ALEXANDER SCHLEICHER SEGELFLUGZEUGBAU
D - 6416 POPPENHAUSEN / WASSERKUPPE

Flight and Operations Manual
for the Sailplane Model

A S W 1 9 B

June 1978 Edition

This manual is always to be carried on board !

It belongs to the Sailplane A S W 1 9 B

Serial No. ...19322.....

Registration No. ...N10WH...

Owner : .....

.....

.....

Manufacturer : Alexander Schleicher
Segelflugzeugbau
D - 6416 Poppenhausen

This manual is the translation of the German original which is approved by the Federal Office of Civil Aeronautics of the Federal Republic of Germany (LBA). The translation has been done by best knowledge and judgement.

In any case the original text in German language is authoritative.

Contents

Amendments to the Manual

No.	Title	Page	Date, Signature
1	TN 3, Waterballast	22	15.12.1976 G. Wieber

1.1. Preface

The ASW 19 B has been licenced according to the 'Airworthiness Requirements for Sailplanes' (LFS).

Please note that the minimum safety factor is 1.5. The safety factor is the proportion of ultimate load against limit load.
This points to important consequences for the flight operations :

Breaking loads will be reached either by exceeding the permissible loads by 50 % or by exceeding the permissible speeds by a $1.5 = 1.22$ factor, in other words by only 22 %. Therefore, the stated placard speeds must be observed at all times.

Furthermore, it should be considered that, while the sailplane is able to absorb a gust of +- 10m/s at max. permissible speed, the pitot, however, must be able to take the related g-load accelerations of +6 g or -4 g without moving the controls to the extent that the sailplane is overstressed.

This gust value of +- 10 m/s, however, does not cover strong turbulence situations like in cumulonimbus clouds, wave rotors, visible funnel clouds, or when skimming mountain passes at low altitudes.

In order to maintain a sufficient safety factor in these situations, the flying speed should be held below the maneuvering speed placard of 170 km/h, this is the green color marked range on the airspeed indicator.
The green range on the airspeed indicator shows the speed range in which full control movements may be made, decreasing all the way to 1/3 of the possible control movements at placard speed in the yellow range.

For the max. permissible speed another restriction must be regarded:

The inflight flutter tests are done at about 2.500 to 3.500 m msl. As the airspeed indicator reads too low values at increasing speeds - the critical flutter speed, however, being more or less determined by true airspeed for light aircraft -, the following speed limits are valid for high altitude flights :

Altitude meter msl.	feet msl.	Indicated Airspeed km/h	knots
0-3.000	0-10.000	255	138
5.000	16.400	225	120
7.000	23.000	200	110
9.000	29.500	180	95
11.000	36.000	155	85
13.000	42.600	135	75

If above limited values are not exceeded, true airspeed will be constantly 290 km/h (155 kts) above 3.000 m msl. (10.000 ft). This speed is high enough to face strongest jet streams.

Another warning seems to be apt for aerobatics : The flight test experiences and also the experiences with the ASW 15 and the ASW 17 show that high g-loads can be stand better in semi-reclined position with legs being placed high than with older design gliders or even motor-aircraft.

The installation of a g-meter is recommended at least temporarily in order to become used to the new g-load feeling. Because of the rubber suspended instrument panel the g-meter overreads short period landing gear loads by approx. 1.5, whereas long period inflight accelerations are read correctly.

1.2. Operation Values and Limitations

Maximum speeds :

Up to 10.000 ft (see page 5)	255 km/h (138 kts / 158 mph)
With full control deflections	170 km/h (92 kts / 106 mph)
In aerotow	170 km/h (92 kts / 106 mph)
For auto- and winchtow	125 km/h (67 kts / 78 mph)

For this purpose the following colored calibration markings appear on the airspeed indicator :

Red line at 255 km/h (138 kts, 158 mph).
Green range between 85 - 170 km/h (46 - 92 kts, 53 - 106 mph).
Yellow range between 170 - 255 km/h (92 - 138 kts, 106 - 158 mph).
The yellow triangle at 90 km/h (49 kts, 56 mph) shows the recommended approach speed.

