

**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

G19CE Revision 1 Schempp-Hirth Flugzeugbau GmbH Duo Discus T January 22, 2009

TYPE CERTIFICATE DATA SHEET NO. G19CE

This data sheet, which is part of Type Certificate No. G19CE prescribes conditions and limitations under which the product for which the Type Certificate was issued meets the airworthiness requirements of the Federal Aviation Regulations.

Type Certificate Holder: Schempp-Hirth Flugzeugbau GmbH
Krebenstrasse 25
D-73230 Kirchheim/Teck
Germany

I. Model "Duo Discus T" Glider, Utility Category (Non-Self Launching), approved April 26, 2005

Description: A two-seat, mid-wing, non-self launching powered sailplane constructed from carbon, glass, and aramid fiber reinforced plastic (CFRP/GFRP/AFRP) construction (wings constructed mainly of CFRP, see Note 8); T-tail configuration; two-piece wing with tip extensions (and winglets – see Note 7, 8); double panel Schempp-Hirth type airbrakes on upper wing surface (connected to trailing edge flap – see Note 8); water ballast tanks in the wing and (optional) in the fin; retractable main wheel with hydraulic disc brake, fixed nose wheel; tail skid or (optional) tail wheel.

Production of the Duo Discus T with sales name “Duo Discus-xT” will take the place of the Duo Discus T through accomplishment of of Schempp-Hirth Modification Bulletin No. 890-6. The data plate for the sales name Duo Discus-xT will remain as “Duo Discus T”. Serial numbers for the Duo Discus-xT are 126, 128 and subsequent.

Engine: (1) Solo 2350 D
German Type Certificate Data Sheet No. 4603, Issue 5, dated December 18, 2001

Fuel: Two-stroke mixture, unleaded automotive gasoline
Min. RON 95 or AVGAS 100 LL

Oil (lubrication) Fuel/oil mixture, mixing proportion for “CASTROL Super TT”: 30:1 (3.3%)

Engine Limits: Max. Continuous Power: 29.5 BHP (22 kW) at 6500 rpm

Propeller Technoflug Leichtflugzeugbau GmbH
Model: OE-FL 5.110/83 av
Data Sheet No. OE-FL /83, Edition 7, dated December 7, 2001
Diameter: 43.31 in (1100 mm) + .08 in (2mm) / - 1.57 in (40 mm)
No further diameter reduction permitted
Reduction ratio: 1:1.56

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Airspeed Limits (IAS):

V_{NE} Speed Limit versus Altitude	[knots]	[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

	[knots]	[mph]	[km/h]
V_{RA} (Rough Air Speed)	97	112	180
V_A (Maneuvering Speed)	97	112	180
V_T (Aerotow)	97	112	180
V_W (Winch Launch)	81	93	150
V_{LO} (Landing Gear Operating Speed)	97	112	180
V_{MAX1} (Max Speed w/ Power Plant Extended, Ignition ON)	67	78	125
V_{MAX2} (Max Speed w/ Power Plant Extended, Ignition OFF)	86	99	160
$V_{PO_{MAX}}$ (Power Plant Ext/Ret Speed)	59	68	110
$V_{PO_{MIN}}$ (Power Plant Ext/Ret Speed)	49	56	90

C.G. Range

Max. Forward C.G: 1.77 in. (45 mm) aft of datum
 Max. Aft C.G: 9.84 in. (250 mm) aft of datum

Datum

Wing leading edge at wing root rib

Leveling Means

Upper edge of a wedge 100:4.5 slope to be horizontal when placed on rear top of fuselage.

Maximum Weights

With or without water ballast:
 Max. Take-Off and Landing: 1543 lb (700 kg)
 Max. permitted weight of all non-lifting parts: 1080 lb (490 kg)

For serial numbers 172 and subsequent; optional for serial numbers 147, 150, 151 to 171; (see NOTE 8 and 9)

With water ballast:

Max. Take-Off and Landing: 1654 lb (750 kg)

Without water ballast:

Max. Take-Off and Landing: 1588 lb (720 kg)

Max. permitted weight of all non-lifting parts: 1103 lb (500 kg)

Minimum Crew

One; when flown solo, control is from front seat only.

