

SCHEIBE FLUGZEUGBAU GMBH

August-Pfaltz-Str.23

D - 8060 Dachau

Tel. (08131) 72083 und 72084



FLIGHT MANUAL

for the

SF 34

Sailplane

This manual must be carried on board of the sailplane at all times.

This Flight manual is FAA approved for U.S. registered gliders in accordance with the provisions of 14 CFR Section 21.29. and is required by FAA Type Certificate Data Sheet No.

Registration: Factory Serial No.

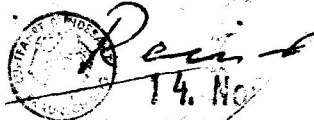
Owner:

German edition of operating instructions are approved under § 12 (1) 2. of LuftGerPD.


Published September 1983

LBA approved
Date

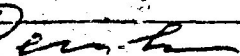
Approval of translation has been done by best knowledge and judgement - in any case the original text in German language is authoritative.



1.1. Log of revisions

Revision No.	Pages affected	Description	FCAA approval signature	Date
1	13	additional armature at rear wing/fuselage connection	 SCOTT AIRPARK RT. 1 BOX 239 LOVETTSVILLE, VA 22000	40.3. 1989




14. Nov. 1989

Pages included:

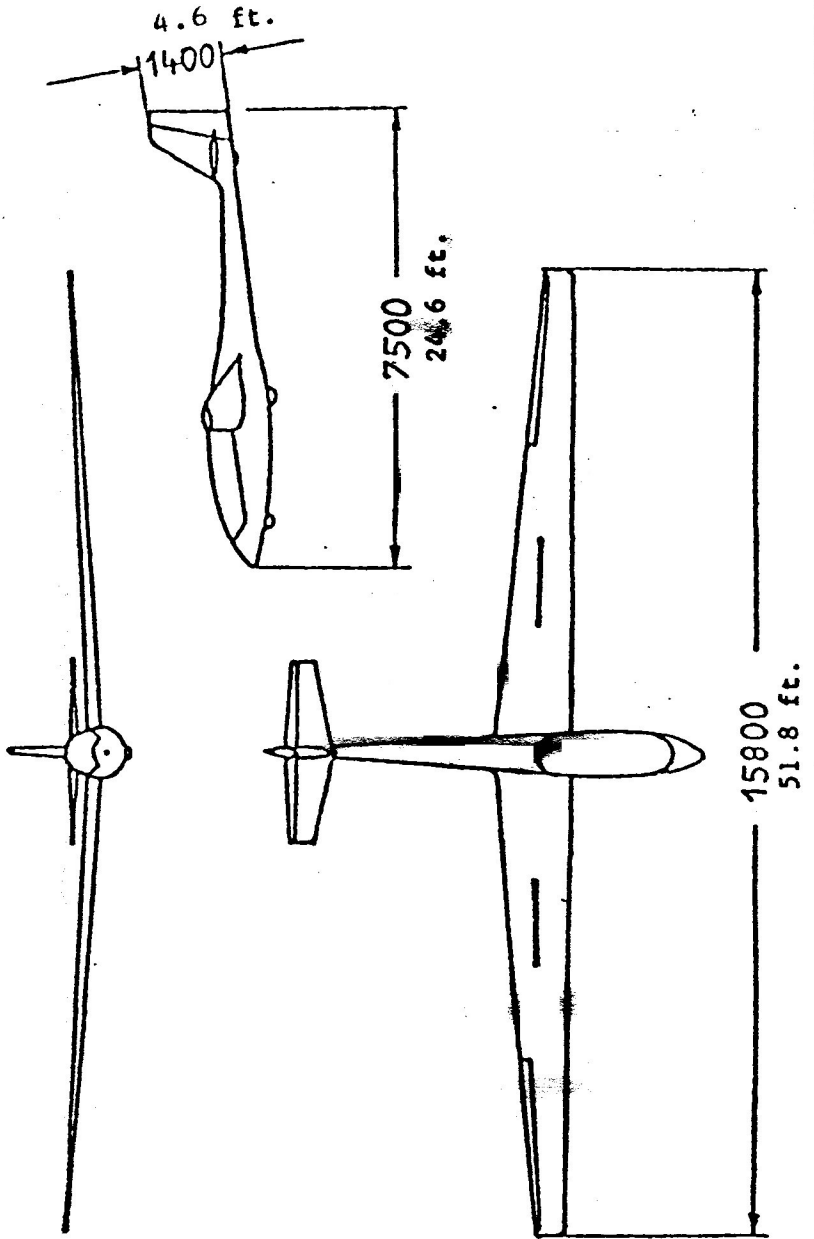
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- 16
- 17
- 18
- 19
- 20
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Perin
14. Nov. 1963

