Type Acceptance Report

TAR 4/21B/1 – Revision 1

Zlin Z 50L/LA/LS

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Executive Summary

New Zealand Type Acceptance has been granted to the Zlin Z 50 L, LA and LS Models based on validation of Type Certificate number EASA.A.108. There are no special requirements for import.

Applicability is currently limited to the Models and/or serial numbers detailed in Section 2, 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 generally 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 revision of the State-of-Design Type Certificate Data Sheet referenced herein.

1. Introduction

This report details the basis on which Type Acceptance Certificate No. 4/21B/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 notes the status of all models included under the State-of-Design type certificate which have been granted type acceptance in New Zealand, which are listed in Section 2. The history of the Zlin Z50 model type acceptance in New Zealand under type certificate EASA.A.108 is listed in Appendix 1.

2. Aircraft Certification Details

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

Type Certificate Holder:	Zlin Aviation A.S.
Type Certificate:	EASA.A.108
Issued by:	European Aviation Safety Agency
Manufacturer:	Moravan N.C.
Supersedes:	
Type Certificate:	Type Certificate of Airworthiness No. 77-01
Issued by:	Czechoslovak Socialist Republic – State Aviation Inspectorate

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

(i)	**Model:**	Z 50 L, Z 50 LA, Z 50 LS
	MCTOW:	840 kg. [17 lb.] – Normal Category 760 kg. [16 lb.] – Aerobatic Category
	Max. No. of Seats:	1
	Noise Standard:	ICAO Annex 16 Chapter X, dated 1 October 1990
	Engine:	Lycoming AEIO-540-D4B5 (Z 50 L, LA) Lycoming AEIO-540-L1B5D (Z 50 LS) Type Certificate: 1E4 Issued by: Federal Aviation Administration
	Propeller:	Hoffmann HO-V 123 K-F/200 AH (Z 50 L) Hoffmann HO-V 123 K-V/200 AH (Z 50 LA, LS) Type Certificate: P.058 Issued by: European Aviation Safety Agency
		MTV-9-B-C/C 200-15 Type Certificate: P.096 Issued by: European Aviation Safety Agency
		MTV-3-B-C/200-01 (Z 50 LS) Type Certificate: 32.130/54 Issued by: Luftfahrt Bundesamt

Notes: 1. Refer to TCDS EASA.A.108 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

The application for New Zealand type acceptance of the Zlin Z50 was from the importer, Mr D Cranna, dated 17 July 2003. The first-of-type example was Z50LS serial number 0070, registered ZK-ZSO. The Z50L Series is a single-seat all-metal mid-wing high performance aerobatic monoplane with fixed undercarriage.

Type Acceptance Certificate Number 4/21B/1 was granted on 3 November 2003 to the Zlin Models Z50L, Z50LA and Z50LS Series based on validation of Czech Type Certificate of Airworthiness No. 77-01, and includes the Hoffman V123 Series propeller based on LBA Type Certificate 32.130/17. The are no special conditions for import into New Zealand.

The Z50 Series is a competition aircraft which first appeared at the 1976 World Aerobatic Championships, where it finished second. The Z50L versions are all Lycoming powered, while the Z50M version has the Walter M137AZ in-line engine and Avia V503A propeller. The Z50LA differs from the Z50L only in that a different version of Hoffmann propeller is fitted, with decreased pitch. (The Z50L can be converted to the Z50LA in accordance with Information Bulletin Z50/3.) The Z50LS has a different engine variant with two separate magnetos instead of one double magneto. Moravan reported a total of 81 examples of the Zlin 50 have been produced, including 33 Model Z50LS, 18 Model Z50LA and 12 Model Z50L. (There were also 2 Model Z50LE, 9 Model Z50LX [LS with auxiliary fuel tanks] and 7 Model Z50M.)

This report was raised to Revision 1 to update the format and note the change of State-of-Design type certificate jurisdiction to EASA.

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:

EASA Type Certificate Number EASA.A.108

Type Certificate Data Sheet number EASA.A.108 at Issue 4 dated 23 July 2010
- Model 50 L approved October 12, 1977
- Model 50 LA approved November 25, 1980
- Model 50 LS approved May 10, 1982

Supersedes:
SAI Type Certificate of Airworthiness No.77-01 – Type Z50L approved 12.10.77
Appendix to the Type Certificate of Airworthiness of the Z50 L Aircraft (TCDS)
Appendix 1 to TC 77-01 – Type Z 50 LA approved 25.11.1980
Appendix 2 to TC 77-01 – Type Z 50 LS approved 10.5.1982
Supplement 3 to TC 77-01 – Type Z 50 M Approved
Appendix 4 to TC 77-01 – Noise
Supplement 5 to TC 77-01 – Type Z 50 LS approved 13.11.1992
Appendix 6 to TC 77-01 – Type Z 50 LX approved 14.10.1991
Appendix 7 to TC 77-01 – approves –L1B5 and L1B5D engines on 14.10.1991
Supplement 8 to TC 77-01 – approves MTV-9-B-C/C 200-15 prop on 17.11.92