Weights

Empty weight with min. equipment and antenna, approx.	245 kg (540 lbs).
Max. all-up weight	454 kg (1000 lbs).
Max. weight of non-lift producing members	230 kg (507 lbs).

Water ballast in wing tanks 70 - 90 kg (154 to 198 lbs) depending on cockpit loads.
(See table on page 10 !).

Weak link in tow line

for winch- and aerotow 600 kg (1323 lbs).

In Flight Center of Gravity

Datum point is the leading edge of the wing root rib (without the fillet of the wing-fuselage fairing).
The horizontal reference line is the center line of the fuselage tail cone or a wedge template (1000 : 45) levelled out on the top side of the fuselage aft portion (see the page 'rigging data' of the appendix).
In Flight Center of Gravity range is from 240 mm to 384 mm (9.45 to 15.12 inch) both behind datum.

Permissible Load Factors

Max. positive load factor	+ 5.3
Max. negative load factor	- 2.65
at 170 km/h (92 kts, [redacted])	

decreasing to :

Max. positive load factor	[redacted]
Max. negative load factor	
at 255 km/h (138 kts, [redacted]).	

Notes

The sailplane is suited for cloud flying and - without water ballast - for semi-aerobatics (positive g-loads only).
Flights under icing conditions are not recommended, specially if the glider has been wet before climbing through the icing level. Experiences have shown that in the area of the rather narrow control gaps any rain or condensation drops dry off relatively slowly and turn to ice when climbing above the freezing level. Therefore, one has to expect a stiffening of the controls leading to blocking of controls in extreme cases. Isolated climbs above the freezing level with a dry sailplane did not lead to any stiffening of the controls even though the leading edges of wings and control surfaces showed severe icing.

Flights with water ballast above freezing level should be avoided because of the risk of icing-up of the tank ventilation.
Tall pilots can fly without the adjustable seat-rest, but they must use a stiff cushion that levels the edge of the towing hook fairing and the box of the wheel. Tall pilots also should use gym shoes with heels as low as possible so that they can use the most forward pedal position.
Small pilots should check prior to start if they can apply full rudder deflections and if they cannot fall off the pedals with their feet. If necessary, a board with a support for the heels can be installed on the pedals.

1.3. Minimum Equipment (see equipment list in the appendix)

Airspeed indicator with range 50 - 270 km/h (25 - 145 kts, 30 - 170 mph).
Lap and shoulder straps.
Parachute or back-cushion at least 6 cm thick (2.5 inch) when compressed.
Altimeter.

Additional minimum equipment for cloud flying :
Turn and bank indicator.
Compass.
Transceiver (Federal Rep. of Germany only).

Experience to date has shown the pitot pressure system for the airspeed indicator satisfactory for cloud flying.
If the compass cannot properly be compensated on the instrument panel, it should be mounted in the canopy e.g. above the control stick or on the right cockpit wall in the area above the map pocket.
Instruments weighing more than 1000 grams (2.2 lbs) should not be mounted but with the 4 instrument screws, but should also be braced against one or possibly several of the rubber instrument panel mounts.

It is strongly advised only to use instrument panels made of fiberglass. Panels made of other materials might - in the case of crash landings - lead to serious injuries.

1.4. Weight and Balance Information

Payload in cockpit (pilot and parachute) :

Minimum 75 kg (165.3 lbs)
Maximum 115 kg (253.4 lbs)

Exceptions possible, see page 20 !

The glider is provided such that interchangeable trim weights can be mounted in front of the pedals. Therefore, it is possible - without carrying sandbags or lead cushions in the seat - to fly with cockpit payloads lower than 75 kg (165 lbs) respectively lower than the min. value shown on page 20 of the Flight Manual.

The lead discs weigh 1 kg (2.2 lbs) each.

As the weights are installed so far forward in the sailplane, they have 2.5 times the effectivity as the same mass in the seat. If e.g. 1 kg is installed in front of the pedals, the minimum cockpit payload is by 2.5 kg (5.51 lbs) lower; if 2 kg (4.4 lbs) are installed, the payload is by 5 kg (11.02 lbs) lower, and so on.

Important Note :

1. Only 7 weights (7 kg) altogether are allowed to be installed at the fittings.
2. The nut must be properly fixed and checked prior to every take-off. It must be safetied with a safety pin.

