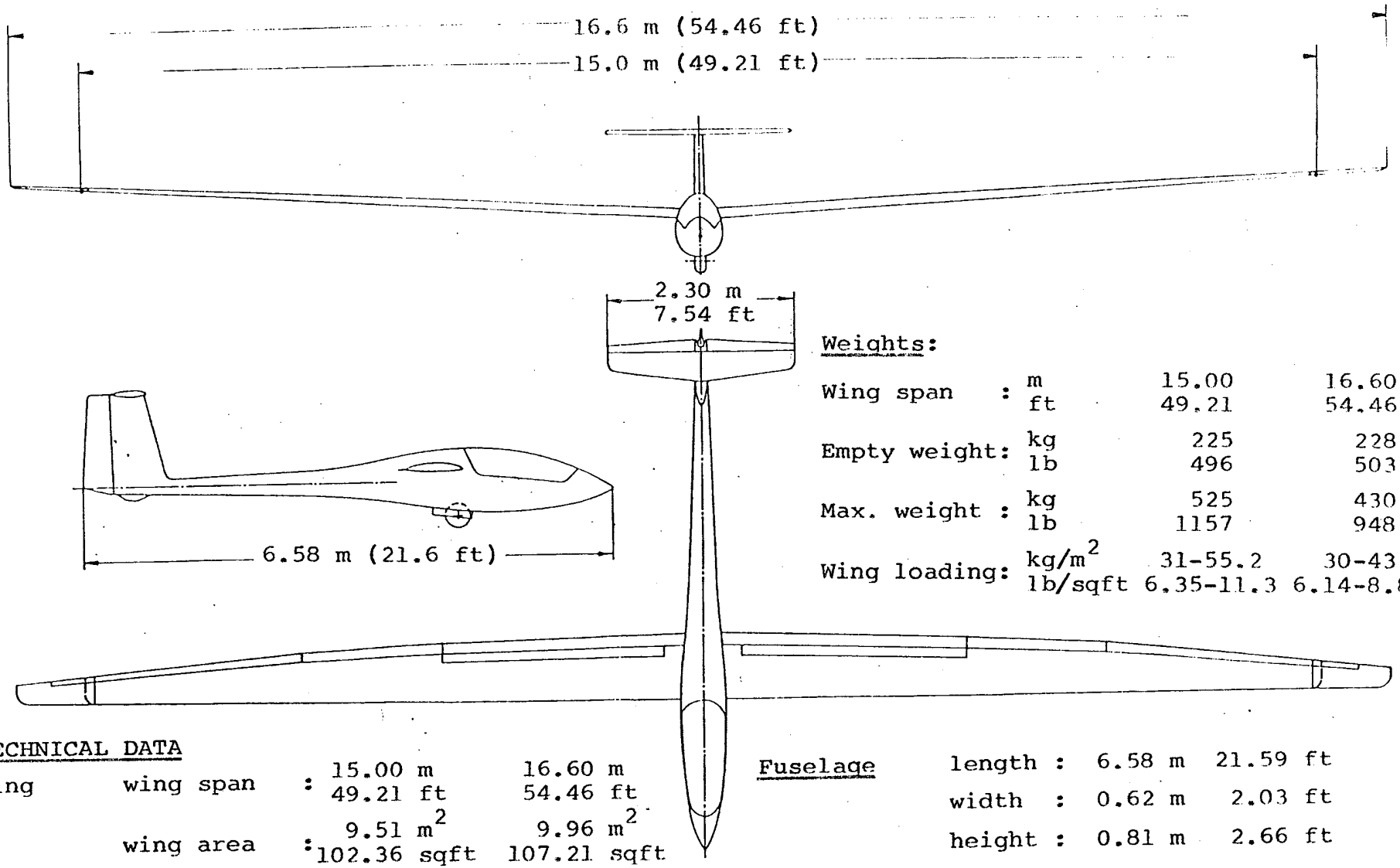
AMENDMENT LIST

(log of revisions)

