Type Acceptance Report

TAR 98-02 – Revision 2

SCHEMPP-HIRTH DUO DISCUS

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Executive Summary

New Zealand Type Acceptance has been granted to the Schempp-Hirth Duo Discus Series based on validation of EASA Type Certificate number EASA.A.025. 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(b).

1. Introduction

This report details the basis on which Type Acceptance Certificate No. 98/02 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:	Schempp-Hirth Flugzeugbau GmbH
Model:	Duo Discus
Type Certificate:	EASA.A.025
Issued by:	European Aviation Safety Agency
	(Previously covered by LBA Type Certificate Nr. 396)
MCTOW	660 kg [1455 lb.] 700 kg [1543 lb.] – with Water Ballast 750 kg [1654 lb.] – with MB 396-15
Max. No. of Seats:	2
Noise Standard:	Not Applicable

3. Type Acceptance Certificate

The application for type acceptance of the Duo Discus was from the New Zealand agent and importer, Drake Aviation Limited, dated 29-8-97. The First-of-Type example was a brand new machine serial number 142, registered as ZK-GDD.

Type Acceptance Certificate Number 98/2 was granted on 28 September 1997 to the Schempp-Hirth Duo Discus based on validation of LBA Type Certificate number 396. There are no special requirements for import into New Zealand.

This report was raised to Revision 1 to add the Duo Discus (x) variant and also note the change in type certificate responsibility to EASA. The applicant was Drake Aviation, and the first-of-type example was serial number 469 registered ZK-GZR. This is not an official new model on the type certificate, but the (x) name is used for marketing purposes to distinguish the latest aircraft incorporating Modification Bulletin 396-15. The Manuals are the same but at a different Revision status, and have therefore been identified separately.

Revision 2 added the Duo Discus (xL) variant, after application from the importer Glider Rentals Ltd. The first-of-type was serial number 593 registered ZK-GQQ. Type acceptance was granted on 4 December 2009. The xL is a Duo Discus (x) with MB 396-16 embodied.

The Duo Discus is a 20m span all-composite glider with provision for water ballast and no flaps to qualify in the Standard Class. It is a development of the original Discus single-seat competition sailplane with a similar wing planform. The L/D ratio is 45:1. Differences on the Duo Discus (x) are the addition of winglets; the use of predominately CFRP for the fuselage; new extended main landing gear strut; and changes to the airbrake system to link with the landing flap. Serial number 469 was one of the prototypes, and does not have the new undercarriage shock absorber. The Duo Discus (x) was advertised with an increased maximum weight of 750 kg, for which a strengthened wing has been developed. However at the time the manufacturer advised that approval of the change had not yet been achieved and would be covered by a Revision to MB 396-15. The primary difference for the xL is a 10cm lengthened cockpit, plus some changes to improve the airbrake system.

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) Type certificate:

Copy of LBA Musterzulassungsschein Nr. 396 issued 21.03.1994
Copy of Sailplane Data Sheet No. 396 for Duo Discus dated 21.03.94

Now superseded by:

EASA Type Certificate Data Sheet EASA.A.025 Issue 7 dated 25 July 2008
– Model Duo Discus LBA approved 21 March 1994
– Duo Discus (x) [MB 396-15] EASA approved 10 February 2006
– Duo Discus (xL) [MB 396-16] EASA approved 14 March 2008

(2) Airworthiness design requirements:

(i) Airworthiness Design Standards:
The certification basis of the Duo Discus is the Joint Airworthiness Requirements for Sailplanes and Powered Sailplanes (JAR 22) effective on June 27, 1989 (Change 4 of the English Original Issue) including amendments 22/90/1 through 22/92/1. Compliance was also shown with Standards for Structural Substantiation of Sailplanes and Powered Sailplanes Components consisting of Glass or Carbon Fibre Reinforced Plastics, issued July 1991; Additional requirements when using water ballast fin tank: LBA-letter I4-I 413/89; Draft NPA 22 D-46 dated 30 September 1993 relating to JAR 22.785(e)(f) "Seat and Restraint System"; and Draft NPA 22 D-64 dated 5 October 1993 relating to JAR 22.788 "Headrests". Two equivalent safety findings for the Duo Discus series have been made.

For approval of Modification Bulletin No. 396-15 for the Duo Discus (x) the manufacturer elected to upgrade the design requirements to JAR-22 effective on October 28, 1995 (Change 5 of the English original version). This was to provide a common certification basis (and shared substantiation) with the Duo Discus xT.

This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41, as JAR-22 is an acceptable certification basis for sailplanes and powered sailplanes in accordance with Advisory Circular 21-1A. There are no non-compliances and no additional special conditions have been prescribed by the Director under §21.23. The Duo Discus is approved for Day VFR flight only.

(ii) Special Conditions:
Nil

(iii) Equivalent Level of Safety Findings:
JAR 22.207(c) – With the C.G. in the rearward position the stall warning begins above 1.1 $V_{S1,}$ because the pitot pressure in the tailplane is affected by the fuselage wake at high AOA. However this is acceptable because IAS values drop quickly and still give the pilot a good warning that the stall is approaching. (This condition is applicable to gliders with TN 396-3 or MB 396-15.)