3. If the minimum cockpit payload trimmed by the ballast weights is exceeded by more than 30kg (66 lbs), i.e. if a heavier pilot wants to fly, the trim weights must be removed.

The inner cockpit wall at the right hand side must show the following placard :
' Check number and installation of trim weights prior to take-off. '

The loading of the baggage compartment has no significant effect on the CG location. It must not, however, be loaded by more than 15 kg (33 lbs). Hard objects weighing more than 1 kg (2.21 lbs) should be carefully secured in the baggage area in order to prevent accidents.

Loading of Water Ballast

The max. all-up flying weight of 454 kg (1000 lbs) must not be exceeded. For a determination of the proper amount of water ballast the following chart may be used :

Payload (kg) →
(Pilot + Parachute)

EMPTY WEIGHT ↓ see page 20

	65	75	85	95	105	115
230	full	full	full	full	full	full
240	"	"	"	"	"	"
250	"	"	"	"	"	89 kg
260	"	"	"	"	89kg	X
270	"	"	"	89kg	X	X

Payload (lbs)

	150	170	190	210	230	
510	full	full	full	full	full	
530	"	"	"	"	"	
550	"	"	"	"	26.4	U.S. Gal.
570	"	"	"	26.4	24.0	
590	"	"	26.4	24.0	X	

X These weight combinations due to very high payload exceed the max. permissible weight of the non-lift producing members.

1.5. Operating Handles, Placards and Nomenclatures

Data Plate :

Segelflugzeugbau A. Schleicher Poppenhausen

Type: ASW 19 B S. No. 19 XXX

Airspeed limits:

Winch and auto tow	125
Aero tow	170
Rough air conditions	255
Calm air conditions	255

Trimming plan

Load in the front seat (incl. parachute):

single / dual max. XXX min. XX

Pilots of less weight have to complete the weight by a reliablely fixed lead cushion

Serial Number and Type Plate :

A. Schleicher
6416 Poppenhausen

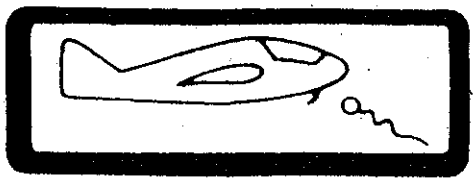
Muster : AS-W19
Werk-Nr: 19 XXX
Kennz:

Made in West Germany

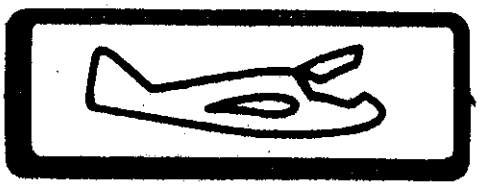
Placard for Trim Weight Check :

Minimum Cockpit Load without Trim Weight . kg (lbs)
1 Trim Disc is equivalent to 25 Kg (5 lbs) Cockpit Load

Check Weight and proper fixing of Trim Discs prior to Start.

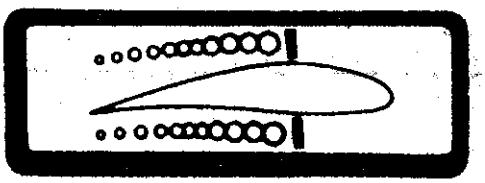


Tow release :
Yellow knob LH of stick.

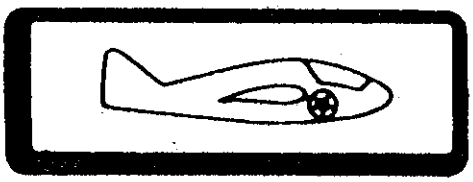


Open canopy :
Move white handles left and right on canopy frame forward.

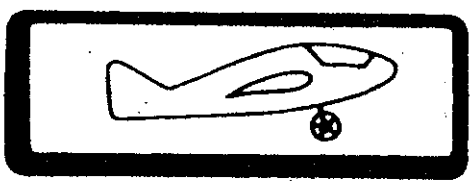
To jettison canopy :
Pull red handle above instrument panel.



Dive brakes :
Blue handle on upper LH cockpit wall.



