Type Acceptance Report

TAR 1/21B/3 – Revision 2

Schempp-Hirth Ventus-2cT

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Executive Summary

New Zealand Type Acceptance has been granted to the Ventus powered glider series based on validation of LBA Type Certificate number 825. 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.1/21B/3 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.

The report also notes the status of all models included under the foreign type certificate which have been granted type acceptance in New Zealand. Models covered by the type acceptance certificate issued under Part 21B are listed in Section 2 of this report. Models which were accepted prior to that under NZCAR Section B.9 are listed in Appendix 1.

2. ICAO Type Certificate Details

Manufacturer:	Schempp-Hirth Flugzeugbau GmbH
Type Certificate:	Musterzulassungsschein Nr. 825
Issued by:	Luftfahrt-Bundesamt, Bundesrepublik Deutschland
Model:	Ventus-2cT
MCTOW	500 kg [1102 lb] – 18m span 525 kg [1157 lb] – 15m and 18m span with TN 825-19 embodied 565 kg [1246 lb] – 18m s/n 108 and up with MB 825-44 embodied 600 kg [1322 lb] – 18m span with TN 825-37-2 embodied
Max. No. of Seats:	1

Noise Standard:	Noise Regulation for Aircraft (LVL), Issue of August 1, 2004
Engine:	Solo Type 2350
	Type Certificate: Musterzulassungsschein Nr. 4603 Issued by: Luftfahrt-Bundesamt
	Note: Solo engine Model 2350 modified according to LBA-approved Technical Note No. 4603-1 and No. 4603-3 by Messrs. Solo-Kleinmotoren GmbH.
Propeller:	OE-FL 5.83/83a5, v92
	Approval: Data Sheet Number OE-FL./83 Issued by: Luftfahrt-Bundesamt
Model:	Ventus-2cM
MCTOW	500 kg [1102 lb] – 18m span 525 kg [1157 lb] – 15m and 18m span with TN 825-19 embodied 565 kg [1246 lb] – 18m s/n 137 and up with MB 825-44 embodied 600 kg [1322 lb] – 18m span with TN 825-37-2 embodied (Maximum take-off mass for self-launches is 585 kg [1290 lb])
Max. No. of Seats:	1
Noise Standard:	Noise Regulation for Aircraft (LVL), Issue of August 1, 2004
Engine (1):	Solo Type 2489
	Type Certificate: Musterzulassungsschein Nr. 4613 Issued by: Luftfahrt-Bundesamt
Propeller (1):	Technoflug KS-F2-1A/158-R 108
	Type Certificate: Number 32.110/19 Issued by: Luftfahrt-Bundesamt
Engine (2):	Solo Type 2625-01 [MB No. 825-27]
	Type Certificate: Musterzulassungsschein Nr. 4600 Issued by: Luftfahrt-Bundesamt
Propeller (2):	Technoflug KS-1G-152-R-122
	Type Certificate: Number 32.110/18 Issued by: Luftfahrt-Bundesamt

3. Type Acceptance Certificate

The application for New Zealand type acceptance of the Ventus-2cT was from the local agent, Shields Sailplane Services Ltd, dated 10th August 2000. A supporting letter and data package was sent by the manufacturer on 16th October 2000. The first-of-type examples were serials 60 and 61, registered as ZK-GVT and ZK-GCK respectively. The Ventus-2cT is a single-seat 18m-span midwing all-composite powered-glider fitted with water ballast tanks, flaps and retractable engine, with optional 15m-span outer panels with winglets.

Type Acceptance Certificate Number 1/21B/3 was granted on 20 October 2000 to the Schempp-Hirth Model Ventus-2cT based on validation of LBA Type Certificate 825, and includes the Solo 2350 engine based on LBA Type Certificate 4603 and the Oehler OE-FL propeller based on LBA Data Sheet OE-FL./83. There are no special requirements for import into New Zealand.