No.	Reference/ short title	Page	Date
1.	Technical Note No. 349-6: Modified canopy locking device (S/N 2,4,21,26,27, 28,33,35) Modified canopy jettisoning device (S/N 2,4,21,26,27, 32,33,35,36,37)	7, 12, 29 7, 12, 29	April 1983 April 1983
2.	Technical Note No. 349-7 Increase of the max. A.U.W. at 15 m Wing span. Increase of the non-lift carrying parts at 15 m and 16.6 m wing span. 27. Juli 1984	4, 10, 13, 18, 19, 22A, 22B, 23, 24, 26, 28, 31, 36, 36A, 38, 40, 42, 43, 44, 47 17, 45A	June 1983 March 1984
3.	Optional use of modified water tank filler caps 09. Juli 1984	42	June 1984

Approval of translation has been done by best knowledge and judgement — In any case the original



Weights:

Wing span :	m	15.00	16.60
	ft	49.21	54.46
Empty weight:	kg	225	228
	lb	496	503
Max. weight :	kg	525	430
	lb	1157	948
Wing loading:	kg/m^2	31-55.2	30-43
	lb/sqft	6.35-11.3	6.14-8.80

TECHNICAL DATA

Wing	wing span :	15.00 m 49.21 ft	16.60 m 54.46 ft
	wing area :	9.51 m^2 102.36 sqft	9.96 m^2 107.21 sqft
	aspect ratio:	23.7	27.7

Fuselage

length :	6.58 m	21.59 ft
width :	0.62 m	2.03 ft
height :	0.81 m	2.66 ft

Cockpit data- and reference placards

Identification plate (fire proof)

Manufacturer:
SCHEMPP-HIRTH
Kirchheim-Teck

Type:

Serial No/Yr of Mfr:

T.C. Number:

Operating limits

Maximum permitted all-up weight:

Wing span 15.0 m : 1157 lb / 525 kg
Wing span 16.6 m : 948 lb / 430 kg

Max. permitted speeds (IAS):	kt	mph	km/h
Flap settings -1, -2, S	135	155	250
Flap settings L, +2, +1, 0	86	99	160
in rough air	102	118	190
Maneuvering speed	102	118	190
Aerotow	97	112	180
Auto/Winch launch	81	93	150
for U/C extension	97	112	180

Weak links for towing:

Maximum 680 daN (1499 lb)

Main wheel tire pressure:

up to 330 kg/728 lb = 3.5 bar (50 psi)
above 330 kg/728 lb = 4.7 bar (67 psi)

1.3 Flap use

The flaps alter the wing section so that the laminar "bucket" is always well suited to the actual flying speed.

	Flap setting	Optimum Flying Speed 330 kg 728 lb	380 kg 838 lb	430 kg 948 lb	500 kg 1102 lb	
Thermalling (for narrow thermals)	+1 (+2)	75- 85 40- 46 47- 53	80- 90 43- 49 50- 56	85-100 46- 54 53- 62	95-110 51- 59 59- 68	km/h kt mph
Best L/D	0	90-120 49- 65 56- 75	95-130 51- 70 59- 81	100-140 54- 76 62- 87	110-150 59- 81 68- 93	km/h kt mph
Between Thermals	-1	120-140 65- 76 75- 87	130-150 70- 81 81- 93	140-160 76- 86 87- 99	150-175 81- 94 93-109	km/h kt mph
	-2	140-215 76-116 87-134	150-230 81-124 93-143	160-250 86-135 99-155	175-250 94-135 109-155	km/h kt mph
High speed	S	215-250 116-135 134 155	230-250 124-135 143-155	250 135 155	250 135 155	km/h kt mph

2.3 Load factors

The following maneuvering load factors must not be exceeded:

at V_A = 190 km/h (102 kt, 118 mph)

n = + 5.3

n = - 2.65

at V_{NE} = 250 km/h (135 kt, 155 mph)

n = + 4.0

n = - 1.5

Airbrakes closed.

With airbrakes extended: Max. n = + 3.5

2.4 Weights

	15.0 m	16.6 m
Empty weight approx.	225 kg 496 lb	228 kg 503 lb
Maximum permitted all-up weight	525 kg 1157 lb	430 kg 948 lb
Max. weight of non-lifting parts	241 kg 531 lb	241 kg 531 lb

For max. permitted water ballast see section 2.5.

