DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

G85EU
Revision 1
SCHEMPP-HIRTH
Duo Discus
April 11, 2008

TYPE CERTIFICATE DATA SHEET No. G85EU.

This Data Sheet which is a part of the Type Certificate No. G85EU prescribes conditions and limitations under which the product for which the Type Certificate was issued meets the Airworthiness Requirements of the Federal Aviation Administration.

Type Certificate Holder.

Schempp-Hirth Flugzeugbau GmbH
Krebenstrasse 25
73230 Kirchheim/Teck
Germany

I. Model "Duo Discus", Non-Powered Glider, Utility Category, approved March 3, 1995

Description:

A two-seat, mid-wing, non-powered sailplane with carbon and glass fiber reinforced plastic construction (CFRP/GFRP) {or CFRP/GFRP/AFRP construction, see NOTE 11}; two-piece wing with tip extensions (and winglets – see NOTE 11, 12); double-panel Schempp-Hirth type airbrakes on upper wing surface (connected to trailing edge flap – see NOTE 11); water ballast in the wing and (optional) in the fin; retractable main wheel with hydraulic disc brake; fixed nose wheel and tail skid (or optional wheel); enhanced ventilation air control; T-tail configuration with fixed horizontal stabilizer.

Production of the Duo Discus with sales name "Duo Discus-x" will take the place of the Duo Discus. The data plate for the sales name Duo Discus-x will remain as "Duo Discus". Serial numbers for the Duo Discus-x are 450, 469, 473 and subsequent.

Airspeed Limits (IAS):

Warning: At higher altitudes, the true airspeed is higher than the indicated airspeed, so V_{NE} is reduced according to the table below:

V_{NE} (never exceed)	kts	mph	km/h
0 -2000 m (6562 ft)	135	155	250
3000 m (9843 ft)	130	150	241
4000 m (13123 ft)	124	142	229
5000 m (16404 ft)	117	135	217
6000 m (19685 ft)	111	127	205
7000 m (22966 ft)	105	121	194
8000 m (26247 ft)	99	114	183
9000 m (29528 ft)	93	107	172
10000 m (32808 ft)	87	101	162
12000 m (39370 ft)	76	88	141

Airspeed Limits (IAS) cont'd.:

		kts	mph	km/h
V_{NE}	Never exceed speed	See previous table		
V_{RA}	Max. rough air speed	97	112	180
V_A	Max. maneuvering speed	97	112	180
$V_{Airbrakes}$	Max speed with airbrakes fully extended	135	155	250
V_T	Max. aerotow speed	81 (or 97*) *See NOTES 10, 11	93 (or 112*) *See NOTES 10, 11	150 (or 180*) *See NOTES 10, 11
V_W	Max. winch launch speed	81	93	150
V_{LO}	Max. landing gear operating speed	97	112	180

Airspeed Indicator Markings:

	IAS Range	Significance
Green Arc	49 - 97 kts (56 - 112 mph) (90 – 180 km/h)	**Normal operating range** Lower limit is the speed 1.1*V_{S1} at the maximum weight and most forward c.g.; Upper limit is the maximum permissible speed in rough air.
Yellow Arc	97 - 135 kts (112 – 155 mph) (180 – 250 km/h)	Maneuvers must be conducted with caution and operating in rough air is not permitted.
Red Line	135 kts (155 mph) (250 km/h)	Maximum speed for all operations
Yellow Triangle	54 kts (or 51 kts*) 62 mph (or 59 mph*) 100 km/h (or 95 km/h*) * See NOTE 11	Approach speed at maximum weight without water ballast

C.G. Range: Forward limit: 1.77 in (45 mm) aft of datum plane
Rear limit: 9.84 in (250 mm) aft of datum plane
See Flight and Maintenance Manual for weight and balance data and loading chart

Empty Weight C.G.: See Maintenance Manual

Datum: Wing leading edge at root rib
Horizontal reference line = aft fuselage center line in horizontal position

Leveling Means: Tail jacked up such that a wedge-shaped block with dimensional ratio of 100:4.5, when placed on the rear top fuselage, is level along its upper edge.

