Type Acceptance Report

TAR 5/21B/26

DG 500MB

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Executive Summary

New Zealand Type Acceptance has been granted to the Model DG-500M series based on validation of LBA Type Certificate number 843. 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(2).

1. Introduction

This report details the basis on which Type Acceptance Certificate No.5/21B/26 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

Manufacturer:	DG Flugzeugbau GmbH
Model(s):	DG-500MB
Type Certificate:	Musterzulassungsschein Nr. 843
Issued by:	Luftfahrt-Bundesamt, Bundesrepublik Deutschland
MCTOW	1819 lb. [825 kg] – With 22m span 1797 lb. [815 kg] – With 20m span
No. of Seats:	2
Noise Standard:	Noise requirements for aircraft (LSL) Chapter 10 issued Jan 1st, 1991
Engine:	Solo 2625 02
Type Certificate:	Musterzulassungsschein Nr. 4600
Issued by:	Luftfahrt-Bundesamt, Bundesrepublik Deutschland

Propeller: Technoflug KS-1G-160-R110()B

Type Certificate: Musterzulassungsschein Nr. 32.110/18
Issued by: Luftfahrt-Bundesamt, Bundesrepublik Deutschland

3. Type Acceptance Certificate

The application for New Zealand type acceptance was from the local agent Mr Paul Buchanan dated 3 February 2005. The first-of-type example was serial number E214B13, registered ZK-GPP. The DG-500MB is a tandem two-seat high performance composite-construction competition or training motorglider with flaps and retractable powerplant.

Type Acceptance Certificate Number 5/21B/26 was granted on 7 March 2005 to the DG Flugzeugbau Model DG-500MB based on validation of LBA Type Certificate 843, and includes the Solo 2625 02 engine approved under LBA Type Certificate 4600 and the Technoflug Type KS-1G propeller approved under LBA Type Certificate 32.110/18. There are no special requirements for import into New Zealand.

The DG-500MB is a development of the DG-500M self-launching glider, with the original Rotax two-stroke engine replaced by a more powerful (64 hp) version of the Solo engine installation as developed for the DG-800. The wing is in four sections and is available in either 22 meter span form or 20 meter span with winglets, the latter for competition work.

4. Type Data

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) Type certificate:

LBA Type Certificate Nr: 843 for DG-500MB issued 23 July 1999
Type Certificate Data Sheet No. 843 Issue 1 dated July 23, 1999

LBA Musterzulassungsschein Nr. 4600 – Solo 2625 issued 16 March 1998
JAR-22(H) TCDS Number 4600 Issue 1 dated March 16th, 1998

Propeller Certificate Data Sheet No. 32/110/18 Issue 2 dated Nov 06, 1995

(2) Airworthiness design requirements:

The certification basis of the DG-500MB is JAR-22, at Change 4 issued 7th May 1987, including Amendments 22/90/1, 22/91/1 and 22/92/1, plus the Preliminary guideline for the stress analysis of glasfibre and carbonfibre reinforced plastic structures for sailplanes and powered sailplanes issued May 1986. This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, and Part 21 Appendix C, as JAR-22 is the basic standard for Sailplanes and Powered Sailplanes called up in Advisory Circular 21-1A. Two equivalent level of safety decisions were granted, which have been reviewed and accepted by the CAA. There are no non-compliances and no additional special conditions have been prescribed by the Director under §21.23.

The certification basis of the Solo Type 2625 engine is Subpart H of JAR 22, Change 5 from October 28th, 1995. This is an acceptable standard for motorgliders as noted above.

The certification basis of the Technoflug Type KS propeller is JAR 22 Section J, with Amendments 22/84/1, 22/84/2 and 22/86/1.

(3) Certification compliance listing:

Nachweisliste (MZ) – Compliance Checklist Type: DG-500 MB dated 18.03.99

ELOS JAR §22.207(c) – The required stall warning occurs later than between 1.05 and 1.1V_{S1} (1.01 to 1.06 V_{S1} depending on flap setting) because of the properties of the wing section. The lift coefficient curve remains horizontal for a period after reaching maximum, so the glider remains controllable close to the stall and also requires a (noticeable) high pitch angle to achieve the stall.