<u>No. of Seats</u>	Two: Front seat: moment arm 55.12 in (1400 mm) forward of datum Rear seat: moment arm 11.42 in (290 mm) forward of datum
<u>Maximum Baggage</u>	An enclosed baggage compartment is not provided
<u>Fuel Capacity</u>	4.28 U.S. gallons (16.2 Liters) Usable: 4.23 U.S. gallons (16.0 Liter) Non-usable: 0.5 U.S. gallons (0.2 liters) Moment arm: 20.47 in (520 mm) aft of datum
<u>Water Capacity</u>	Both wing tanks: 52.84 U.S. Gallons (198 Liters) Moment arm: 2.56 in (65 mm) aft of datum Fin tank (optional): 2.91 U.S. Gallons (11 Liters) Moment arm: 209.45 in (5320 mm) aft of datum
<u>Control Surface Movements</u>	<p>Aileron:</p> <p>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</p> <p>Elevator:</p> <p>Up/down: 2.05 ± 0.16 in. (52 ± 4 mm) Measured 6.69 in. (170 mm) from hinge axis</p> <p>Rudder:</p> <p>To either side: 7.48 ± 0.79 in. (190 ± 20 mm) Measured 16.14 in. (410 mm) from hinge axis.</p> <p>Trailing Edge Flap (see NOTE 8): Airbrakes locked: Down: 0 inch (0 mm);</p> <p>Airbrakes fully extended (approx. 8.66 inches (220 mm) control rod travel: Down 3.74 inches + 0.39 inch / - 0.20 inch (95 mm + 10 mm / - 5 mm)</p>
<u>Weak Link for Towing</u>	<p>Aerotow and Winch Launch: 1543 to 2006 lb (700 to 910 daN)</p> <p>For serial numbers 172 and subsequent; optional for serial numbers 147, 150, 151 to 171; (see Notes 8 and 9): Aerotow: Max 1910 lb (850 daN) Winch Launch: 2135 lb (950 daN)</p>
<u>Serial Nos. Eligible</u>	<p>Prematurely exported (prior to issuance of U.S. type certificate) Duo Discus T sailplane serial number 21 is eligible for a U.S. Standard Airworthiness Certificate if Solo Kleinmotoren GmbH Service Bulletin No. 4603-11, dated April 15, 2002, has been complied with and all requirements of this TCDS are satisfied.</p> <p>Prematurely exported serial numbers 41, 45, 55, 64, 72, 76, and 94 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.</p>

Serial Nos. Eligible, cont'd

Serial numbers 126, 128 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 890-6, latest approved version, are satisfied and applicable Airworthiness Directives have been implemented.

Certification Basis

The regulations (unless otherwise stated) are Title 14 of the Code of Federal Regulations (14CFR):