I. Contents

General	Page
I.1 Log of revisions	1, 1a
I.2 Contents	2
I.3 Dimensions	3
I.4 Description	4
I.5 Technical Data	4
II.1 Certification Category	4
II.2 Limitations	4
II.3 Required Equipment	4
II.4 Speed Limits	5
II.5 Airspeed Indicator Markings	6
II.6 Max. g-Loads	6
II.7 Weight and CofA Range	7
II.8 Loading	7, 8
II.9 Towing	9
II.10 Tire Pressures	9
II.11 Cross Wind Limit	9
II.12 Placards and Control markings	10
III. Emergency Procedures	12
III.1 Spin recovery	12
III.2 Bail out	12
III.3 Other Abnormalities (Rain, Ice)	12
III.4 Stall	13
III.5 Ground Loop	13
IV. Normal Operating Procedures	13
IV.1 Daily Preparation	13
IV.2 Preflight Checklist (Picture)	13, 14, 15
IV.3 Before Takeoff Checklist	16
IV.4 Tow Procedures	16
IV.5 Free Flight	17
IV.6 Slow Flight and Stall	17
IV.7 High Speed Flight	18
IV.8 Aerobatic Procedures	18
IV.9 Approach & Landing	19
IV.10 Slip characteristics	19
V.1 Performance Polar	19
V.2 Determination of the center of gravity	20, 21



I.4 Description

The SF-34 is a tandem two-place high performance sailplane of fiberglass-composite construction. The shoulder mounted wings are fully cantilevered, and all control surfaces are balanced. The landing gear consists of a spring suspended main gear with a single wheel, and a nose wheel. The main wheel is equipped with a brake.

Only the front seat must be used for solo flying.

I.5 Technical Data

Wing Span	15.8m	51.8ft.
Length	7.5m	24.6ft.
Height (Top of Fin)	1.4m	4.6ft.
Wing Area	14.8m ²	159.3sq.ft.
Aspect Ratio	16.9	
Gross Weight	540.0kg	1190.0 lbs
Max. Wing Loading	36.5 kg/m ²	7.47 lbs/sq" 7.47 Lbs/ft ²

II.1 Certification Category

Glider, Utility. Certification Basis: 14 CFR Sections 21.23 and 21.29 effective 1.2.1965, and L F S M dated 23.10.1975


II.2 LIMITATIONSPermitted Flying:

VFR Day only.

Simple aerobatics, such as Loops, Hammerhead Stall, Lazy Eight, Chandelle and Spin.

II.3 Required Equipment:

1. One Airspeed Indicator with a 170 kts range, and one Altimeter, in the forward cockpit
2. Two seat belts with shoulder harness.
3. Two seat and back cushions, or thin-pack parachutes.
4. Loading table.

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14. Nov. 1983

Required Equipment cont.

5. Flight Limits plaque
6. Flight Manual.
7. For cross country flights: One Compass and one Variometer in the forward cockpit.

When the sailplane is used as a trainer, the required instruments must also be installed in the rear cockpit.

II.4 Speed Limits

Smooth Air	135 kts.
Maneuvering	92 kts.
Aero Tow	92 kts.
Auto or Winch Tow	65 kts.

The maneuvering speed is the maximum speed at which full deflection of any control surfaces can safely be executed. Only 1/3 of maximum movements must be used at the maximum smooth air (V_{ne}) speed.

Note that this speed must be reduced at altitude in accordance with the following table:

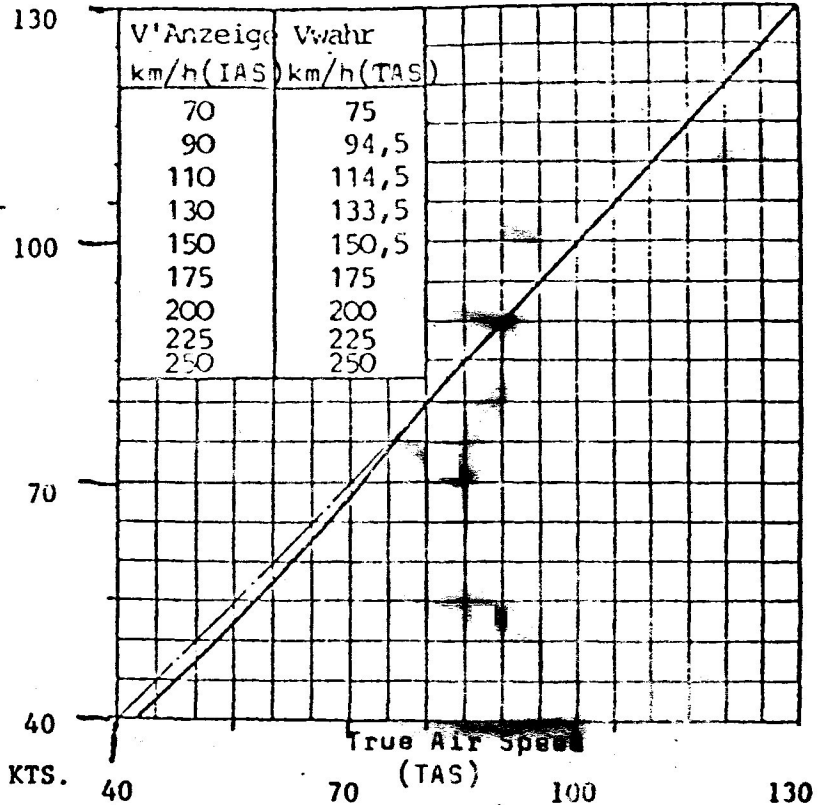
0-6000 ft.	135 kts.
9000 ft.	124 kts.
12000 ft.	121 kts.
15000 ft.	115 kts.
18000 ft.	109 kts.

Airspeed indicator error will vary depending on pitot and static source used. The built-in pitot in the fin, and the provided fuselage static ports, will produce minor errors as follows:

Indicated kts.	True kts.
40	43.0
50	52.5
60	62.3
70	72.0
80	80.5
90 and above	No error.



14. NOV. 1963

Indicated Air Speed (IAS)II.5 Airspeed Indicator Markings:

135 kts: Red radial line.

52 kts: Yellow triangle. Minimum approach speed at max. gross weight.

II.6 Maximum g-Loads:

The following g-Loads are not to be exceeded in flight.

At Maneuvering Speed: +5.3, -2.65.

At Max. Speed with airbrakes closed: +4.0, -1.5.

With airbrakes extended: +3.5.



14. Nov. 1983

II.7 Weights

Empty Weight	ca.	738 lbs	335 kg.
Max. Gross Weight		1190 lbs	540 kg.
Max. Allowable weight less wings:		815 lbs	370 kg.

Center of Gravity Range:

20 % - 43 % of M.A.C. or:
 86.57" (2199mm) to 97.52" (2477mm) aft of datum. Datum is located 78.74" (2 000mm) ahead of the leading edge at the wing root.

II.8 Loading Schedule SF 34

Compliance with this schedule will assure that the C.G. Remains within limits.

Minimum Front Seat:	154 lbs	(70 kg)
Maximum Front Seat:	242 lbs	(110 kg)
Maximum Rear Seat:	242 lbs	(110 kg)
Maximum Bag Compartment:	33 lbs	(15 kg)

Note: The combined weight of the front seat, the rear seat, the baggage compt. and the empty aircraft must not exceed 1190 lbs (540 kg) at any time.

Ballast may be added to the forward seat to obtain the minimum front seat loading.

Changes to the aircraft empty weight due to the addition or removal of equipment, should be recorded on the table on the following page.



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 14. Nov. 1933

II.9 Towing

E 75 or E 72 release hook are recommended for aerotows.

Safety connector "Europa G 73" or "Europa G 72" recommended for both winch launch and aero tow. The nose release hook should normally be used for aero tows.

Weak Link

For both aero and winch launch, a weak link of 1200 - 1400 lbs strength is recommended. See also FAR 91.17.

II.10 Tire Pressure

Nose Wheel 260 X 85 mm	35 psi
Main Wheel 5.00 X 5 inches	42 psi

II.11 Crosswind

Maximum safe crosswind component for takeoff and landing: 11 kts.