2.5 Loading table

Cockpit seat load (pilot and parachute)

Minimum	70 kg (154.3 lb)
Maximum	110 kg (242.5 lb)

Note: As the actual minimum seat load of this sailplane to which this manual refers may differ from the above typical weight, the seat load placard in the cockpit must show the actual minimum seat load from the log chart, see page 23!
Pilot's weight of less than this minimum seat load must be raised by using trim ballast.

1. Ballast (lead- or sand cushion) must be securely held in place by attaching it to the lap belt brackets.
2. Ballast by means of lead plates can be installed into the fuselage nose cone. 2.0 kg (4.4 lb) ballast correspond to 5.0 kg (11 lb) pilot weight.

   The installation point is 1745 mm (68.7 in.) ahead of datum (BE).

Neither the max. permitted all-up weight nor the maximum weight of the non-lift carrying parts (N.T.) must be exceeded.

C/G position of the pilot:

(with parachute or back cushion)

518 mm (20.4 in.) ahead of datum (BE).

Loading table with water ballast

Maximum weight with water ballast
Wing span 16.6 m . . . . . 430 kg/ 948 lb
Wing span 15.0 m . . . . . 525 kg/1157 lb

Lever arm of water ballast:

167 mm (6.57 in.) aft of datum (BE)

Table of various water ballast loads and cockpit loads for both wing spans:

Empty weight kg lb	Cockpit loads kg / lb									
	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb
	70	154	80	176	90	198	100	220	110	243
220 485										
16.6 m	140	309	130	287	120	265	110	243	100	220
15.0 m	168	370	168	370	168	370	168	370	168	370
230 507										
16.6 m	130	287	120	265	110	243	100	220	90	198
15.0 m	168	370	168	370	168	370	168	370	168	370
240 529										
16.6 m	120	265	110	243	100	220	90	198	80	176
15.0 m	168	370	168	370	168	370	168	370	168	370
250 551										
16.6 m	110	243	100	220	90	198	80	176	70	154
15.0 m	168	370	168	370	168	370	168	370	165	363
	Water ballast (kg/lb) in both wing tanks									

Baggage compartment

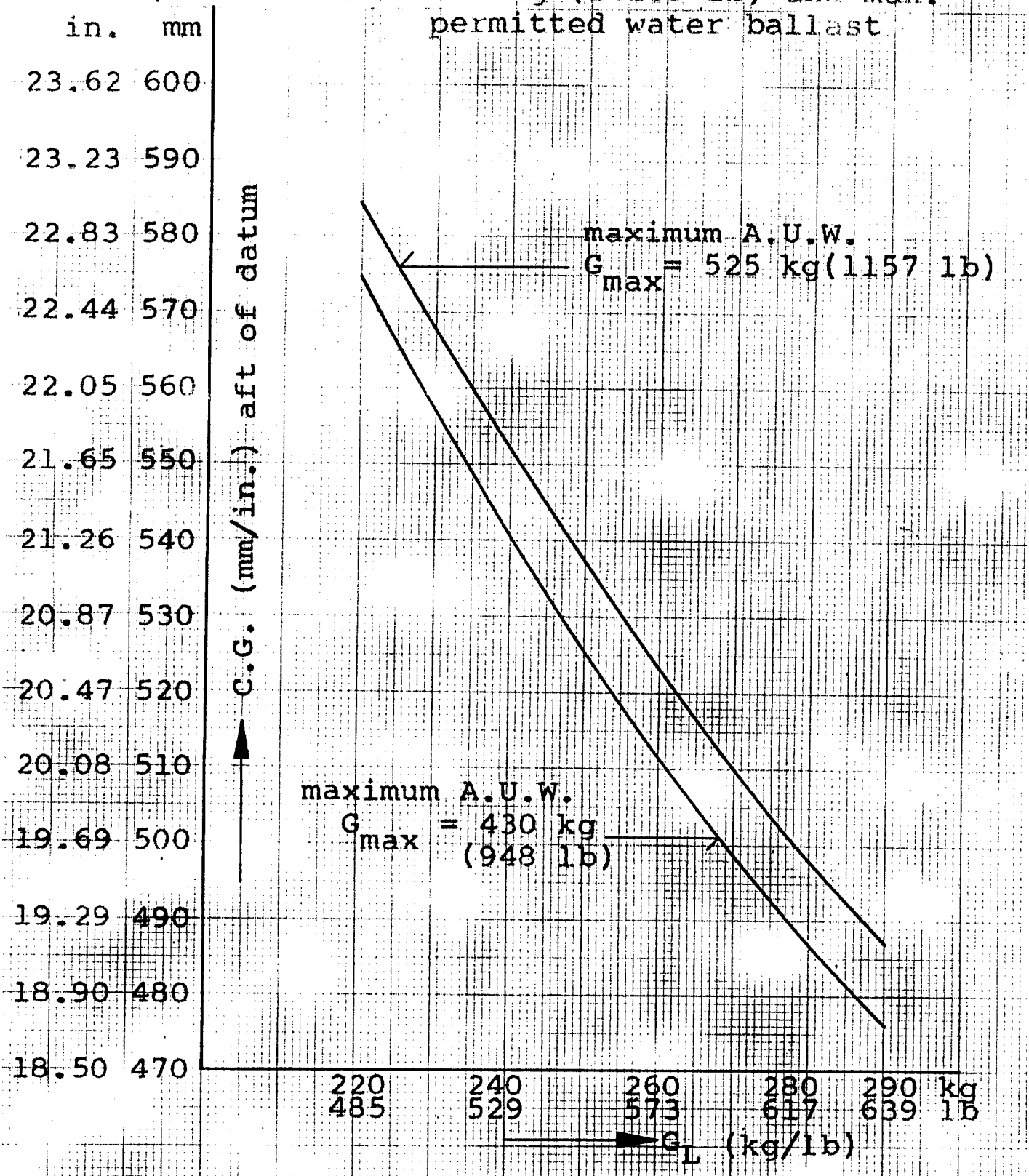
Maximum permitted load of the baggage compartment is 2 kg (4.4 lb).
This load must be considered when the max. permitted water ballast load is determined.