ELOS JAR §22.1093(b) – No carb heat is provided, because the carburettor is situated close to the engine and no carburettor icing was reported during flight testing in extreme conditions. Further the service history of Rotax and other similar 2-stroke designs indicates carb icing is not a problem.

(4) Environmental Certification:

Lärmmeßgutachten (Noise Expert Opinion) DG-500MB (22m span)
Lärmmeßbericht (Noise Report) DG-500MB (20m span) – Ifd. Nr.: 315

(5) Flight manual: LBA-Approved Flight Manual for Motorglider DG-500MB
CAA Accepted as AIR 2911 (see Section §5.3.6 for noise data)

(6) Illustrated Parts Catalogue: None produced

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

ICA/Maintenance Manual for the Motorglider DG-500MB (Commercial Designation DG-505MB): http://www.dg-download.de/Manuals/warth-505mb-e.pdf
Repair Manual for DG-500MB: http://www.dg-download.de/Manuals/reph-505mb-e.pdf
Technical Notes available on: http://www.dg-flugzeugbau.de/tm-500m-e.html

Manual for the Engine SOLO Type 2625 02

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

Email from DG Chief of Design, Wilhelm Dirks, dated 28 February 2005

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	***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 - Shoulder Harness required if certified for aerobatics; >10 pax; Flight Training	JAR 22.1307 – Four piece symmetrical safety harness required minimum equipment – See TCDS Section III paragraph 11
91.507	Pax Information Signs - Smoking, safety belts fastened	Not Applicable – Less than ten passenger seats
91.509	Minimum Instruments and Equipment	Not Applicable to powered gliders (See NZCAR Part 104)
91.511	Night VFR Instruments and Equipment	Not Applicable – Certificated for Day VFR flight only
91.513	VFR Communication Equipment	***Operational requirement – compliance as applicable***
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	Not Applicable – Superseded by §104.101(5)
91.529	ELT - TSO C91a after 1/4/97 (or replacement)	***Operational requirement – compliance as applicable***
91.531	Oxygen Indicators - Volume/Pressure/Delivery	Not fitted as standard
91.533	Oxygen for Unpressurized Aircraft	Not fitted as standard
91.541	SSR Transponder and Altitude Reporting Equipment	***Operational requirement – compliance as applicable***
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	***To be determined on an individual aircraft basis***

Civil Aviation Rules Part 104

Subpart C - Equipment and Maintenance Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
104.101	(1) Airspeed Indicator	Required as Minimum Equipment – See TCDS Section III para. 11
	(2) Altimeter (Adjustable for barometric pressure)	Required as Minimum Equipment – See TCDS Section III para. 11
	(3) Magnetic Compass	Required as Minimum Equipment – See TCDS Section III para. 11
	(4) Safety Harness for each seat	Required as Minimum Equipment – See TCDS Section III para. 11
	(5) A First Aid Kit	***Operational requirement – compliance as applicable***
	(6) For powered gliders –	
	(i) Fuel gauge for each main fuel tank	Required as Minimum Equipment – See TCDS Section III para. 11
	(ii) Oil Pressure Gauge or warning device	Not Applicable – Two-stroke engine (Pre-mix fuel-oil system)
	(iii) A tachometer or engine governor light	Required as Minimum Equipment – See TCDS Section III para. 11
	(7) For IMC flight –	(Engine parameters displayed on the DEI [Digital Engine Indicator])
	(i) A variometer	⎫ The DG-500MB is approved for cloud flying without water ballast
	(ii) Turn & Slip/Artificial Horizon	⎬ and the engine retracted if a turn and slip indicator and variometer
	(iii) Radio transceiver	⎭ are fitted (See Flight Manual Sections 2.12(B) and 2.13(c))

Attachments

The following documents form attachments to this report:

Photographs first-of-type example serial no. 5E214B13 ZK-GPP
Three-view drawing DG Flugzeugbau Model DG-500MB
Copy of LBA Type Certificate Data Sheet Number 843

Sign off

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David Gill — Checked – AWE3

Team Leader Airworthiness — Date: 7 March 2005

Appendix 1

List of Type Accepted Variants:

Model:	*Applicant:*	*CAA Work Request:*	*Date Granted:*
DG-500MB	Mr P J Buchanan	5/21B/26	7 March 2005