Maximum Weight:

Max. take-off and landing (incl. water ballast): 1543 lb (700 kg)
Max. take-off and landing (without water ballast): 1455 lb (660 kg)
Max. weight of all non-lifting parts: 970 lbs (440 kg)

Number of Seats:

Two; when flown solo, pilot operation permissible only in front seat
C.G. position, front seat: 55.12 in. (1400 mm) ahead of datum
C.G. position, rear seat: 11.42 in. (290 mm) ahead of datum.
Distances are with parachute or back cushion in place. See Maintenance Manual for other C.G. positions

Maximum Baggage:

Enclosed baggage compartment not provided

Ballast Capacity:

Each wing tank: 26.15 gal (99 liters); Both wings: 52.31 gal (198 liters)
C.G. position of water ballast in wing tanks: 2.56 in. (65mm) aft of datum
Fin tank (optional): 2.91 gal (11.02 liters)
C.G. position: 209.45 in. (5320 mm aft of datum

Note: The max. take-off weight should not be exceeded when ballast weights are combined.

Weak Link for Towing (Aerotow and Winch):

1543 lb - 2006 lb (700 - 910 daN)

Tow Release:

1) Nose hook: Tost E 85, LBA TCDS No. 60.230/1
2) C.G. tow release: Europa G 88, LBA TCDS No. 60.230/2
Note: Installation of Europa G 88 is optional

Control Surface Movements.

Ailerons:
Up: 2.80 ± 0.20 in. (71 ± 5 mm)
Down: 1.42 ± 0.20 in. (36 ± 5 mm)
Measured 6.93 in. (176 mm) from hinge axis.

Elevator:
Up 2.05 ± 0.16 in. (52 ± 4 mm)
Down 2.05 ± 0.16 in. (52 ± 4 mm)
Measured 6.69 in. (170 mm) from hinge axis.

Rudder:
To both sides: 7.48 ± 0.79 in. (190 ± 20 mm)
Measured 16.14 in. (410 mm) from hinge axis.

Trailing Edge Flap (see NOTE 11):
Airbrakes locked:
Down: 0 inch (0 mm);

Airbrakes fully extended (approx. 8.66 inches (220 mm) control rod travel):
Down: 3.74 ± 0.20 inches (95 ± 5 mm)

Serial Numbers Eligible:

Serial numbers 1-449, 451-468, 470-472 are eligible for a U.S. Standard Airworthiness Certificate if all import requirements of this TCDS are satisfied and applicable Airworthiness Directives have been implemented.

Serial numbers 450, 469, 473 and subsequent are eligible for a U.S. Standard Airworthiness Certificate if all import requirements of this TCDS, including incorporation of Schempp-Hirth Modification Bulletin 396-15, latest approved version, is satisfied and applicable Airworthiness Directives have been implemented.

Certification Basis:

1) Code of Federal Regulations (CFR) FAR Part 21, effective February 1, 1965 including Amendments 21-1 through 21-91.

2) Joint Airworthiness Requirements for Sailplanes and Powered Sailplanes (JAR-22), Change 4 of the English original version, effective June 27, 1989, and includes Amendment 22/90/1, 22/91//1, 22/92/1.

3) Joint Airworthiness requirements for Sailplanes and Powered Sailplanes (JAR-22), Change 5 of the English original version, effective October 28, 1995. This was used for the certification of the Duo Discus when the sailplane has been modified according to Schempp-Hirth Modification Bulletin 396-15 dated July 18, 2006.

4) Exemption No. 4988 to 14CFR45, Effective April 20, 1964, Amendments 45-1 through 45-16, Section 45.11(a) and (d) (External Identification Plate).

5) LBA Document I 4 – FVK/91: Standards for Structural Substantiation of Sailplanes and Powered Sailplane Components Consisting of Glass or Carbon Fibre Reinforced Plastics, issued July 1991.

6) Additional requirements for the installation of a water ballast system into the fin (for compensating the nose-heavy moment of water ballast in wing tanks). LBA Reference: I4 – I 413/89 dated October 25, 1989

7) EASA Type Certificate Data Sheet No. EASA.A.025, Issue 4, dated October 23, 2006

8) Date of original application for FAA type certificate: June 16, 1994

9) Date of application for amendment to FAA type certificate: April 25, 2007

Import Requirements:

The FAA can issue a U.S. airworthiness certificate based on the European Aviation Safety Agency (EASA) or the German civil airworthiness authority (LBA, on behalf of EASA) Export Certificate of Airworthiness signed by a representative of EASA or the LBA on behalf of the European Community. The Export C of A should contain the following statement: “The aircraft covered by this certificate has been examined, tested, and found to conform to the type design approved under FAA Type Certificate G85EU and to be in a condition for safe operation.”