Lever arm of baggage:

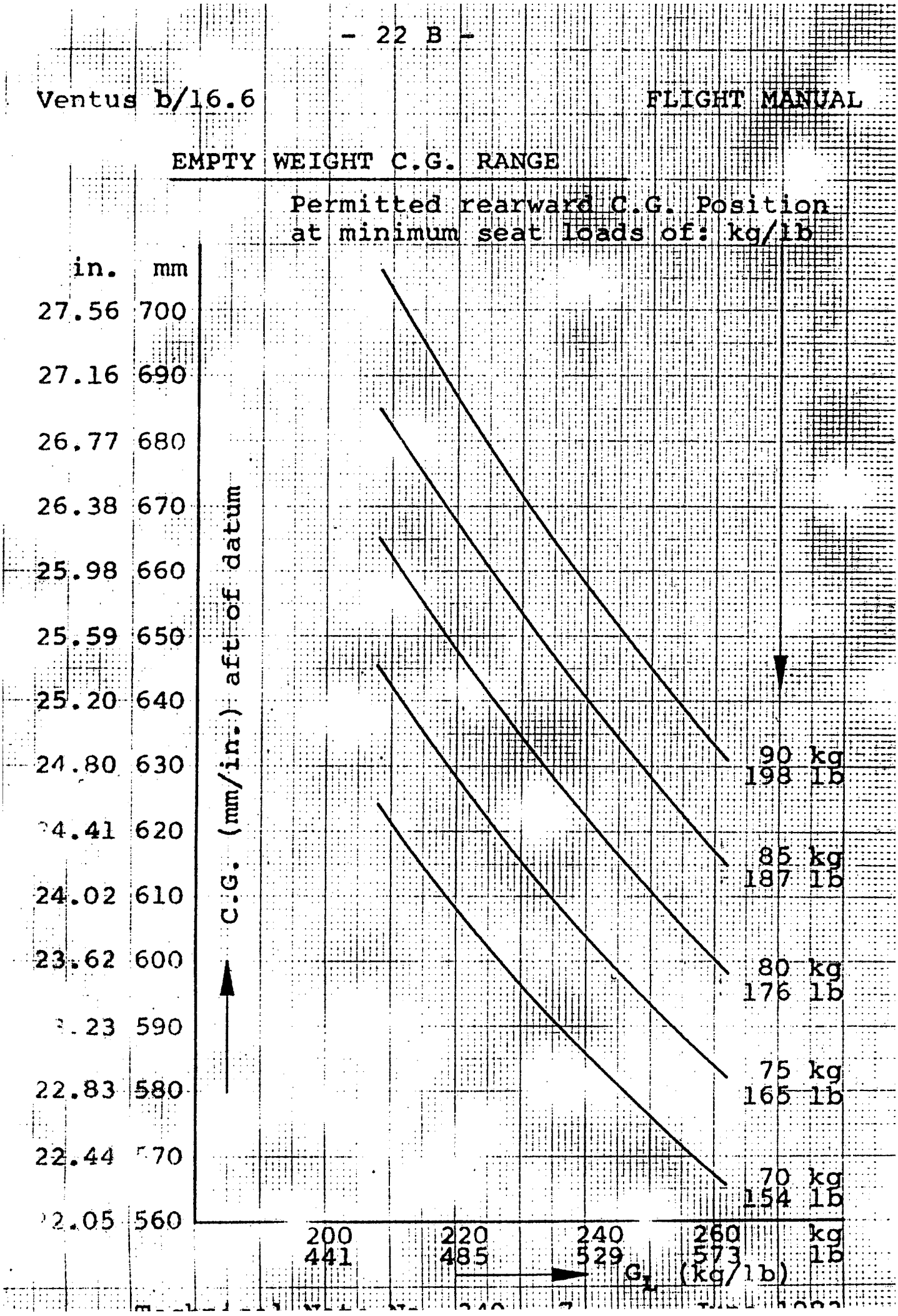
845 mm (33.26 in.) aft of datum (BE).