The Ventus-2c is a new design of Standard Class high performance glider designed for competition in the 18m class, although with optional wingtips it can also be flown in the 15m class. The Ventus-2cT is the non-self-launching variant of the Ventus-2c and is identical except for the "Turbo" sustainer engine system. This powerplant installation was previously proven in the Ventus bT model, which was type accepted in NZ in November 1985 and there are currently three examples registered. There have also been examples of the Ventus cT and cM, the latter a fully self-launching version with a more powerful motor. (All the powered versions of the Ventus are included on the same type certificate.)

This report was raised to Revision 1 to add the latest variant identified with the salescode Ventus-2c(x)T, applicable to serial number 108 and on with Modification Bulletin 825-44 embodied. This employs, among other things, a new horizontal tail and the use of modified 18m outboard wing panels. The application for type acceptance was from the manufacturer dated January 11, 2005, and the first-of-type was serial number 133 registered as ZK-GCH. Type acceptance was granted on 19 March 2005.

This report was raised to Revision 2 to include the Ventus-2cM variant, which is the self-launching powered version of the Ventus-2c with the 49 hp Solo engine. The applicant was the local agent, and the first-of-type example was Ventus-2c(x)M serial number 223, registered ZK-GLA. Type acceptance was granted on 4 December 2008.

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) ICAO Type certificate:

Musterzulassungsschein Nr.: 825 – Ventus-2cT – date of Issue 27 November 1996
Type Certificate Data Sheet No. 825 – Ventus-2cT – Issue 2, dated 14.10.1997
LBA-TCDS No: 825/PS – Variant: Ventus-2cT – Issue 3 of November 16, 2004
LBA-TCDS No: 825/PS – Variant: Ventus-2cM – Issue 4 of November 16, 2004

Musterzulassungsschein Nr.: 4603 – Solo 2350 – date of Issue 1 August 1989
Engine Identification Sheet No. 4603 – Solo 2350/B/C – Issue 3, dated 1.08.1989

Musterzulassungsschein Nr.: 4613 – Solo 2489 – date of Issue 10 January 1997
Motor-Kennblatt Nr. 4613- Solo 2489 – Ausgaub 1, 10 Januar 1997

Musterzulassungsschein Nr.: 4600 – Solo 2625 – date of Issue March 16 1998
Motor-Kennblatt Nr. 4600- Solo 2625 – Ausgaub 1, March 16 1998

Propeller Data Sheet No. OE-FL./83 – Edition 5, dated April 28, 1995

Musterzulassungsschein Nr.: 32.110/18 – KS – date of Issue 1 September 1992
Propeller Certificate Data Sheet No. 32.110/18 – KS 1C/G – Issue 3, June 13, 2005
Musterzulassungsschein Nr.: 32.110/19 – KS-F2 – date of Issue 20 February 1997
Propeller Certificate Data Sheet No. 32.110/19 – KS-F2-1 – Issue 1, Feb 20, 1997

(2) Airworthiness design requirements:

(i) Airworthiness Design Standards:

The certification basis of the Ventus-2cT and -2cM is the Joint Airworthiness Requirements for Sailplanes and Powered Sailplanes (JAR 22) effective on June 27th, 1989 (Change 4 of the English Original Issue), including Amendment 22/90/1. This is an acceptable certification basis in accordance with NZCAR Part 21B Para §21.41 and Appendix C, as JAR-22 is the basic standard for powered sailplanes called up under Advisory Circular 21-2B. There are no non-compliances and no additional special conditions have been prescribed by the Director under §21.23. The powered Ventus is approved for Day-VFR flying.

(ii) Special Conditions:

Appendix I of Amendment 22/90/1 (to JAR 22) concerning powered sailplanes not capable of self-launching. (-2cT only)

Standards for structural substantiation of sailplanes and powered sailplane components consisting of glass or carbon fiber reinforced plastic, Edition of July 1991.

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.