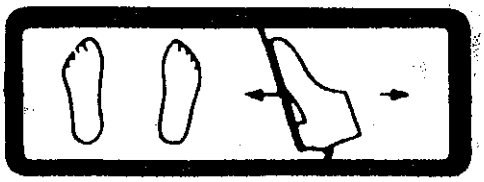
Landing gear up :
Black handle on lower LH cockpit wall pulled back,



Landing gear down :
Black handle pushed forward.

Trim noseheavy :
Green knob on LH arm rest pushed forward and secured.

Trim tailheavy.

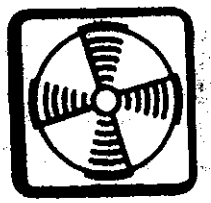


Rudder pedal adjustment : Grey knob RH of control stick.

To move pedals back :
Take load off pedals and pull back. Release control knob suddenly and put slight pressure on pedals to adjust them.
To move pedals forward :
Pull knob and simultaneously push pedals forward. Release control knob suddenly and lock in place by putting slight pressure on pedals.

Wheel brake :

Brake lever at control stick !



Ventilation :
Light blue knob LH above instrument panel.

Water ballast :
Dark blue lever LH and RH on upper cockpit wall. To open valve move lever forward.

Anchoring point for parachute static line :

Red ring on main bulkhead !

1.6. In Flight Information

Instructions for rigging and derigging are given on pages21 to 24. After rigging it is advisable to check all controls, dive brakes, wheel brake, and tire pressure.
Even when the sailplane is hangared it must be preflighted by checking all controls. According to experience hangared sailplanes are subject to hangar switching damages and are endangered by small animals.

Canopy release :

First push forward white canopy lock-knobs, then pull red canopy release knob and push canopy upward.

Winch Launch :

Maximum winch launch speed is 125 km/h (67 kts, 78 mph). Trim lever being in the center or in slight back position the sailplane lifts off by itself and takes to a moderate climb. When safety height is reached, slight back pressure can be applied.
Winch tows on the forward towing hook have not been tested.
The landing gear can only be retracted after the tow.
Winch tows with water ballast are only recommended with more than 10 kts headwind. There is a strict warning : No tailwind tows on low powered winches !

Aero Tow :

Maximum aerotow speed is 170 km/h (92 kts, 106 mph). Tested lengths for manila or nylon towropes are within the 25 - 60 m range (80 to 200 ft). Tows can be effected on the Center of Gravity hook or on the forward towhook (optional extra).

The pilot should try to keep the tailskid on the ground until take-off. This gives several advantages. Lift-off will be at the earliest possible time. The landing gear gets lower loads. The direction stability during ground roll is considerably improved. During flight tests aerotows with crosswinds stronger than 25 kts were demonstrated. The stiff end of the tow-rope cannot touch the ground and, therefore, cannot release the automatism of the front towhook. Take-off in a tail down attitude is most important !

For tows on the C.ofG. towhook the retracting of the landing gear is only allowed after release !

Free Flight

Because of the possibility of loading the ship with water ballast the all-up weight varies in a wide range. The following speeds are given for an all-up weight of 340 kg (750 lbs); speeds for max. all-up weight of 454 kg (1000 lbs) are given in brackets.

Minimum speed in level zero bank flights is 67 km/h, 36 kts, [illegible] mph (77 km/h, 42 kts, 48 mph).
Just when approaching minimum speed a distinct stall warning is noticed by tail buffeting. Stalling speeds increase with bank in turning flight. One should expect an increase in stalling speed of 10 % for 30° bank and 20 % for 45° bank.

The best rate of sink is at 75 km/h, 40.5 kts, [illegible] mph (90 km/h, 49 kts, [illegible] mph) in level flight. Max. L/D is at 90 km/h, 48.5 kts, [illegible] mph (105 km/h, 57 kts, [illegible] mph).
In thermals optimum speed to fly is between 75 and 80 km/h, 40.5 and 43 kts, [illegible] mph (88 and 95 km/h, 48 and 51 kts, 55 and 59 mph) at 30° bank, at 45° bank max. L/D is between 80 and 85 km/h, 43 and 46 kts, [illegible] mph (95 and 100 km/h, 51 and 54 kts, 59 and 62 mph).