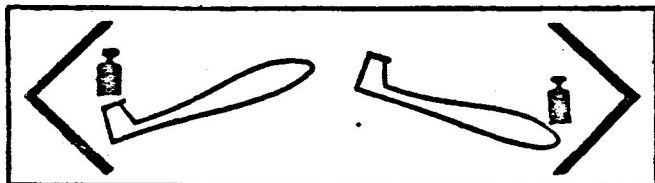


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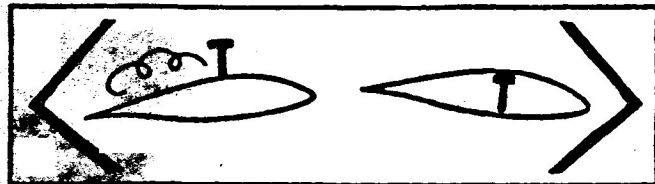
II.12 Placards and control markings

In the front of the cockpit on the starboard side:

Max permissible all up weight		1190 lbs
Maximum airspeed in calm air	VNE	135 kts
in heavy turbulence	VB	92 kts
during aero tow	VT	92 kts
on winch or auto tow	VW	64 kts
with dive brakes out	VFE	135 kts
manoeuvring speed	VA	92 kts
Loading limits (pilot and parachute)		
Minimum load on the front seat		154 lbs
(if this load is not attained use ballast)		
Maximum load on the front seat		242 lbs
Maximum load on the rear seat		242 lbs
but not exceeding the maximum permissible total load		
Maximum permissible total payload (See page 8)		lbs



TRIM LEVER
Port side of front and rear cockpits



DIVE BRAKE and WHEEL BRAKE LEVER
Port side of front and rear cockpits

Tire Pressure
16 PSI 2,5 bar

Tire Pressure
43 PSI 3 bar

starboard side of fuselage by the nose wheel
starboard side of fuselage by the main wheel

LUGGAGE MAX. 33 lbs 15 kg

Weak link 1323 lbs 600 kg

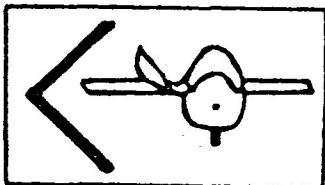
Luggage compartment
Port side of fuselage above the tow coupling

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On front and rear instrument panels

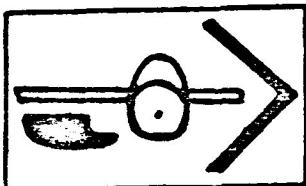
S T A R T C H E C K

1. Canopy closed and locked
2. Safety harness on and fastened
3. Trim set
4. Dive brakes closed and locked
5. Full and free movement of controls



CANOPY
LOCK

Port side of
canopy frame
front and rear



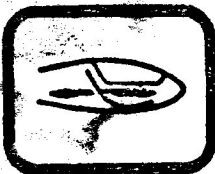
CANOPY
JETTISON

Cockpit star-
board side
front and rear



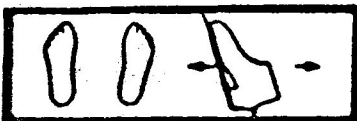
RELEASE
HANDLE

Front and rear
instrument pa-
nel



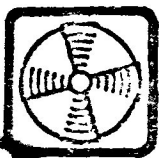
BACK REST
ADJUSTMENT

Starboard side
of cockpit



PEDAL
ADJUSTMENT

Front edge of
the seat



COCKPIT
VENTILATION

Front instr.
panel

Review

III. EMERGENCIES

III.1 Spin Recovery

Spins can be arrested by the following control movements:

- a. Opposite rudder.
- b. Relieve elevator back pressure.
- c. Neutralize (center) ailerons.

When rotation stops, center the rudder, and recover gently with the elevator.

III.2 Bail Out

Canopy jettison and exit is possible from either seat without difficulty, using the following procedure:

- a. Pull red knobs on both sides of the cockpit simultaneously; and push canopy out of the way.
- b. Release seat buckles.
- c. Stand up, and exit to the right or left, opposite the aircraft movement.
- d. Pull parachute ripcord after 1-3 seconds.

Canopy hinge bolts should be well lubricated, to prevent binding.

III.3 Other Abnormalities

Rain drops, excessive dirt or ice accumulation on the wings and tail surfaces, will cause a slight loss in performance, and the minimum speeds should be increased by 5-10 kts. Do not try to take off with snow or mud accumulations on wings or tail surfaces.



14. Nov 1953

III.4 Stall

The SF 34 remains controllable around all three axis in a stall, and will recover quickly with minimum loss of altitude, by gently relaxing elevator back pressure.