Draft NPA 22 D-46 dated April 7, 1994 – JAR 22.785(e)(f) “Seat & Restraint System”.

Draft NPA 22 D-64 dated April 12, 1994 relating to JAR 22.788 “Head Rests”.

Provisional standards for the additional substantiation of a protection against fire in powered sailplane fuselages featuring an engine firmly installed behind the cockpit. LBA-Reference: I 4 421 – Fire protection-94, dated September 13, 1994. (-2cM only)

(iii) Equivalent Level of Safety Findings:

Two ELOS special compliances were made for the Ventus-2cT and -2cM:

JAR 22.207(c) – With the c.g. in the aftmost position the stall warning starts above the required $1.1V_{S1}$ due to fuselage wake effects on the pitot head. This is acceptable because the IAS-values drop quickly and the pilot still gets good warning about the impending stall.

JAR 22.1093(a/b) – No pre-heater is fitted because the induction pipe is close to warm cylinders and service experience with 170 aircraft has shown intake icing is not a problem.

Two ELOS were made with respect to the Ventus-2cT:

JAR 22.902(b) – There is no direct indication of retraction of the pylon to the pilot, but is indicated acoustically through striking the power unit against the block brake and switching off the retraction spindle motor. This has been satisfactory in service with 350 motorglider.

JAR 22.971 – There is no drainable sump fitted to the upper removeable (optional) fuel tank, because of its small size and the ease of cleaning by removal. In addition three years experience with the Ventus bT shows condensation is not a problem.

One ELOS was made with respect to the Ventus-2cM:

JAR 22.51 – The best rate-of-climb speed V_Y is less than 1.3 V_{si} but higher than 1.15 V_{si}. Tests were required to show this speed was safe under all reasonably expected operating conditions, including very turbulent conditions and demonstration of engine failure.

(iv) Airworthiness Limitations:

See Maintenance Manual Section 3.3 Special Inspections.

(3) Aircraft Noise and Engine Emission Standards:

(i) Environmental Standard:

The Ventus-2cT (LVL Section 3) and Ventus-2cM (LVL Section 1) have been certificated under German Aircraft Noise Protection Requirements.

(ii) Compliance Listing:

Ventus-2cT – 300m measured fly-over noise level – 57.5 dB(A) (See FM §5.3.3)
Ventus-2cM [Solo 2489] – measured noise level in a climb – 62.0 dB(A)
Ventus-2cM [Solo 2625-01] – measured noise level in a climb – 61.7 dB(A)
Ventus-2cM [Solo 2625-01] (MB 825-38) – noise level in a climb – 61.2 dB(A)
Ventus-2c(x)M [Solo 2625-01] (MB 825-44) – noise level in a climb – 61.7 dB(A)

(4) Certification Compliance Listing:

Nachweisliste (Mz) Compliance Checklist Ventus-2cT dated 8.11.1996

Nachweisliste (Mz) Compliance Checklist Ventus-2cM dated 4.2.1997

Nachweisliste (Mz) Compliance Checklist Tech. Note No.825-19 dated 24.09.97
Nachweisliste (Mz) Compliance Checklist Mod. Bulletin No.825-25 dated 3.2.1997
Nachweisliste (Mz) Compliance Checklist Ventus-2cM MB 825-27 dated 24.12.00
Nachweisliste (Mz) Compliance Checklist Mod. Bulletin No.825-31 dated 15.12.99

Nachweisliste (Mz) Compliance Checklist Ventus-2cT TN 825-37 dated 15.05.06
Nachweisliste (Mz) Compliance Checklist Mod. Bulletin No.825-41 dated 14.12.01
Nachweisliste (Mz) Compliance Checklist Ventus-2cM MB 825-42 dated 07.09.04
Nachweisliste (Mz) Compliance Checklist Ventus-2cT MB 825-44 dated 07.09.04
Nachweisliste (Mz) Compliance Checklist Ventus-2cM MB 825-44 dated 14.09.04