(2) Airworthiness design requirements:

(i) Airworthiness Design Standards:
The certification basis of the Z 50 L Series is FAR Part 23 with all changes and amendments up to No.23-14 inclusive. This is an acceptable certification basis in accordance with CAR Part 21B paragraph §21.41, because FAR 23 is the basic standard for normal category airplanes called up under Part 21 Appendix C. No additional special conditions have been prescribed by the Director under §21.23.

A number of deviations against FAR Part 23 were accepted by the Czech airworthiness authority during certification, mainly due to the specialised nature of the aircraft. These were reviewed and accepted by the CAA.

The certification basis of the Hoffmann V123 series propeller is FAR Part 35. This is the basic airworthiness design standard for aircraft propellers called up under Part 21 Appendix C.

(ii) Special Conditions:
Nil

(iii) Equivalent Level of Safety Findings:
§23.177(a)(3) – Does not meet the requirement for the aileron control movement to increase steadily with the angle of slip. This was accepted because the Z50 is an aerobatic aircraft and the instability is outweighed by good controllability which does not require exceptional pilot skill.

§23.207(c) – Z50 did not provide the required stall warning margin. This was accepted for a special aerobatic aircraft because it allowed "the pilot to use a wider range of speed polar".

§23.613(c), §23.615 – Materials and design values used comply with the Czechoslovak State Standard and local specifications. This was accepted as equivalent to use of MIL-HDBK properties.

§23.967(d) – The fuel tank is located in the pilot's compartment and not isolated by fume and fuel-proof enclosures. This was accepted "on the proviso that the instructions for tank tightness test are included in the Flight Manual."

§23.971 – The fuel tank sump cannot be completely drained. This was accepted because the fuel system arrangement avoids water entry into the power plant fuel system.

§23.993(d)(e), §23.1182, §23.1183 – Hoses are not fire-resistant as specified in the airworthiness standards. This was accepted on the basis of service history.

§23.1093(a)(4) – The induction pre-heat temperature is less than the temperature of the cooling air at the engine outlet. This was accepted because flight in icing conditions is prohibited.

§23.1351(d) – No ammeter is fitted, only an alternator-out warning light. This was accepted because a storage battery is fitted which can supply emergency power for a period.

§23.1181 to §23.1401 – The aircraft does not have any lights as it is restricted to Day VFR.

(iv) Airworthiness Limitations:
See Z50 Technical Manual for airframe life.

(3) Aircraft Noise and Engine Emission Standards:

(i) Environmental Standard:
The Z 50 L Series has been certificated for noise under ICAO Annex 16, VI/10.

(ii) Compliance Listing:
TCDS EASAN.A.108 at Issue 4 dated 24 August 2009.

Model:	Engine:	Propeller:	Weight (kg):	Take-off Noise Level dB(A)
Z 50 L	AEIO-540-D4B5	HO-V123-()-()-200-AH	800	75.6
Z 50 L	AEIO-540-D4B5	MTV-9-B-C/C 200-15	800	75.6
Z 50 LA	AEIO-540-D4B5	HO-V123-()-()-200-AH	800	76.1
Z 50 LA	AEIO-540-D4B5	MTV-9-B-C/C 200-15	800	76.1
Z 50 LS	AEIO-540-L1B5	HO-V123-K-V-200-AH	840	77.4
Z 50 LS	AEIO-540-L1B5	MTV-9-B-C/C 200-15	840	77.4
Z 50 LS	AEIO-540-L1B5	MTV-3-B-C/200-01	840	77.4

(4) Certification Compliance Listing:

List of Z 50 type certification reports

Lycoming Report No. 3431 – Torsional (Shear) Stress Survey of AEIO-540-D4B5 Engine with Hoffman HO-V-123K-F/200 AH Propeller – dated March 9, 1976

(5) Flight Manual: Czech SAI-Approved Flight Manual – Z 50 L, Z 50 LA
CAA Accepted as AIR 2841

Czech SAI-Approved Flight Manual – Z 50 LS
CAA Accepted as AIR 2842

(6) Operating Data for Aircraft:

(i) Maintenance Manual:
Technical Manual – Aircraft Type: Z 50 L, LA (See §14.4 for Service Life)
Technical Manual – Aircraft Type: Z 50 LS (See §14.4 for Service Life)

(ii) Current service Information:
List of Service Bulletins, Service Letters and Service Instructions for the Z50
(Mandatory SB Z50/43a increases the airframe Service Life to 1200 hours.)