Dangerous Flight Attitudes

The ASW 19B has extremely harmless stalling characteristics. Stall is indicated at 70 km/h, 30 kts, 43.5 mph (80 km/h, 43 kts, 50 mph) by large stick movement for the elevator and by tail buffeting.
At forward to normal C. of G. positions (from approx. 85 kg (190 lbs) cockpit load onwards) and with the stick hard back the aileron and rudder respond up to approx. half control movements in the normal sense.
Only at rear C. of G. positions (near minimum cockpit load) the ASW 19 B will not maintain a stationary stall with the stick hard back, but starts 'porpoising'.
Full deflections of rudder and aileron will cause wing dropping, opposite rudder and aileron deflections will lead to spin.
Wing dropping as well as spinning are terminated with the (German) standard procedure (opposite rudder and elevator neutral).

If no corrective measures are applied, the sailplane normally will terminate the sideskid or spin by itself and will develop a spiral-like side slip.
This sideslip can also be ended with opposite rudder before this slip will eventually change to a spiraldive with the typical build-up of high speeds.

At forward C. of G. positions the ASW 19 B spins very steeply and starts spiraldive after less than one turn, whereas at rear C. of G. positions the glider's pitch becomes steeper and steeper after an initial flat and slow turn (approx. 30° negative pitch) until the transition into spiraldive develops after 5 to 7 turns.

Raindrops, hoarfrost and icing deteriorate the aerodynamic flow and will cause a change in flight characteristics. Therefore, a safety margin of 10 km/h, 5 kts or 7 mph should be added to the above speeds for level flight and circling and these speeds must be regarded as minimum speeds.

Landing

Lower the landing gear in time, at the latest at approx. 100 m (300 ft) altitude. Approach should normally be made at about 90 km/h, 49 kts or 56 mph (yellow ▷ on the airspeed indicator); this speed should be trimmed, For turbulent air a corresponding faster speed must be flown.
The glide path can be varied by means of the airbrakes within wide limits. The airbrakes must be held up, as they will close by their own weight, but do not lock !
Sideslipping is very effective. The angle of bank is small, but yaw angles are big during sideslipping. At great yaw angles there is a rudder lock which can be overcome with moderate pedal forces to get out of the sideslip; bringing the stick to a neutral position brings the rudder back to a normal position, too.

Semi-Aerobatics

Besides spinning (only with normal to rear C. of G. limits more than one turn is possible) the following aerobatics are approved:
Loops, Stall Turns, Lazy Eight, and Chandelle, as well as combinations of these maneuvers. Negative load factors are not certified.

Loop

A starting speed in the lowest point of about 160 - 180 km/h, 85 - 95 kts, or 100 - 112 mph, is recommended.

Stall Turn

A stall turn is started with 190 - 210 km/h, 102 - 113 kts, 118 - 130 mph. At about 100 km/h, 54 kts, 62 mph, the turn is started by full application of the rudder and, if need be, supported by some opposite aileron deflection.

Lazy Eight :

This maneuver can be done up to 180 km/h, 100 kts 112 mph, in the crossing point, It is an excellent practice for control and airspace coordination which every pilot should exercise.

Chandelle

This maneuver is started like a stall turn, however, the transition to level flight must already be initiated at 110 km/h, 60 kts, 70 mph, by applying full rudder and full contrary aileron deflections. The stick, too, must be remarkably pushed.

Aerobatics are not approved with water ballast on board !

1.7. Empty Weight Center of Gravity Limits

After repairs, installations of additional equipment, repainting of the sailplane etc. special attention is to be given to the empty weight center of gravity which must remain within the permissible limits.
Datum point and reference line are the same as shown in para 1.2.
A diagram of the empty weight center of gravity location range is given on page 32. If these limits are maintained, it is assured that also the inflight C. of G. is within the permissible limits, provided the load limitations have been properly observed.

The inflight C. of G. has a great effect on the flight characteristics; it is, therefore, absolutely necessary to observe the prescribed limits. A C. of G. location aft of the rear limit is dangerous because this adversely affects the stall and spin characteristics. Moreover, the elevator becomes hypersensitive.
Excessive forward C. of G. locations lead to a loss in the flight performance and prevent from flying in the maximum lift range which is very important in tight circling.