EMPTY WEIGHT C.G. RANGE

Permitted forward C.G. position at max. seat load of 110 kg (242.5 lb) and max. permitted water ballast



EMPTY WEIGHT C.G. RANGE



Weight- and Balance Log Chart

Date of weighing						
Inspector: Signature, Stamp						
Empty weight	15.0 m					
	16.6 m					
Equipment list dated						
Empty weight C.G. position mm aft of datum(BE)						
	15.0 m					
	16.6 m					
Weight of pilot and parachute	max. 15.0 m					
	max. 16.6 m					
	min.					
Maximum payload	15.0 m					
	16.6 m					
Permitted water ballast at max. payload						
	15.0 m					
	16.6 m					

<u>Note</u>: Permitted weights see page 17. Weights above are kg/lb

2.7 Weak link in tow rope / launch cable

For both winch launching and aerotow:

Maximum: 680 daN (1499 lb)

The minimum strength of the weak link should not be less than the maximum all up weight.

2.8 Tow hook(s)

a) C.G. Tow hook

For winch launching and aerotow the TOST safety release hook

Europa G 72 or Europa G 73

is used, which is installed on the bottom of the fuselage in front of the main landing wheel.

b) Nose tow hook (if installed)

For aerotow the TOST nose tow hook

E 72 or E 75

is used, which is installed in the nose of the fuselage.

Operating Instructions

See Flight- and Maintenance Manual.

See Data- and Reference Placards in the cockpit according to Flight Manual, page 10-12

Airspeed Indicator Colour Markings

	kt	mph	km/h
Maximum permitted speed V_{NE}	135	155	250
Maneuvering speed V_A	102	118	190
1.1 x Stalling speed 1.1 V_{sl}	48	55	89
White arc (flap setting L,+2,+1,0)	44- 86	50- 99	81-160
Green arc (normal range)	48-102	55-118	89-190
Yellow arc (caution range)	102-135	118-155	190-250
Radial red line (never exceed) at	135	155	250
Yellow triangle (approach speed) at	62	71	115

The stalling speed on which the A.S.I. markings are based refers to the following configuration:

a) Flap setting: "L"
b) Airbrakes : Closed
c) Max. weight : G_{max} = 525 kg (1157 lb)
d) Wing span : 15.0 m

3. Emergency Procedures

3.1 Spin Recovery

If the sailplane with the C.G. in midway or rearward position unintentionally enters a spin, full opposite rudder should be applied immediately and the control column eased forward.
When rotation stops, centralize the rudder and pull out smoothly from dive.

