S E C T I O N 2

2.1 Introduction

This section includes operating limitations, instrument markings, and basic placards necessary for safe operation of the G 103 C TWIN III SL powered sailplane, its engine, standard systems and standard equipment.

The limitations included in this Section and in Section 9 have been approved by the Luftfahrt-Bundesamt.

2.2 Airspeed

Airspeed limitations and their operational significance are shown below:

	Speed	IAS (km/h)	IAS (kts)	Remarks
V_{NE}	Never exceed speed	248 237 214 192 171	134 128 116 104 92	Do not exceed this speed in any operation and do not use more than 1/3 control deflection Altitude: 0-2000 m 0- 6562 ft -3000 m - 9842 ft -5000 m -16404 ft -7000 m -22966 ft -9000 m -29528 ft
V_{RA}	Rough air speed	175	94	Do not exceed this speed except in smooth air, and then only with caution. Examples of rough air are lee-wave rotors, thunderclouds etc.
V_A	Manoeuvring speed	175	94	Do not make full or abrupt control movement above this speed, because under certain conditions the motorglider may be overstressed by full control movement.
V_W	Max. winch-launching speed	140	76	Do not exceed this speed during winch- or autotow-launching
V_T	Max. aerotowing speed	140	76	Do not exceed this speed during aerotowing
V_P	Max. speed with engine power on	175	94	The max. permissible engine speed (6800 rpm) must not be exceeded (propeller in CRUISING position, engine at full power)
V_{POmin}	Minimum powerplant extension and retraction speed	90	48	Do not extend or retract the retractable powerplant outside of this speed range
V_{POmax}	Maximum powerplant extension and retraction speed	110	59	

2.3 Airspeed Indicator Markings

Airspeed indicator markings and their color-code significance are shown below:

Marking	IAS value or range (km/h)	(kts)	Significance
Green arc	86-175	46- 94	Normal Operating Range. (Lower limit is 1.1 V_{S1} at max. weight and most forward c.g. Upper limit is rough air speed V_{RA})
Yellow arc	175-248	94-134	Manoeuvres must be conducted with caution and only in smooth air
Red line	248	134	Maximum speed for all operations
Yellow triangle	107	57	Approach speed at max. weight
Blue line	90	48	Best rate of climb speed V_y

2.4 Powerplant, Fuel and Oil

Engine Manufacturer:	Bombardier Rotax GmbH
Engine Model:	Rotax 505 A
Maximum Power, Take-Off:	31.6 kW/43 HP
Continuous:	26.7 kW/36 HP
Maximum Engine rpm at MSL	
• For variable pitch propeller:	Take-Off: 6800 rpm
	Continuous: 6400 rpm

Although the maximum engine RPM for continous operation is 6800 RPM , the RPM limit caused by the combination engine/propeller is 6400 RPM with propeller in CRUISE - position.

• For fixed pitch propeller:	Take-Off: 6800 rpm
	Continuous: 6800 rpm
Maximum Cylinder Head Temperature:	250 °C
Lubrication:	Mixture lubrication, mixture ratio 1 : 50

A two stroke fuel-oil mixture (ratio 1 : 50) must be used.

Approved Fuel Type:	Super non-leaded
Approved Fuel Grade:	Octane value min. 95 ROZ
Oil Grade:	2 stroke oil Castrol TTS

This is a proven oil. In addition to meet the minimum specification (according to TSC3), this oil has other properties which encourage its use. These properties have nothing to do with safety aspects.

The fuel tank system consists of a 33 liter (7.25 imp. gal / 8.7 US gal) fuselage tank and a 47 liter (10.3 imp. gal / 12.4 US gal) wing tank (as standard only for variable pitch propeller):

Useable Fuel:	31 liters (6.8 imp. gal / 8.2 US gal) in fuselage tank
Non-Useable Fuel:	2 liters (0.44 imp. gal / 0.53 US gal) (indication ≙ 0)
Fuel Consumption	
- at take-off power:	approx. 22 l/h (5.8 US gal/h / 4.8 imp. gal/h)
- at 70% take-off power:	approx. 16 l/h (4.2 US gal/h / 3.5 imp. gal/h)
Propeller Reduction Drive:	Toothed belt drive (3 : 1 reduction)

Propeller 1:	Manufacturer:	MT-Propeller-Entwicklung
	Model:	MTV-24-M/158-16
	Diameter:	158 cm (62 in.)
Propeller 2:	Manufacturer:	Technoflug Leichtflugzeugbau
	Model:	KS-1C-158-R-108
	Diameter:	158 cm (62 in.)