Rigging Data

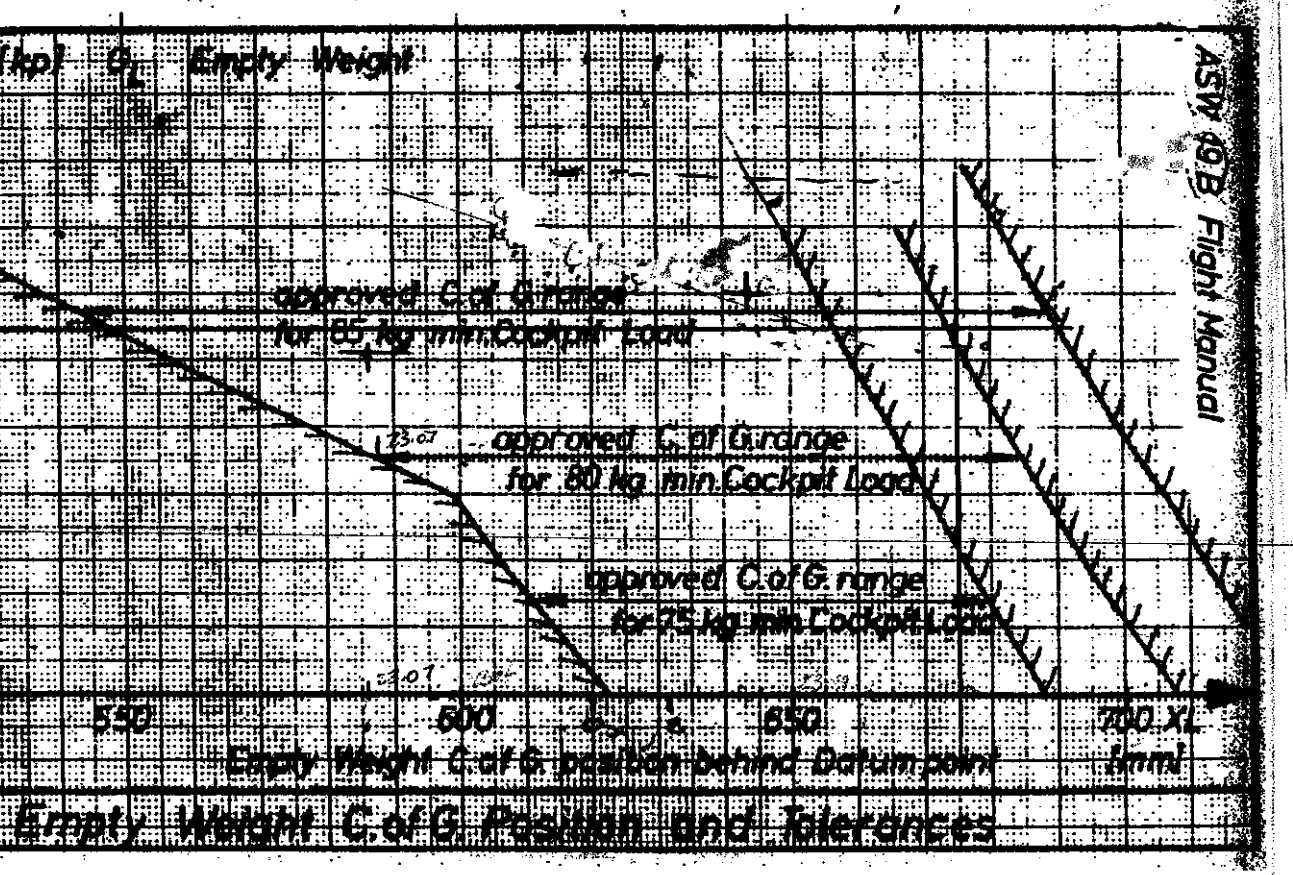
The angles of attack and aerodynamic twist as well as the control deflections can be found on the rigging data sheet / page 30.
After a repair it is to take care that the tolerances have been held. The controls have the following positive stops :

Rudder :Two wooden stops on the rear lower rudder fitting.