JAR 22.335(f) – An alternative method to derive V_D was used based on an LBA technical paper, which equated maximum dive speed to be that where the glider sink rate was a specified 7.8125 m/s.

(iv) Airworthiness Limitations:
See Maintenance Manual §3.3 Special Inspections of the Airframe

(3) Aircraft Noise and Engine Emission Standards:

Not applicable.

(4) Certification Compliance Listing:

Nachweisliste (Mz) Compliance Checklist – Duo Discus dated 01.03.1994
Nachweisliste (Mz) – Duo Discus – Modification Bulletin 396-15 dated 2.3.06
(Mz) – Duo Discus x, 700 kg – Modification Bulletin 396-15 with CFR-wing
(Mz) – Duo Discus x, 750 kg – Mod. Bulletin 396-15 with CFR-wing (Issue 3)
Nachweisliste (Mz) – Duo Discus – Technical Note 396-16
Nachweisliste (Mz) – Duo Discus – Technical Note 396-12
Nachweisliste (Mz) – Duo Discus (xL), 750 kg – Modification Bulletin 396-16

(5) Flight manual: LBA Approved Duo Discus Sailplane Flight Manual – Issued Oct 93
CAA Accepted as AIR 2592

LBA Approved Flight Manual for the Sailplane Duo Discus (x) – Issued October 93 – Rev.11 (S/N 450, 469 and 473 and on when in compliance with MB-No.396-15) – CAA Accepted as AIR 2955

LBA Approved Flight Manual for the Sailplane Duo Discus (xL) – Issued October 2007 – (S/N 534 and S/N 542 and on when in compliance with MB-No.396-16) – CAA Accepted as AIR 3118

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

(i) Maintenance Manual:
Maintenance Manual for Duo Discus – Issued January 1994
(Includes Repair Instructions)

Maintenance Manual for Duo Discus (x) – Issued January 1994 – Rev.14
(S/N 450, 469 and 473 and on when in compliance with MB-No.396-15)

Maintenance Manual for Duo Discus (xL) – Issued October 2007
(S/N 534 and S/N 542 and on when in compliance with MB-No.396-16)

(ii) Current service Information:
Summary of Schempp-Hirth TN and LBA-ADs – Model: Duo Discus

(iii) Illustrated Parts Catalogue:
N/A – None published

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

Letter from Schempp-Hirth Flugzeugbau GmbH dated July 18th, 1997.
CAA 2171 (Duo Discus xL) from Schempp-Hirth dated 18 November 2009

(8) Other information:

Modification Bulletin No.s 396-15, 396-16

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:

Subpart F - Instrument and Equipment Requirements

PARA:	REQUIREMENT:	MEANS OF COMPLIANCE:
91.505	Shoulder Harness if Aerobatic; >10 pax; Flight Training	2x 4-point harness required equipment – See TCDS A.III-3
91.507	Pax Information Signs - Smoking, safety belts fastened	Not Applicable – Two-seat glider
91.509	Minimum Instruments and Equipment	Not Applicable – Powered aircraft only
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	N/A – Two-seat glider [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	***Operational requirement – compliance as applicable***
91.533	Oxygen for Non-Pressurised Aircraft (required for >30 min above FL100)	***Operational requirement – compliance as applicable*** [Factory oxygen system available as option. – See FM §7.13]
91.541	SSR Transponder and Altitude Reporting Equipment	***Operational requirement – compliance as applicable***
91.543	Altitude Alerting Device - Turbojet or Turbofan	Not Applicable – Glider
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 A.III-3 and FM §2.12
	(2) Altimeter (Adjustable for barometric pressure)	Required as Minimum Equipment – See TCDS A.III-3 and FM §2.12
	(3) Magnetic Compass	***Operational requirement – compliance as applicable***
	(4) Safety Harness for each seat	Required as Minimum Equipment – See TCDS A.III-3 and FM §2.12
	(5) A First Aid Kit	***To be determined on an individual aircraft basis***
	(6) For powered gliders	Not Applicable
	(7) For IMC - (i) A variometer (ii) Turn & Slip/Artificial Horizon (iii) Radio transceiver	***Operational requirement – compliance as applicable***

Attachments

The following documents form attachments to this report:

Three-view drawing Schempp-Hirth Model Duo Discus
Copy of EASA Type Certificate Data Sheet Number EASA.A.025

Sign off

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David Gill	Checked – David Selby
Team Leader Airworthiness	Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

Model:	*Applicant:*	*CAA Work Request:*	*Date Granted:*
Duo Discus	Drake Aviation Ltd	98/21B/2	28 September 1997
Duo Discus (x) [Mod. 396-15]	Drake Aviation Ltd	6/21B/27	1 September 2006
Duo Discus (xL) [Mod.396-16]	Glider Rentals Ltd	10/21B/16	4 December 2009