(5) Flight Manual: LBA-Approved Flight Manual for powered Sailplane Ventus-2cT Issued June 1996 – CAA Accepted as AIR 2705

LBA-Approved Flight Manual for powered Sailplane Ventus-2cT Issued November 2003 – CAA Accepted as AIR 2912

Note: At CAA request an applicability statement was added to the front page of the manual. (S/N 108 and on)

LBA-Approved Flight Manual for powered Sailplane Ventus-2cM Issued May 1996 – CAA Accepted as AIR 3077

LBA-Approved Flight Manual for powered Sailplane Ventus-2cM (Ventus-2c(x)M S/N 137 and on when in compliance with MB-No. 825-44) – Issued November 2003 – CAA Accepted as AIR 3075

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

(i) Maintenance Manual:
Maintenance Manual for powered Sailplane Ventus-2cT – Issued June 1996
Maintenance Manual for powered Sailplane Ventus-2cT – Issued November 2003 (MM includes Repair Instructions) – Applicable Ventus-2c(x)T – S/N 108 and on

Maintenance Manual for powered Sailplane Ventus-2cM – Issued 1 June 1996
Maintenance Manual for powered Sailplane Ventus-2cM – Issued November 2003 (MM includes Repair Instructions) – Applicable Ventus-2c(x)M – S/N 137 and on

Engine Manual for Solo Engine Model 2340 issued 7.11.83 at Rev.3 dated 24.5.85

Manual for the Engine SOLO Type 2 489 – Edition 1, October 7th, 1998

Ingrid Oehler-TB GmbH – Manual for folding-propeller OE-FL issue 14.06.99

Technoflug Operation and Maintenance Manual No.P3 for the Two-Blade Composite Propellers with Fixed Pitch KS 1 C ()(), KS 1 G ()(), KS 1 G ()()W

Operation & Maintenance Manual No.P4 2-Blade Folding Propeller KS-F2-()()/()()

(ii) Current service Information:
Modification Bulletins and Technical Notes

(iii) Illustrated Parts Catalogue:
Not issued separately for airframe.

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

CAA 2171 from Schempp-Hirth Chief Technical Office dated October 16, 2000
CAA 2171 from Schempp-Hirth Head of Technical Office dated November 4, 2008

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 safety harness (symmetrical) required minimum equipment – See TCDS Section III.8
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 by seating [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.8
	(2) Altimeter (Adjustable for barometric pressure)	Required as Minimum Equipment – See TCDS Section III.8
	(3) Magnetic Compass	Required as Minimum Equipment – See TCDS Section III.8
	(4) Safety Harness for each seat	Required as Minimum Equipment – See TCDS Section III.8
	(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.8
	(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.8
	(7) For IMC flight –	(ILEC Engine Control Unit Fitted as Standard – See FM §7.10)
	(i) A variometer	⎫
	(ii) Turn & Slip/Artificial Horizon	⎬ The powered Ventus is not approved for cloud flying
	(iii) Radio transceiver	⎭

Attachments

The following documents form attachments to this report:

Photographs first-of-type example Ventus-2cT serial number 60 ZK-GVT
Three-view drawing Schempp-Hirth Model Ventus-2cT
Copy of LBA Type Certificate/ Type Certificate Data Sheet No.825

Sign off

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David Gill	Checked – AWE Chris Thomson
Team Leader Airworthiness	Airworthiness Engineer

Appendix 1

List of Type Accepted Variants:

Model:	*Applicant:*	*CAA Work Request:*	*Date Granted:*
Ventus bT	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
Ventus cM	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
Ventus cT	AC 21-1.2/NZCAR Part 21 Appendix A(c)		
Ventus-2cT	Shields Sailplane Services Ltd	1/21B/3	20 October 2000
Ventus-2c(x)T	Schempp-Hirth Flugzeugbau GmbH	5/21B/23	19 March 2005
Ventus-2cM	Sailplane Services Limited	9/21B/10	4 December 2008