III.5 Ground Loop

With the nose wheel on the ground, a ground loop is nearly impossible. The aircraft tends to track straight ahead. Therefore, if a wing tip touches the ground during launch, or runway alignment is lost; release immediately!

IV. NORMAL OPERATION

IV.1 Daily Preparation

Before flight, and especially after the aircraft has been assembled, a thorough inspection is necessary. Check for damaged or deformed parts, and make positive control movement checks, to assure that all hinges and bearings move freely.

IV.2 Check List

- 1: a 2 wing bolts, and 4 wing-to-fuselage attach pins; proper seating and safety.
proper seating and securing of the rear wing/fuselage pins
- b Aileron rod connections in fuselage.
- c Air brake rod connections in fuselage.
- d Barograph, batteries and other equipment in baggage compartment secure.
- e Rudder Pedals.
- f Rudder cables for frayed strands.
- g Sit in cockpit, and check rudder for free movement.
- h Test air brakes.
- i Test wheel brake
- j Test and check release hooks.
- k Static ports open

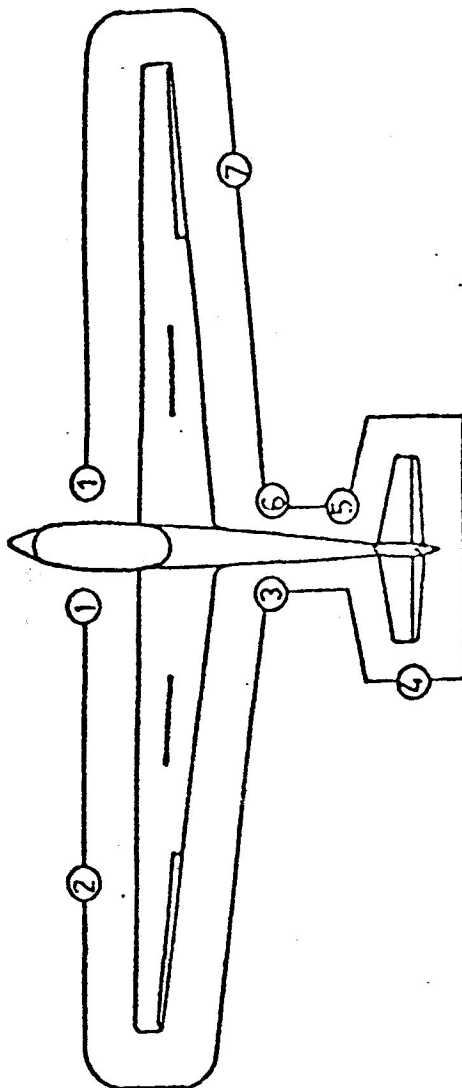
- l Instrument set altimeter
 - m Seat belts
 - n Ventilation and seat back adjustment
 - o Absence of insects, mice snakes etc.
 - p Canopy, locks and release.
 - q Tire pressure; Nose 34 lbs, Main 42 lbs.
2. a Top and bottom of wing for damage.
b Air brakes; condition, movement and flush stowage.
c Ailerons and hinges; freedom of movement, and excess play.
d Aileron actuator; inspect from below.
e Wing tip for damage.
3. a Fuselage for damage, especially bottom.
4. a Empennage for damage.
b Both horizontal stabilizers for correct installation, safety and excessive play.
c Both elevators for free movement and excessive play.
d Rudder for free movement and excessive play.
If the rudder was just installed, assure that the cables were not crossed.
5. a Condition of tail wheel, pitot, and T.E. probes.
6. Same as 3.
7. Same as 2.

Should damage to the sailplane be found or suspected following trailering, outlanding, hard landing, excessive speed or maneuvering; the wings and tail surfaces should be removed, and the sailplane inspected by a competent mechanic. Any damage must be repaired before further flight.



14. Nov 1963

RECOMMENDED INSPECTION PATTERN.



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14. Nov. 1933

IV.3 Before Takeoff Checklist

1. Canopy.....Closed and locked
2. Seat Belts.....Fastened.
3. Trim.....Set for takeoff.
4. Air Brakes.....Closed and locked.
5. Flight Controls.....Checked free.

IV.4 Tow Procedures

Winch:

Use a 1200-1400 lbs safety link attached to the C.G. tow hook. Max. towing speed 65 kts!