3.2 Safety Considerations

Take-off by winch launch or aerotow from uncut grass fields must be strictly avoided. If a wing tip is caught in high grass, release tow rope/winch cable immediately, otherwise a break-out with resulting ground loop (with risk of damage) cannot be prevented.
After an emergency release at low altitude, in straight flight, flap setting "0", a speed of 80-115 km/h (43-62 kt, 50-71 mph), depending on wing loading, should be maintained.

In circling flight the speed should be increased according to the bank angle. This will prevent the sailplane from being inadvertently and unnoticeably flown in a stalled condition.
If light vibration and sloppy controls are felt, the sailplane is flying in a stalled condition - the control column should then be eased forward immediately.

f) Check main wheel tire pressure:
Up to 330 kg (727 lb): 50 psi (3.5 bar)
Above 330 kg (727 lb): 67 psi (4.7 bar)

g) Check condition and operation of tow hook(s)

2.) a) Check upper and lower wing surfaces for damage

b) Clean and grease water dump valves

c) Check connection of wing tip extensions (locking pin must be flush with upper wing surface)

d) Check ailerons for proper condition and free movement. Check for unusual play by gently shaking the trailing edge of the aileron. Check hinges for damage

3.) a) Check flaps for proper condition and free movement. Check for unusual play by gently shaking the trailing edge of the flap. Check hinges for damage with the spoiler open

b) With the flaps set to "S", airbrakes closed, check the gas strut in the control circuit in the fuselage. Do this by pushing the inboard end of the flap down at the trailing edge to the "L" position and release it. Flap must return to the "S" setting.

c) Check airbrakes for proper condition, fit and correct locking

4.) a) Check fuselage for damage, especially the underside

When releasing the tow rope, pull the yellow grip fully several times and turn only when definitely clear of rope.

Winch Launch

Max. permitted winch launch speed:

V_W = 150 km/h (81 kt, 93 mph).

For winch launching only the C.G. hook must be used. The flaps are set at 0 (above 430 kg/948 lb A.U.W. at + 1). The trim is normally at a mid-point position, but for rearward C.G. positions it should be set to fully nose heavy.
As the cable tightens, apply the wheel brake gently in order to prevent the sailplane overrunning the winch cable.

Ground run & take-off are normal, there is no tendency to veer off or to climb excessively steeply on leaving the ground. Depending on the cockpit load the sailplane is lifted off with the stick almost fully pushed forward at aft C.G. positions and slightly pulled back at forward C.G. positions. After climbing to a safe height the stick is further pulled back for transition into the steep climbing attitude. At normal flying weights, without water ballast, the launch speed should not be less than 90 km/h (49 kt, 56 mph) and with water ballast not less than 100-110 km/h (54-59 kt, 62-68 mph). Normal launch speed is about 100 km/h (54 kt, 62 mph), with water ballast about 115-125 km/h (62-68 kt, 71-77 mph).
At the top of the launch the cable will normally back release automatically; the cable release should, however, be pulled firmly several times to ensure that the cable has actually gone.

Note:

Winch launching at maximum permitted all-up weight of 525 kg/1157 lb should only be performed if an appropriately strong winch and a cable in perfect condition are available.
Furthermore, for the search of up-currents a winch launch makes not much sense if the release height gained is less than 400 m (1300 ft).

In case of doubt, reduce all-up weight to e.g. 430 kg/948 lb or less.

Winch launching with water ballast is not recommended if the head wind is less than 20 km/h (11 kt).

It is explicitly advised against winch launching with a tail wind.

4.5 Low Speed Handling and Stall

In order to become familiar with the sailplane it is recommended to explore the low speed- and stall characteristics at a safe height. Stalls should be approached from straight flight and from turning flight (with approx. 45° bank), using various flap settings. The following speeds (being the results from measurements done with two different sailplanes) are typical in straight flight:

A.U.W.	305 kg 672 lb			347 kg 765 lb			430 kg 948 lb			430 kg 948 lb			525 kg 1157 lb		
C.G. Pos.	340 mm 13.39 in.			340 mm 13.39 in.			200 mm 7.85 in.			200 mm 7.87 in.			200 mm 7.87 in.		
Wing span	15 m			16.6 m			15 m			16.6 m			15 m		
Stalling speed, airbrakes closed,	km/h	kt	mph	km/h	kt	mph	km/h	kt	mph	km/h	kt	mph	km/h	kt	mph
Flaps + 2	60	32	37	61	33	38	70	38	43	71	38	44	83	45	52
Flaps 0	65	35	40	65	35	40	75	40	47	77	42	48	89	48	55
Flaps S	70	38	43	75	40	47	88	48	55	88	48	55	99	53	62
airbrakes extended, Flaps L	50	27	31	59	32	37	63	34	39	66	36	41	80	43	50