Serial numbers 517, 526, and 533, which were exported to the U.S. prior to re-issuance of FAA type certificate G85EU are eligible for a U.S. airworthiness certificate if the Export C of A contains the following statement: “The aircraft covered by this certificate has been examined, tested, and found to conform to the type design approved under EASA Type Certificate number A.025, Issue 04, dated October 23, 2006, and to be in a condition for safe operation. This approval requirement is applicable in the Federal Republic of Germany. In addition, the minimum equipment requirements of FAA type certificate G85EU must be met.

Equipment:

The basic required equipment as prescribed in the applicable airworthiness regulations (see Certification Basis) and the Flight Manual must be installed in the glider for certification.

(2) Airspeed Indicator displaying up to 162 knots (186 mph, 300 km/h)
(2) Altimeter
(1) Outside air temperature indicator with sensor (when flying with water ballast; red line at +2° C (35.6° F). Sensor must be installed in ventilation air intake.
(2) 4-point harness (symmetrical) per occupant
(2) Autormatic or manual parachute
(1) Back cushion per occupant if no parachute is used; thickness approx. 3.9 in. (100 mm) when compressed
(1) Flight Manual for Duo Discus, LBA-approved March 21, 1994 or later approved date.

Equipment, cont'd:

For structural reasons, the weight of each instrument panel with instruments in place must not exceed 22 lbs (10 kg).

Service Information:

Each of the documents listed below must state that it is approved by the European Aviation Safety Agency (EASA) or – for approvals made before September 28, 2003 – by the German Airworthiness Authority (LBA). Any such documents are accepted by the FAA and are considered FAA approved.

- Aircraft flight manual
- Aircraft Maintenance Manual
- Repair manual
- Technical Notes
- Modification bulletins

Operating and Service Instructions

1. Flight Manual for Duo Discus; issued October 1993 with applicable revision updates

2. Maintenance Manual for Duo Discus, issued January 1994, with applicable revision updates.

3. Repair Manual for Duo Discus, issued January 1994 with applicable revision updates.

4. Operating Instructions: Tost model "E 85" nose tow release, latest approved version

5. Operating Instructions: Tost model "Europa G 88" safety tow release, latest approved version

NOTES.

NOTE 1. Current weight and balance data together with list of equipment included in certificated empty weight, and loading instructions, when necessary, must be provided for each glider at the time of original certification.

NOTES, cont'd

NOTE 2. The placards listed in flight manual must be displayed. Flight Manual Limitations may not be changed without FAA approval.

NOTE 3. Section 12, "Airworthiness Limitations" of the Duo Discus Maintenance Manual, Instructions for Continued Airworthiness, dated January 1994 and later approved versions is FAA-approved. These Airworthiness Limitations may not be changed without FAA approval.

NOTE 4. All external portions of the glider exposed to sunlight must be painted white except the areas for registration numbers, wing tips, outboard and of ailerons, nose of fuselage, and rudder.

NOTE 5. Major structural repairs must be accomplished at FAA-certificated repair stations rated for composite aircraft structure work, in accordance with Schempp-Hirth methods approved by FAA.

NOTE 6. Information essential for the proper operation, maintenance and repair of the glider is contained in the Duo Discus Flight Manual, Maintenance Manual, and Repair Instructions.

NOTE 7: The use of a fin-mounted pitot probe for the airspeed indicator is permissible in compliance with the LBA-approved Schempp-Hirth Flugzeugbau GmbH Technical Note No. 396-3, respective Modification Bulletin No 396-7.

NOTE 8: The use of the fuselage from the powered sailplane Duo Discus T is permissible in compliance with the LBA-approved Schempp-Hirth Flugzeugbau GmbH Modification Bulletin No. 396-9.

NOTE 9: The installation of a manually operated rudder control during the production is permissible in compliance with the LBA-approved Wolf-Hirth GmbH Technical Note No. 396-4.

NOTE 10: The increase of the maximum permitted speed on aerotow is permissible in compliance with the LBA-approved Schempp-Hirth Flugzeugbau GmbH Technical Note No. 396-5, respective Modification Bulletin No. 396-10

NOTE 11: The use of wings with trailing edge flaps connected to the airbrakes; wingtips with winglets; additional landing gear shock absorber struts; landing gear with wheel brake; additional regulation flap for ventilation air control; and CFRP fuselage and wing construction are permissible in compliance with the LBA-approved Schempp-Hirth Flugzeugbau GmbH Modification Bulletin No. 396-15, issued July 18, 2006. Consult this bulletin for applicability and eligible serial numbers.

NOTE 12: The modification of the wing tips for winglets is permissible when in compliance with the LBA-approved Schempp-Hirth Flugzeugbau GmbH Technical Note No. 396-12.

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