The sailplane must be lined up exactly in the takeoff direction before launching, as the rudder has limited effect during the ground roll. Trim and elevator should be held neutral during takeoff. After a safe altitude has been reached, a light pull on the stick will increase the rate of climb. The yellow handle on the left side of the instrument panel is pulled all the way out to release the cable. Release immediately if the launch speed exceeds 65 kts.

Since the C.G. hook is installed slightly off center a slight tendency to turn right may be observed. This can be offset by a slight pressure on the left rudder pedal.

Tail wind launches are not recommended.

Aerotow

A 150 - 200 ft rope with a 1200 - 1400 lbs safety link should be attached to the nose release hook. Use the C.G. hook for aerotows only when training to fly sailplanes without nose hook. Max towing speed is 93 kts!



14. Nov. 1983

Before launch, the sailplane must be lined up exactly in the takeoff direction, due to limited rudder effect, while the nose wheel is on the ground. The elevator trim should be centered.

Aileron response is available as soon as the sailplane rolls, making wing levelling easy. The takeoff roll can be shortened by pulling back slightly at 25 - 30 kts indicated. This lifts the nosewheel clear, and allows the SF 34 to become airborne at about 40 kts.

Pull the yellow handle on the left side of the instrument panel out as far as it will go; to release the tow rope.

IV.5 Free Flight

The air brakes may be used at any speed up to 134 kts (V_{ne}). Controls must be moved to their limit ^{ne} only at speeds below 92 kts. (Maneuvering speed). Move controls gently above this speed.

IV.6 Slow Flight and Stall

The minimum speed at gross weight is about 40 kts, with the air brakes retracted, and about 41.5 with extended brakes. A light buffeting can be felt in the stick as the speed drops below 43 kts. Continued pull back will cause the SF 34 to "mush", while ailerons and rudder remains effective. Recovery occurs instantly, when back pressure is released. A rapid pull back of the stick will result in a stall straight ahead; the faster the pull back, the further the nose will drop. Recover by relaxing stick back pressure.



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14. Nov. 1983

IV.7 High Speed Flight

The maximum speed with or without air brakes deployed is 134 kts!

The air brakes will not prevent overspeeding at descent angles in excess of 45 degrees.

IV.8 Simple Aerobatics

Secure all loose items.

1. Inside Loop

Entry Speed: 90 kts.
Pull up: about 2 g.
Exit speed: about 85 kts.

2. Hammerhead Stall

Entry speed: 95 kts.
Pull up: about 2 g.

Start applying rudder slowly at 70 kts. Opposite rudder just before the peak.

Warning: If an unintentional tail slide should occur, all controls must be forcefully held in neutral position.

3. Spin

Spinning is only possible with the C.G. in the aft range.

Reduce airspeed gradually to 43 kts. then pull back sharply, and apply full rudder. Ailerons should be neutral. About 180 ft. will be lost in each turn.

Recovery: Opposite rudder, ailerons and elevator neutral. Bring the nose up to normal attitude at 80 kts.

Pull out: about 2 g.



Reiche
14. Nov. 1953

4. Chandelle

Entry speed:

90 kts.

Curve steeply while climbing during the first 90 degrees. Reduce speed and control pressure during remainder of turn, so as to arrive on the opposite heading at minimum flying speed.

IV.9 Approach and Landing

The minimum approach speed is 52 kts. in calm air. Wind and gust corrections must be added as necessary. The air brakes permit steep approaches. Their deployment causes no trim changes. Use airbrakes with caution near the ground.

IV.10 Slip characteristics

The sideslip characteristic of the SF 34 is quite normal. If needed this manoeuvre can be used for steeper approaches, but it is normally not necessary due to the effective air Brakes. The side-slip is effective by using a 15 degrees angle of side-slip and should be finished at a safe height. The speed range of the side-slip is normally 46 - 60 kts (85 - 110 km/h).