Stall warning occurs 2 or 3 kt (3-5 km/h) above stalling speed and is indicated by a slight buffeting and increasing vibration in the control system when pulled further back. Ailerons get spongy and the sailplane tends to slight pitching motions.

Usually a steady spinning motion is not possible. In some cases the sailplane recovers after one or two full rotations with heavy skidding and enters a dive. The spinning attitude can be very steep, and with a high rotation speed.

The loss of height during recovery from spin is approx. 50 to 100 m (165-330 ft).

A safe recovery from spin is effected by following the standard method:

a) apply opposite rudder against direction of spin

b) short pause

c) ease the control column forward until rotation ceases and the airflow is restored.

d) Centralize rudder and pull gently out of the resulting dive.

It should also be noted that with airbrakes extended the sailplane should be pulled out less abruptly than with retracted airbrakes (see section 2.3 load factors).

Airbrakes fully extended, a limitation of the terminal velocity in a 45° dive at maximum permitted A.U.W. of 525 kg (1157 lb) is established at about 230 km/h (124 kt, 143 mph), respectively at about 190 km/h (102 kt, 118 mph) at 430 kg (948 lb) A.U.W.

4.7 Flying with water ballast

The water ballast tanks are integral compartments in the wing nose.
The tanks are to be filled with clear water only through a round opening on the upper surface of the wing nose. Tank openings are closed with plugged-in filler caps having either a 5 mm (0.2 in.) hole or a 6 mm (0.24 in.) female thread for lifting and venting.
Lifting is done by inserting the special rigging pin into the 5 mm cap hole or, should the cap have a 6 mm threaded hole, by using the tailplane rigging screw.
Since the cap hole also serves as vent hole it always should be kept open.
Tanks also have an additional venting tube running from the highest point of the tank through the wing to the underside of the wing tip.
Dumping the ballast takes about four or five minutes from full tanks.
The tank in each wing has a capacity of approx. 84 liters of water. When filling the tanks bear in mind the weight of the pilot and ensure that the maximum permitted all-up weight is not exceeded, see Loading Table, page 18.

Both tanks should always be filled with the same amount of water to prevent lateral imbalance.
Prior to take-off with partially filled tanks ensure that the wings are held level in order to allow the water to be equally distributed so both wings are balanced.
Due to the heavier wings the helper on the tip should assist the take-off run as long as possible.
Thanks to the integral bulkheads in the ballast tanks there is no perceptible movement of the water ballast when flying with partially full tanks.

When flying with max. permitted A.U.W. the low speed- and stall behaviour of the sailplane is slightly different from the flight characteristics without water ballast. Stall speed increases (see section 4.5) and for corrections of the flying attitude larger control surface movements are required. Also, for recovery from a stall break slightly more height is necessary to regain normal flying attitude.
Water ballast is dumped through an opening on the lower wing surface near the root rib. The dump valve mechanism is hooked-up automatically when the wings are rigged.

In the unlikely event of the tanks emptying unevenly or only one of them emptying (recognized by having to apply up to 50% opposite aileron for normal flying attitude), it is necessary to fly somewhat faster to take into account the higher weight and also to avoid stalling the sailplane.

Should the sailplane spin with a very flat longitudinal attitude, then full forward stick is required for recovery according to the standard method.
When landing, be prepared to veer off course as the heavier wing will touch down somewhat earlier.