- 1) Code of Federal Regulations (CFR) FAR Part 21, effective February 1, 1965 including Amendments 21-1 through 21-80, effective March 1, 2002 for serial numbers 1 through 125 and 127 (applies to original TC application). For serial numbers 126, 128 and subsequent, FAR Part 21 up to and including Amendment 21-88 applies.
- 2) JAR 22 Joint Airworthiness Requirements for Sailplanes and Powered Sailplanes, Change 5 of the English Original Issue, dated October 28, 1995, including additional Amendments 22/90/1, 22/91/1, 22/92/1, and 22/94/1.
- 3) JAR 22.785(e)(f), Seat and Restraint System, Change 6, dated 26 September, 2000.
- 4) JAR 22.788, Head Rests, Change 6, dated 26 September, 2000.
- 5) Equivalent Level of Safety number ACE-08-13 to JAR 22.1093, Change 5 - Induction System Icing Protection applicable for serial numbers 126, 128 and subsequent. Equivalent Level of Safety number ACE-05-02 to JAR 22.1093, Change 5 - Induction System Icing Protection, is applicable for serial numbers 1 through 125 and 127.
- 6) Equivalent Level of Safety number ACE-08-16 to JAR 22.207(c), Change 5: Stall Warning, applicable to serial numbers 126, 128 and subsequent.
- 7) LBA Standards for Structural Substantiation of Sailplanes and Powered Sailplane Parts Consisting of Glass or Carbon Fibre Reinforced Plastics, dated July 1991.
- 8) Additional requirements for the installation of a water ballast system into the fin (for compensating the nose-heavy moment due to seat loading and water ballast in wing tanks). LBA Reference: I4 – I 413/89 dated October 25, 1989.
- 9) Date of original application for FAA type certificate: September 27, 2002.
- 10) Date of application for amendment to FAA type certificate: April 25, 2007.
- 11) EASA Type Certificate Data Sheet No. EASA.A.074, Issue 4, dated July 25, 2008*.

* The German airworthiness authority, Luftfahrt-Bundesamt, originally type certificated the Duo Discus T under its type certificate number 890. The FAA validated this product under U.S. Type Certificate Number G19CE. Effective September 28, 2003, the European Aviation Safety Agency (EASA) began oversight of this product on behalf of Germany, the State of Design. EASA TCDS Number EASA.A.074 replaces LBA TCDS number 890.

Import Requirements

The FAA can issue a U.S. airworthiness certificate based on the German civil airworthiness authority (Luftfahrt-Bundesamt, LBA) Export Certificate of Airworthiness (C of A) signed by a representative of 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 G19CE and to be in a condition for safe operation."

Major modifications/alterations as defined in 14 CFR Part 1.1 and 14CFR Part 43, Appendix A are not approved unless covered by this data sheet.

Equipment

The basic required equipment as prescribed in the applicable airworthiness regulations (see Certification Basis) must be installed in the glider for certification. In addition, the following items of equipment are required:

- (2) Airspeed Indicators with range up to 162 kts (186 mph, 300 km/h)
- (2) Altimeters
- (1) Outside Air Temperature Indicator with Sensor (when flying with water ballast, red line at 35.6 °F (2 °C)
- (1) Magnetic Compass
- (2) Engine Control Units featuring
 - RPM indicator
 - Engine hour meter
- (1) Fuel Quantity Indicator
- (1) Rear View Mirror
- (2) Four-piece Safety Harnesses (symmetrical)
- (2) Automatic or Manual Parachutes or
- (2) Back Cushions (thickness approx. 3.15 in (8 cm) when compressed); one per seat
- (1) Flight Manual for Duo Discus T, issued May 2000 and EASA/LBA approved with latest applicable revisions

For additional equipment, refer to the Flight and Maintenance Manual

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). Unless otherwise noted, any such documents are accepted by the FAA and are considered FAA approved.

- Aircraft Flight Manual
- Aircraft Maintenance Manual
- Repair Manual
- Technical Notes

Operating and Service Instructions:

1. For serial numbers 1 through 125 and 127, Flight Manual for Duo Discus T, issued May 2000, LBA approved December 21, 2001 with applicable revision updates.
For serial numbers 126, 128 and subsequent, Flight Manual for Duo Discus T, issued May 2000, LBA approved February 10, 2006 with applicable revision updates.
2. Instructions for Continued Airworthiness (Maintenance Manual and Repair Instructions) for Duo Discus T, dated June 2000 or later with applicable revision updates.
3. Airworthiness Limitations Section for Duo Discus T, dated July 2003 and LBA approved August 01, 2003.