2.5 Powerplant Instrument Markings

Two powerplant multifunction instruments are installed. These are TAZ-G103-A (front cockpit) and TAZ-G103-B (rear cockpit) for the variable pitch propeller or type -AS and -BS for the fixed pitch propeller. The instruments monitor the following parameters:

- Engine rpm (permanent lighting of the LED)
  with the variable pitch propeller:
  - green diode: 3500 to 6700 rpm
  - red diode: above 6800 rpm

  with the fixed pitch propeller:
  - green diode: 3500 to 4800 rpm and 5800 to 6700 rpm
  - yellow diode: 4900 to 5700 rpm
  - red diode: above 6800 rpm

- Fuel tank contents:
  amber diode flashes when less than 8 liters (1.76 imp. gal / 2.1 US gal) of useable fuel remain

- Cylinder head temperature:
  The indicator flashes at cylinder head temperatures higher than 250 °C

- Operating hours (only the front cockpit instrument)
- Outside air temperature
- Generator voltage

Note: The operation of the multifunction instruments has been demonstrated to an altitude of 3000 m (9800 ft).

2.6 Mass (Weight)

Maximum take-off mass:	710 kg	(1565.3 lbs)
Maximum landing mass:	710 kg	(1565.3 lbs)
Maximum mass of all non-lifting parts:	535 kg	(1179.5 lbs)
Maximum mass in baggage compartment:	10 kg	(22.0 lbs)

Warning: Do not exceed the maximum permissible total mass!

2.7 Center of Gravity

Center of gravity range: (for flight)	280 mm to 490 mm (11 to 19.3 in.) aft of reference datum
Reference datum:	Wing leading edge at the root rib
Aircraft attitude:	Incidence board 600:24 horizontally on upper side of fuselage in front of vertical stabilizer

The center of gravity range for flight must be strictly adhered to.
The permissible c.g. range will not be exceeded if the loading corresponds to the Weight and Balance Record in section 6.2, page 6.4 of this POH.
Too little mass in the pilot's seat must be compensated by trim ballast (see POH section 6.2, page 6.3).

For determination of the empty mass c.g. position, see Maintenance Manual, Section 7.

2.8 Approved Manoeuvres

This powered glider has been certificated for normal gliding flight and powered flight in the UTILITY airworthiness category. Aerobatic manoeuvres are not permitted.

2.9 Manoeuvring Load Factors

The following manoeuvring load factors must not be exceeded:

- with retracted airbrakes:
* at V_A (175 km/h/94 kts): max. positive load factor n = + 5.30
max. negative load factor n = - 2.65

With increasing speed the above values decrease as follows:
* at V_{NE} (248 km/h/134 kts): max. positive load factor n = + 4.0
max. negative load factor n = - 1.5

- with extended airbrakes
* at V_{NE} (248 km/h/134 kts): max. positive load factor n = + 3.5

2.10 Flight Crew

The motorglider may be flown solo only from the front seat.

Min. load in the front seat	70 kg	(154 lbs)
Max. load in the front seat	110 kg	(242 lbs)
Max. load in the rear seat	110 kg	(242 lbs)

A pilot's weight in the front seat of less than 70 kg (154 lbs) must be compensated by ballast. A pilot's weight between 55 and 69 kg (121 and 152 lbs) can be compensated by installing lead trim weights to the support (standard equipment) on the forward control stick frame.

2.11 Kinds of Operation

With the minimum equipment specified in section 2.12 of the POH the aircraft is certified for:

- flights in accordance with Visual Flight Rules (VFR day)

Flights under IFR and /or icing conditions and flying in clouds are not permitted. The motorglider may not be flown with the engine removed. The self-launching capability has been demonstrated and is approved.