IMPORTANT

1. On longer flights at air temperatures below 0 degr. C (32 degr. F) water ballast must be dumped in any case.
2. At expected average rates of climb of less than 1.5 m/s (295 fpm) there is little point in using much water ballast. The same applies to flights in narrow thermals requiring high angles of bank.
3. Prior to off-field landings water ballast should always be dumped.
4. On no account whatsoever must the sailplane ever be parked with full ballast tanks because of the danger of them freezing up. Prior to parking dump ballast completely, remove the filler caps and allow the tanks to dry out.
5. Prior to filling the water tanks check with the dump valves opened that both drain plugs open, move and close simultaneously. Leaking (dripping) dump valves are avoided by cleaning and greasing the valve seats and drain plugs (with the valves open), then, with the valves closed, the drain plug is pulled in position with the threaded tool used to attach the tailplane.
6. Never pressurize the tanks, for instance directly from the water hose, water should always be poured in.

Warning:

Since the polyester gelcoat of this sailplane becomes very brittle when operating at high altitude at associated temperatures of possibly -40 to -58° F, cracks in the wing shell coating, particularly near the ends of the airbrakes, may occur under certain loads.
Therefore, after having reached the ceiling on high altitude wave flights, descend cautiously while the airbrakes are extended.

A steep descent with the airbrakes extended should only be conducted in case of emergency.

So far no damage to the structure was found on cracked wing shell coatings.

4.10 Restricted Aerobatics

(only permitted without water ballast)

The Ventus b/16.6 is permitted to carry out the following aerobatic maneuvers:

(a) Inside Loop
(b) Stalled Turn
(c) Lazy Eight

Inside Loop

Enter the maneuver at 200 km/h (108 kt) IAS, flap setting -2. At the top of the loop set flaps to 0. Speed during recovery from the maneuver: 160 to 180 km/h (86 to 97 kt).

Stalled Turn

Enter the maneuver at a speed of about 180 to 200 km/h (97-108 kt), IAS, at flap setting -2. Whilst climbing vertically let the wing which will be on the inside of the turn drag and then at about 140 km/h (75 kt) apply rudder in the direction of the dragging wing in order to prevent a distorted maneuver.

Lazy Eight

Enter the maneuver at a speed of about 190 to 200 km/h (102-108 kt) at flap setting -2. After pulling up into a 45° climb enter a turn at about 120 km/h (65 kt). Recovery speed between 160 to 180 km/h (86-97 kt).

4.11 Approach and Landing

The trailing edge airbrakes are a combination of spoiler and flap. They provide a very effective landing aid and make possible steep and relatively slow approaches.
With the flap set at "L" pulling back the airbrake lever about 11 cm (4.3 in.) will only extend the spoilers; they are similar in effect to normal Schempp-Hirth airbrakes. If they are extended suddenly the indicated airspeed increases by about 5 km/h (3 kt) and the sailplane adopts a more nose down attitude. Pulling the airbrake lever further back causes the spoilers to engage the flaps; this does not alter the attitude of the sailplane but does reduce the indicated airspeed by approx. 10 km/h (5 kt).
Normal approach speed with airbrakes fully extended, flap setting "L" and with the main wheel lowered is 80-90 km/h (43-49 kt, 50-56 mph), and at max. A.U.W. between 105 and 115 km/h (57-62 kt, 65-71 mph). In this configuration the glide angle is approx. 1 : 5.4.

Should it become necessary to stretch the glide when making a steep approach, normal flying attitude should first be restored and only then (if it is still necessary) should the airbrakes be retracted.

Touch-down should always be with airbrakes fully extended since this configuration produces the lowest touch-down speed.

It should also be noted that with airbrakes extended the sailplane should be pulled out less abruptly than with retracted airbrakes (see section 2.3 load factors).
At maximum permitted A.U.W., airbrakes fully extended the speed in a 45° dive is limited to approx. 190 km/h (102 kt).

4.7 Flying with Water Ballast

The water ballast tanks are integral compartments in the wing nose.

The tanks are to be filled with clear water only through a round opening on the upper surface of the wing nose. Tank openings are closed with plugged-in filler caps which have a 5 mm hole for lifting and venting. Lifting is done by inserting the special rigging pin into the cap hole, which also serves as vent hole and therefore should be kept open. Tanks also have an additional venting tube running from the highest point of the tank through the wing to the underside of the wing tip.

Ballast dumping takes about four or five minutes from full tanks.

The tank in each wing has a capacity of approx. 80 litres of water. When filling the tanks bear in mind the weight of the pilot and ensure that the maximum all-up weight of 948 lb/430 kg is not exceeded, see Loading Table, page 18.