Operating and Service Instructions cont'd

4. Repair Manual for Duo Discus T, issued June 2000, with applicable revision updates.
5. a. Operating Instructions: Tost model "Europa G 88" safety tow release, latest approved version
 - b. Operating Instructions: Tost model "E 85" nose tow release, latest approved version
6. Operating Manual for the SOLO engine, model "2350 D", latest applicable issue by Messrs. Solo Kleinmotoren GmbH
7. a. Operating Manual for the folding propeller, type "OE-FL .5.110/83, latest applicable issue by Messrs. Ingrid Oehler TB GmbH
 - b. Repair Manual for the folding propeller, type "OE-FL .5.110/83, latest applicable issue by Messrs. Ingrid Oehler TB GmbH

NOTES

- NOTE 1. Current weight and balance data including list of equipment included in the certificated empty weight and loading instructions, when necessary, must be provided for each glider at the time of original certification and at all times thereafter.
- NOTE 2. The placards listed in the flight manual must be displayed. A complete listing of placards is in the Instructions for Continued Airworthiness Manual (Maintenance Manual).
- The following placards must be displayed in clear view of the pilot:
1. "THE MARKINGS AND PLACARDS INSTALLED IN THIS GLIDER CONTAIN OPERATING LIMITATIONS WHICH MUST BE COMPLIED WITH WHEN OPERATING THIS GLIDER IN THE UTILITY CATEGORY. OTHER OPERATING LIMITATIONS WHICH MUST BE COMPLIED WITH ARE CONTAINED IN THE GLIDER FLIGHT AND MAINTENANCE MANUALS."
 2. "Aerotow permitted from the forward hook only".
- "Vne vs Altitude" placard must be located near the Airspeed indicator.
- NOTE 3. Airworthiness Limitations are specified in the LIMITATION section of the Flight Manual, in the Instructions for Continued Airworthiness (Maintenance Manual), and in the "Airworthiness Limitations Section for powered sailplane model Duo Discus T", edition dated July 2003, LBA-approved August 1, 2003. These documents are FAA-approved. These LIMITATIONS specify mandatory replacement times and operating limitations and may not be changed without FAA approval.
- NOTE 4. The following operations are prohibited:
- Night flying
 - Aerobatic maneuvers
 - Flying into known icing conditions
 - Aerotowing using the C.G. hook
 - Winch launching using the nose hook
- Cloud flying is permissible in the U.S. provided the pilot has the appropriate rating per FAR 61.3, the glider contains the necessary equipment specified under FAR 91.205, and the pilot complies with IFR and oxygen use requirements.
- NOTE 5. Operating the Duo Discus T with its power plant temporarily removed or inoperative is permissible in accordance with the directions stated in the Flight Manual.

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- NOTE 6: Major structural repairs must be accomplished at FAA certificated repair stations rated for composite aircraft structure work, in accordance with Schempp-Hirth Flugzeugbau GmbH repair methods approved by FAA.
- NOTE 7: The modification of the wing tips for winglets is permissible when in compliance with the LBA-approved Schempp-Hirth Flugzeugbau GmbH Technical Note No. 890-7 (optional for serial numbers 1 through 125 and 127).
- NOTE 8: 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, increased take-off, landing, and non-lifting parts weight, and CFRP fuselage and wing construction are permissible in compliance with the LBA-approved Schempp-Hirth Flugzeugbau GmbH Modification Bulletin No. 890-6, EASA-approved September 7, 2007. Consult this bulletin for applicability and eligible serial numbers.
- NOTE 9: Increase of the max. permitted all-up mass to 750 kg and of the maximum weight of the non-lifting parts to 500 kg is permissible when in compliance with the EASA-approved Schempp-Hirth GmbH Technical Note No. 890-9 (optional for serial numbers 150 through 171)
- NOTE 10: The use of the elongated fuselage, redesign of the cockpit area, the battery mounting in the vertical fin, and the modified Schempp-Hirth airbrake in combination with the enlarged flight envelope as detailed in Schempp-Hirth Modification Bulletin No. 890-7 is not authorized.
- NOTE 11: 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.

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