
Type Acceptance Report

TAR 4/21B/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 based on validation of Czech Type Certificate of Airworthiness no.77-01. There are no special requirements for import. These models are now eligible for the issue of an Airworthiness Certificate in the Standard Category in accordance with CAR §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 Model Z 50 can become type accepted after supply of the applicable technical data, in accordance with the provisions of CAR §21.43(2).

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.

2. Foreign Type Certificate Details

Type Certificate: Type Certificate of Airworthiness No. 77 - 01

Issued by: Czechoslovak Socialist Republic – State Aviation Inspectorate

Manufacturer: Moravan N.C.

Model(s): Z 50 L, Z 50 LA and Z 50 LS

Engine: Lycoming AEIO-540-D4B5 (Z 50 L, LA)
Lycoming AEIO-540-L1B5D (Z 50 LS)

Propeller: Hoffmann HO-V 123 K-F/200 AH (Z 50 L)
Hoffmann HO-V 123 K-V/200 AH (Z 50 LA, LS)

MCTOW 840 kg. (Normal) 760 kg. (Aerobatic)

Noise Category: ICAO Annex 16 Chapter X, dated 1 October 1990

The certification basis of the Z 50 L is FAR Part 23 with all changes and amendments up to No.23-14 inclusive. This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, as FAR 23 is the basic standard for Normal Category Airplanes called up under Part 21 Appendix C.

A number of deviations against FAR 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. No additional special conditions have been prescribed by the Director under §21.23.

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

3. Type Acceptance Certificate

The application for New Zealand type acceptance 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 high performance aerobatic monoplane.

Type Acceptance Certificate No. 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 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.)

4. Type Data

The type data requirements of NZCAR Part 21B Para §21.43 have been satisfied by supply of the following documents:

(1) Type certificate:

- SAI Type Certificate of Airworthiness No.77-01 – Type Z50L approved 12.10.1977
- Appendix to the Type Certificate of Airworthiness of the Z 50 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 17.11.1992

(2) Airworthiness design requirements: Already held by the CAA.

(3) Certification compliance listing:

List of Z 50 type certification reports

The following deviations from FAR Part 23 are noted on the TCDS:

§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) – The 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.

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

(4) 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

(5) 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

(6) Maintenance manual and service data for aircraft, engine and propeller:

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)

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

(7) Agreement from manufacturer to supply updates of data in (4), (5) and (6):

CAA 2171 from Moravan Office of Airworthiness Manager dated October 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. 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	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	<i>To be determined on an individual aircraft basis</i> (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	<table border="0"> <tr> <td>(1) ASI</td> <td>FAR §23.1303(a) – LUN 1106 fitted as standard *</td> <td>(8) Coolant Temp</td> <td>N/A – Air-cooled engine</td> </tr> <tr> <td>(2) Machmeter</td> <td>N/A – No Mach no. limitations</td> <td>(9) Oil Temperature</td> <td>FAR §23.1305(c) – UST 83 fitted as standard *</td> </tr> <tr> <td>(3) Altimeter</td> <td>FAR §23.1303(b) – LUN 1121 fitted as standard *</td> <td>(10) Manifold Pressure</td> <td>FAR §23.1305(h) – LUN 1401 fitted as standard *</td> </tr> <tr> <td>(4) Magnetic Compass</td> <td>FAR §23.1303(c) – KI 13 or LUN 1222.1 fitted as standard *</td> <td>(11) Cylinder Head Temp.</td> <td>FAR §23.1305(f) – PD 77 MV fitted as standard *</td> </tr> <tr> <td>(5) Fuel Contents</td> <td>FAR §23.1305(a)</td> <td>(12) Flap Position</td> <td>N/A – No flaps fitted</td> </tr> <tr> <td>(6) Engine RPM</td> <td>FAR §23.1305(d) – LUN 1318 fitted as standard *</td> <td>(13) U/c Position</td> <td>N/A – fixed undercarriage</td> </tr> <tr> <td>(7) Oil Pressure</td> <td>FAR §23.1305(b) – UST 83 fitted as standard*</td> <td>(14) Ammeter/Voltmeter</td> <td>FAR §23.1351(d) – deviation granted – only alternator-out warning light fitted</td> </tr> </table>	(1) ASI	FAR §23.1303(a) – LUN 1106 fitted as standard *	(8) Coolant Temp	N/A – Air-cooled engine	(2) Machmeter	N/A – No Mach no. limitations	(9) Oil Temperature	FAR §23.1305(c) – UST 83 fitted as standard *	(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	(7) Oil Pressure	FAR §23.1305(b) – UST 83 fitted as standard*	(14) Ammeter/Voltmeter	FAR §23.1351(d) – deviation granted – only alternator-out warning light fitted	
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	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)	<i>To be determined on an individual aircraft basis</i>
91.531	Oxygen Indicators - Volume/Pressure/Delivery	Not fitted as standard
91.533	Oxygen for Unpressurised Aircraft	<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 – Reciprocating engine powered
91.545	Assigned Altitude Indicator	Not Applicable – Z 50 L is only approved for Day VFR
A.15	ELT Installation Requirements	<i>To be determined on an individual aircraft basis</i>

Attachments

The following documents form attachments to this report:

- Photographs first-of-type example Z 50 LS s/n 0070 ZK-ZSO
- Three-view drawing Zlin Model Z 50 L Series
- Copy of SLI Type Certificate of Airworthiness 77-01 Appendix 1

Sign off

David Gill
Team Leader Airworthiness

Date: 3 November 2003