Caution: Self-launching must be performed according to the instructions in section 4 of the POH.

2.12 Minimum Equipment

- 2 airspeed indicators up to 300 km/h (162 kts) with color codings according to section 2.3 of the POH
- 2 altimeters
- 2 symmetrical safety belts (each consisting of 4 parts)
- back cushions with a min. thickness of 7 cm (2.77 in.) under load or a manually or automatically operated parachute for each occupant
- 1 multifunction instrument TAZ-G103-A or TAZ-G103-AS
- 1 magnetic compass (compensated in the aircraft)
- 1 rearview mirror

Note: During flights outside the traffic pattern and within controlled air space, an operating radio communication system must be available in the motorglider.

Instruments and other parts of the minimum equipment must correspond to an approved design.

2.13 Aerotow, Winch- and Autotow-Launching

Aerotow (only permissible using the nose towing hook)

Max. permissible speed:	140 km/h	(76 kts)
Towing cable weak link (nominal load):	850 daN	(1874 lbf)
Min. length of cable:	40 m	(131 ft)

Winch- and Autotow-Launching (only permissible using the c.g. towing hook)

Max. permissible speed:	140 km/h	(76 kts)
Towing cable weak link (nominal load):	850 daN	(1874 lbf)

Warning: The towing cable weak link (including tolerance) must not exceed 935 daN (2061 lbf).

2.14 Other Limitations

Baggage Compartment Loading
Only load smooth, light objects (max. 10 kg / 22 lbs) which cannot obstruct or injure the pilot during negative accelerations or in the event of a crash landing.

Coloring
All components which are exposed to sunlight (with the exception of the areas for registration marks and colored hazard indicating paint) must have a white surface. Neither the color nor the structure of paint may be changed without the prior permission of the aircraft manufacturer.
Caution: Anti-static paint is used in the area of the wing tank.

Canopy Glazing
The following colors of acrylic glass are approved for the canopy glazing:
- RÖHM 245 colorless
- MECAPLEX 2421 and 7704 blue
- MECAPLEX 2422 green

2.15 Limitations Placards

1

Maximum flying weight		710 kg (1566 lbs)		
Maximum airspeeds (IAS)		km/h	kts	mph
in calm air:	V_{NE}	248	134	154
in rough air:	V_{RA}	175	94	109
Manoeuvring speed:	V_A	175	94	109
Aerotow:	V_T	140	76	87
Winch/Automobile tow:	V_W	140	76	87
Powerplant operation max.:	V_{POmax}	110	59	68
Powerplant operation min.:	V_{POmin}	90	49	56

RH side wall of front and rear cockpit

2

Towing cable weak link	
aero-, winch-	850 daN
and automobile tow:	1874 lbs
Tire pressure	
main wheel: 36-39.8 PSI	2.5-2.8 bar
nose and tail wheel: 36 PSI	2.5 bar

RH side wall of front cockpit

3

Payload

(Pilot and Parachute)

Minimum load in front cockpit: 70 kg 154 lbs
(Less load must be compensated with trim weights)

Maximum load in front cockpit: 110 kg 242 lbs

(The maximum weight must not be exceeded)

RH side wall of front and rear cockpit

2.15 Limitations Placards (continued)

4

Max. baggage 10 kg (22 lbs)

RH side wall

5

Aerobatic manoeuvres are not allowed

Front instrument panel

6

Usable fuel Fuselage tank: 31 Liter (8.2 US gal) (6.8 Imp. gal)

Front instrument panel

7

NO SMOKING

Front and rear instrument panels

8

Tire Pressure 36 - 39.8 PSI 2.5 - 2.8 bar

Main wheel fairing

9

Tire Pressure 36 PSI 2.5 bar

Nose and tail wheel

10

Engine RPM	
3500 to 4800 - 5800 to 6700	---(green)
4900 to 5700 -	---(yellow)
above 6800 RPM-	---(red)

Front and rear instrument panel
(only for fixed pitch propeller)

Note: For further placards refer to the Maintenance Manual.