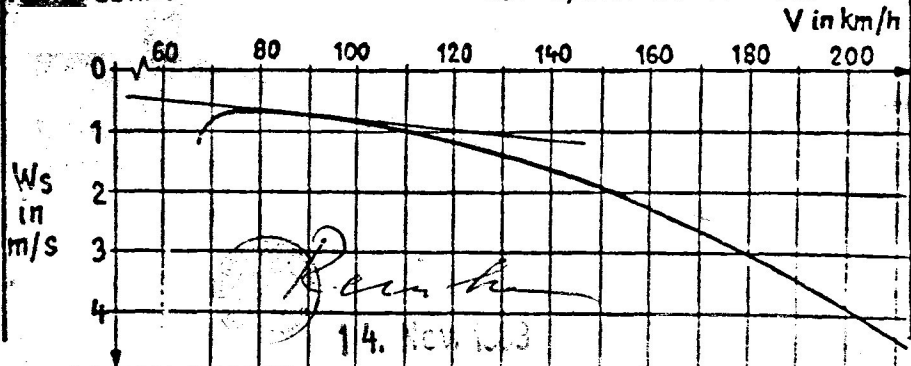
Rudder lock can be relieved without pilot input on the rudder. After moving the aileron into neutral position, the sailplane rolls out of the slip into wing level position. There after the rudder frees itself from the full deflected position.

V. PERFORMANCE

Data based on medium wing loading; 6.7 lbs.

Best L/D: 34 at 52 kts.

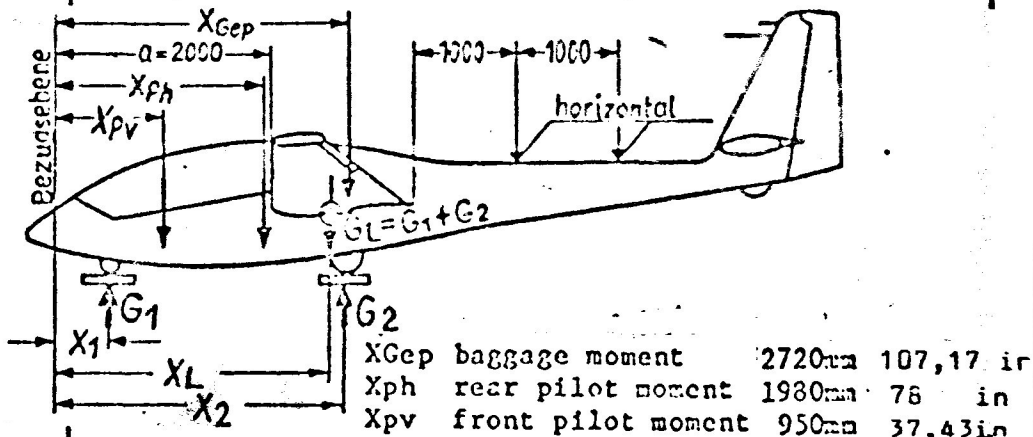
Min. sink: 0.7 m/sek at 41 kts.



V.2 Procedure for determining the centre of gravity

To determine the centre of gravity position put the glider with its nose and main wheels on to a scale. Check with a spirit level that the straight top of the fuselage section is horizontal. With the aircraft in this attitude a plumb line should be dropped from the wing root rib. The C.G. datum plane (BE) is 2.00m (78.8in) in front of this point (shown as distance 'a' in diagram below). Using this point the distances to the wheel axles X1 and X2 are measured.

Using the scales determine weights G1 and G2.



The distance of the empty weight C.G. from the datum plane is determined by the formula:

$$X1 = \frac{G1 \times X1 + G2 \times X2}{G1 + G2}$$

where weights are in kg and distances in mm. If the empty weight C.G. and the pilot and baggage weights fall within the limits given below and in the loading diagram respectively, the flying weight CG, too, lies within acceptable limits.

Empty weight en (in kg)	310	320	330	340	350	360	370
in lbs	696	705	727	750	771	794	816

Permissible

C.G. in mm	2720	2704	2682	2661	2642	2623	2605
in inches	107	106,4	105,6	104,8	104	103,3	102,6

Reinhold
14. NOV. 1953

XL (in mm)

behind BE	2746	2736	2727	2718	2710	2702	2696
in inches	108	107.7	107.4	107	106.7	106.4	106.1

conversion from to multiply with
 kg lbs 2,2
 mm inches 0,0394

Also check that the maximum permissible weight of the non-lifting components is not exceeded when at maximum gross weight.

The weight of the non-lifting components is the sum of the individual weights of the fuselage, horizontal tail unit and maximum load. It must not exceed 370 kg.

Re-determine the empty weight after the application on a new laquer finish, installation of additional equipment or repairs, but at least four years after last weighing the glider.

An inspector has to certify the weight, empty weight C.G. and loading limits on page 7 of the flight manual.



14. Nov. 1953