume I 5<sup>th</sup> Edition, Amendment 9, Chapter 10.

(ii) *Compliance Listing:*

EASA Type Certificate Data Sheet for Noise A.538 – Issue 1, 25 January 2012  
Take-off Noise Level = 63.2 dB(A) [630 kg]; 64.2 dB(A) [700 kg]

(4) Certification Compliance Listing:

Certification Program ASH 31 – CS 22 Amendment 1 – dated 27.August 2010

Compliance Checklist ASH 31 – CS 22 Amendment 2 – dated 03.January 2012

Mid-West Engines Ltd Report No. D081 – Compliance Methodology Agreement  
for IAE50R-AA to JAR22 Subpart H, Issue D

(5) Flight Manual: EASA-Approved Flight Manual for the powered sailplane  
ASH 31 Mi – CAA Accepted as AIR 3298

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

(i) *Maintenance Manual:*

Maintenance Manual for the powered sailplane ASH 31 Mi

Repair Manual

Operation / Maintenance / Installation – IAE50R-AA – Document no: E1.01.05 – E

(ii) *Current service Information:*

Technical Notes ASH 31 available at [www.alexander-schleicher.de/tm/31/tm31.htm](http://www.alexander-schleicher.de/tm/31/tm31.htm)

IAE50R engine data is available at [www.austroengine.at/en](http://www.austroengine.at/en)

(iii) *Illustrated Parts Catalogue:*

Not produced.

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

CAA 2171 Form from Schleicher CEO Ulrich Kremer, dated 11.Nov.2014



## 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 – 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	CS 22.1307 – Required Equipment – See TCDS §*.III.3
91.507	Pax Information Signs – Smoking, safety belts fastened	Not Applicable – Single-seat glider
91.509	Minimum Instruments and Equipment	Not Applicable – Powered glider
91.511	Night VFR Instruments and Equipment	Not Applicable – Certificated for Day VFR flight only
91.513	VFR Communication Equipment	<i>Operational requirement – compliance as applicable</i>
91.517	IFR Instruments and Equipment	Not Applicable – Certificated for Day VFR flight only
91.519	IFR Communication and Navigation Equipment	Not Applicable – Certificated for Day VFR flight only
91.523	Emergency Equipment	N/A – Single-seat glider [Superseded by §104.101(5)]
91.529	ELT – TSO C126 (406 MHz) Appendix A.15 – Installation Requirements	<i>To be determined on an individual aircraft basis</i> Maintenance Manual Section 2.13 addresses locations
91.531	Oxygen Indicators – Volume/Pressure/Delivery	Optional factory provisions – See Maintenance Manual §2.9
91.533	Oxygen for Non-Pressurised Aircraft For flight >30 min above FL100 – Supplemental for crew	<i>Operational requirement – compliance as applicable</i>
91.541	SSR Transponder and Altitude Reporting Equipment	<i>Operational requirement – compliance as applicable</i>
91.543	Altitude Alerting Device – Turbojet or Turbofan	Not Applicable – Certificated for Day VFR flight only
91.545	Assigned Altitude Indicator	Not Applicable – Certificated for Day VFR flight only
A.15	ELT Installation Requirements	<i>To be determined on an individual aircraft basis</i>

### Civil Aviation Rules Part 104

#### Subpart C – Equipment and Maintenance Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
104.101	(1) Airspeed Indicator (2) Altimeter (Adjustable for barometric pressure) (3) Magnetic Compass (4) Safety Harness for each seat (5) A First Aid Kit (6) For powered gliders – (i) Fuel gauge for each main fuel tank (ii) Oil Pressure Gauge or warning device (iii) A tachometer or engine governor light (7) For IMC flight – (i) A variometer (ii) Turn & Slip/Artificial Horizon (iii) Radio transceiver	Required as Minimum Equipment – See TCDS Section §*.III.3 Required as Minimum Equipment – See TCDS Section §*.III.3 Required as Minimum Equipment – See TCDS Section §*.III.3 Required as Minimum Equipment – See TCDS Section §*.III.3 <i>To be determined on an individual aircraft basis</i>  Displayed by (required) ILEC 31Mi Engine Control Unit N/A – Total loss system (Has an oil supply [level sensor] light) Displayed by (required) ILEC 31 Mi Engine Control Unit  } Not Applicable

## Attachments

The following documents form attachments to this report:

- Three-view drawing Alexander Schleicher Model ASH 31 Mi
- Copy of EASA Type Certificate Data Sheet number EASA.A.538
- Copy of EASA Type Certificate Data Sheet number EASA.E.085

## Sign off

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David Gill  
Team Leader Airworthiness

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Checked – Greg Baum  
Airworthiness Engineer

## Appendix 1

### List of Type Accepted Variants:

<i>Model:</i>	<i>Applicant:</i>	<i>CAA Work Request:</i>	<i>Date Granted:</i>
ASH 31 Mi	R M Gaddes	15/21B/10	2 December 2014