Elevator :Two wooden stops on the bellcrank RH of stick.

Aileron :Two wooden stops on the bellcrank RH of stick.
The aileron control circuit stops inside the wing are intended for road transport and should not work when giving full aileron deflections (for the rigged glider).
After the removal of the seat the aileron and elevator stops are easily accessible.
The airbrake control has no forward stop, backward there is a clamp in front of the main bulkhead. This clamp should be adjusted such that there is an approx. 3 cm (1.2 inch) gap between lower airbrake end and upper wing surface when the airbrake is full open.

Pilot weight 165 lbs. Pilots not meeting min. weight
se seat ballast to 165 lbs
. pilot weight 242 lbs



Alexander Schleicher Segelflugzeugbau
D-6416 POPPENHAUSEN/WASSERKUPPE
LBA Anerkennung Nr. I-B 1

Stückprüfbericht
für Segelflugzeuge

Datum: 5/21/2003 | Blatt-Nr.: 1

Muster: ASW 19 B, L-308 | Werk-Nr.: 19322 | Auftr.-Nr.: | N10VH

Auftraggeber: PHILADEPHIA GLIDER COUNCIL

Halter: 934 Rt. 152 Perkasie, PA 18944

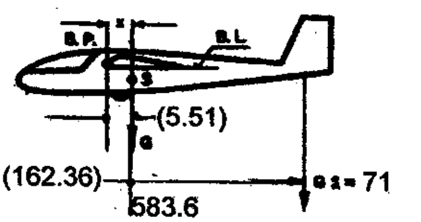
Ort der Prüfung (Gelände): Poppenhausen

Hersteller: A. Schleicher, Poppenhausen | Baujahr: 1980

Vertreter des Halters: A. Schleicher, Poppenhausen | Prüfer: L. Krämung, Poppenhausen

A. Techn. Daten:
1. Bezugspunkt B. P.: Flügelvorderkante 20 mm außerhalb Wurzelkante n. Kennbl.
2. Horiz. Bezugslinie B. L.: Rumpfebene horizontal n. Kennbl.

B. Wägung und Leergew.-Schwerpunktlage:



$\frac{G_2 \cdot b}{G} + a = x$

Schwerpunktlage bei Leergewicht:

$\frac{71 \times 162.36}{583.6} + 5.51 = 24.98$

Schwerpunkt-Lagen:
X_v = vordere; X_h = rückwärt. Grenze

3 TRIM WEIGHTS
ARE AFFIXED

Einzelgewichte	kp	Nichttragende Teile kp
Tragwerk rechts		—
Tragwerk links		—
Rumpf	—	—
Höhenleitwerk	—	—
Seitenruder	—	—
Tragwerk Streben (50 % sind nichttragende Teile)	—	—
Ausrüstung		
Instrumente	—	—
Anschnallgurte	—	—
Leergewicht bzw. N.-Teile		

C. Zulassungsdaten

Leergewicht: — kp
Höchstzulässige Zuladung: kp
Höchstzulässiges Fluggewicht mit Wasserballast: kp
Gewicht der nichttragenden Teile: (einschl. Zuladung) kp

Zahl der Insassen: 1

Im Flugzeug angebracht: Trimmplan: ja/nein*; Datenschild: ja/nein*
Im Flugzeug vorhanden: Betriebsanweisung (Flughandbuch): ja/nein*

Starts seit St...
Betrieb...
Star...

Flügel-Biegeschw.-Zahl: 120 pro Minute.

Kennzeichnung der Bauteile bei der Stückprüfung (Ort, Art, Anzahl, Nr. d...

An beiden Flügel- und Höhenleitwerkswurzel...
Innenrippen der Querruder Schleicher LBA-N...

Kennzeichnung der Bauteile:
*Die Mindestzuladung (Pilot m. Fallschirm) b...
gewicht von 3 kg 75 kg. Geringeres Gewicht ...
platten (1 kg = 2,5 kg Pilotgewicht) im Rumpf...

PHILADELPHIA GLIDER COUNCIL

Formblatt Schl. Seg 1/80

G. Dy 1469794 IA 5-23-03