(iii) Illustrated Parts Catalogue:
Catalog of Spare Parts – Validity from 2. Series – Aircraft Z 50 L, Z 50 LA – 1981
Catalog of Spare Parts – Validity from 3. Series – Aircraft Z 50 LS – 1984

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

CAA 2171 from Moravan Office of Airworthiness Manager dated Oct. 7, 2003

(8) Other information:

LBA Musterzulassungsschein (Type Certificate) Nr. 1062
TCDS Nr. 1062 – Zlin Z50L at Revision 1 dated 10.01.1992
TCDS Nr. 1062 – Zlin Z50LA at Revision 1 dated 10.01.1992
TCDS Nr. 1062 – Zlin Z50LS at Revision 3 dated 10.01.1992
(Provided as evidence of acceptance of the Czech type certificate by another recognised National Airworthiness Authority)

Polish Acceptance of Approval Certificate Ref. GILC-84/00R1
Moravan Aeroplanes a.s. (Includes Zlin Z50LA, Zlin 50LS)

List of accidents to Z 50 aircraft, and the causes

5. New Zealand Operational Rule Compliance

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	Not Applicable – Single seat aircraft with a canopy
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		***To be determined on an individual aircraft basis*** (Flight Manual indicates five-point harness fitted.)	
91.507	Pax Information Signs – Smoking, safety belts fastened		Not Applicable – Single-seat aircraft	
91.509 Min. VFR	(1) ASI	FAR §23.1303(a) – LUN 1106 fitted as standard *	(8) Coolant Temp	N/A – Air-cooled engine
			(9) Oil Temperature	FAR §23.1305(c) – UST 83 fitted as standard *
	(2) Machmeter	N/A – No Mach no. limitations		
	(3) Altimeter	FAR §23.1303(b) – LUN 1121 fitted as standard *	(10) Manifold Pressure	FAR §23.1305(h)– LUN 1401 fitted as standard *
	(4) Magnetic Compass	FAR §23.1303(c) – KI 13 or LUN 1222.1 fitted as standard *	(11) Cylinder Head Temp.	FAR §23.1305(f) – PD 77 MV fitted as standard *
	(5) Fuel Contents	FAR §23.1305(a)	(12) Flap Position	N/A – No flaps fitted
	(6) Engine RPM	FAR §23.1305(d) – LUN 1318 fitted as standard *	(13) U/c Position	N/A – fixed undercarriage
			(14) Ammeter/Voltmeter	FAR §23.1351(d) – deviation granted – only alternator-out warning light fitted
	(7) Oil Pressure	FAR §23.1305(b) – UST 83 fitted as standard*		
	NOTE: * For details of Standard Equipment see paragraph 6.8.3 of Appendix 1 to Type Certificate No. 77-01			
91.511	Night VFR Instruments and Equipment		Not Applicable – Z 50 L is only approved for Day VFR	
91.513	VFR Communication Equipment		LUN 3524.20 or Becker AR2010/25 standard options	
91.517	IFR Instruments and Equipment		Not Applicable – Z 50 L is only approved for Day VFR	
91.519	IFR Communication and Navigation Equipment		Not Applicable – Z 50 L is only approved for Day VFR	
91.523	Emergency Equipment		Not Applicable – Single-seat aircraft	
91.529	ELT - TSO C91a after 1/4/97 (or replacement)		***To be determined on an individual aircraft basis***	
91.531	Oxygen Indicators – Volume/Pressure/Delivery		Not fitted as standard	
91.533	Oxygen for Unpressurised Aircraft		***Operational requirement – Compliance as applicable***	
91.541	SSR Transponder and Altitude Reporting Equipment		***Operational requirement – Compliance as applicable***	
91.543	Altitude Alerting Device – Turbojet or Turbofan		Not Applicable – Reciprocating engine powered	
91.545	Assigned Altitude Indicator		Not Applicable – Z 50 L is only approved for Day VFR	
A.15	ELT Installation Requirements		***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 91/119 operating requirements should be checked in each case, particularly oxygen system capacity and emergency equipment.

Attachments

The following documents form attachments to this report:

Copy of Type Certificate Data Sheet EASA.A.108

Sign off

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David Gill
Team Leader Aircraft Inspection

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Checked – Glen Somerville
Certification Engineer

Appendix 1

List of Type Accepted Variants:

Model:	*Applicant:*	*CAA Work Request:*	*Date Granted:*
Z 50 L, Z 50 LA, Z 50 LS	D. Cranna	4/21B/1	3 November 2003

Appendix 2

3-view Drawing Zlin Model Z 50 L