Maximum permissible recovery loads

Max. positive load + 5,3 g)
Max. negative load - 2,65g) at 170 km/h (92 kts)

With increasing speed the limits decrease linearly to:

Max. positive load + 4,0 g)
Max. negative load - 1,5 g) at 265 km/h (143 kts)

II.6. CREW

The crew of the ASW 20 BL is one pilot.

II.7. MASSES

According to the "Gesetz über Einheiten im Meßwesen" (Weights and Measures Act) of July 2, 1969, the term "mass" is to be used where the kilogram (kg) is the unit, as opposed to the expression "weight" formerly used.

	15 m - Variant	
Empty mass with min. equipment	ca. 270 kg	(595 lbs)
Max. permissible flight mass	525 kg	(1157 lbs)
Max. permissible mass of the non-lifting structural parts	245 kg	(540 lbs)
Water ballast in the wing tanks, depending on empty mass and cockpit load (see tables in Chapter II.9.)	up to 150 kg	(331 lbs) (39,6 USGal)

For 16,59 m variant see Page 15a !

II.8. LIMITS OF C.G. POSITION IN FLIGHT

The empty mass C.G. position is determined in the 15 m-variant. Datum Point (= "Bezugspunkt" = BP) is the leading edge of the wing root rib (disregarding the rounded part of the wing-fuselage transition.

16,59 m Variant:

Empty mass with min.equipment	approx.	275 kg	(606 lbs)
Max. permissible flight mass		430 kg	(948 lbs)
Max. permissible mass of the non-lifting structural parts		245 kg	(540 lbs)
Water ballast in the wing tanks, depending on empty mass and cock-pit load (see tables in Chapter II.9.)	up to	100 kg	(221 lbs)

Loading with water ballast

The max. flight mass of 525 kg (1157 lbs) must not be exceeded in the 15 m - variant; for the 16,59 m - variant the max. permissible flight mass is 430 kg (948 lbs) only so that only very light pilots in gliders with only little equipment may carry some water ballast on board. Use the following table to calculate the maximum possible amount of ballast:

15 m - VARIANT:

Airframe mass (kg)	Cockpit load (kg) [mass of pilot + parachute + baggage] 65	75	85	95	105	115
260	full	full	full	full	full	150+)
270	full	full	full	full	150	140
280	full	full	full	150	140	130
290	full	full	150	140	130	*
300	full	150	140	130	*	*

Airframe mass see Page 17 +)litre = kg

16.59 m - VARIANT:

Airframe mass (kg)x	Cockpit load (kg) [mass of pilot + parachute + baggage] 65	75	85	95	105	115
260	105	95	85	75	65	55
270	95	85	75	65	55	45
280	85	75	65	55	45	35
290	75	65	55	45	35	*
300	65	55	45	35	*	*

Airframe mass see Page 17! x inclusiv wing extension

* Such high airframe masses do not permit such high cockpit loadings, as the max. permissible mass of the non-lifting structural parts will be exceeded.

II.10. TOW ROPE WEAK LINK

For winch and aero tow a weak link of maximum 680 daN (1500 lbs) and minimum 540 kg (1190 lbs) nominal load is to be used, e.g. the new weak link 4 (blue paint finish; 600 daN ± 60 daN / 1323 lbs ± 132 lbs).

II.11 EXTREMES OF PILOT SIZE

Tall pilots can fly without the backrest, but they must use a purpose-made stiff cushion which bridges the edge between the C.G. tow release and the main bulkhead. In the same way tall pilots should fly with sports shoes or

Loading with water ballast

15 m - Variant

Airframe mass (lbs)	Cockpit load (lbs) [mass of pilot + parachute + baggage] 150	175	200	225	250
575	full	full	full	full	39.75[1]
600	full	full	full	39.75	36.75
625	full	full	39.75	36.75	33.75
650	full	full	36.75	33.75	*

Airframe mass see Page 17 [1] US-gal.

16,59 m Variant

Airframe mass [x] (lbs)	Cockpit load (lbs) [mass of pilot + parachute + baggage] 150	175	200	225	250
575	26.75	23.75	20.75	17.75	14.75[1]
600	23.75	20.75	17.75	14.75	11.75
625	20.75	17.75	14.75	11.75	8.75
650	17.75	14.75	11.75	8.75	*

[x] inclusiv wing extension [1] US-gal.
Airframe mass see Page 17

* Such high airframe masses do not permit such high cockpit loadings, as the max. permissible mass of the non-lifting structural parts will be exceeded.

1.3. SPECIFICATION

Wings

Wing section FX-62-K-131 mod. and
FX 60-126 mod. at the wingtip.

Wingspan,optional:	15,00 m (49,21ft)	16,59 m (54,43ft)
Wing area:	10,50 m^2(113,02sqft)	11,013 m^2(118,54sqft)
Wing aspect ratio:	21,43	25,02
Flap settings:	-12°, -6°, +0°, +9°, +38°	
Dihedral:	2,33° (top surface of spar)	
Sweep angle (quarter-chord line):	0°	

Fuselage

Fuselage length:	6,80 m	(22,31 ft)
Height at fin:	1,42 m	(4,66 ft)
Cockpit width:	0,64 m	(2,10 ft)

Vertical tailplane

Height above top surface of fuselage:	1,10 m	(3,61 ft)
Area:	1,00 m^2	(10,76 sqft)
Section:	Wortmann FX 71-L-150/30 13,50 % thickness	

Rudder

Rudder chord ratio:	33,00 %	
Area:	0,30 m^2	(3,23 sqft)

Horizontal tailplane

Span:	2,20 m	(7,22 ft)
Area:	0,997m^2	(10,73 sqft)
Aspect ratio:	4,85	
Section:	Wortmann FX 71-L-150/30 12,00 % thickness	

Elevator		
Area:	0,2991 m^2	(3,22 sqft)
Control surface chord ratio:	30,00 %	
Airbrakes	Schempp-Hirth, top surface only.	
Length:	1,36 m	(4,46 ft)
Area (both):	0,256 m^2	(2,76 sqft)
Height:	0,094 m	(0,31 ft)
Masses		
Empty mass, 15,00 m version:	270 kg	(595 lbs)
16,59 m version:	275 kg	(606 lbs)
Useful load (both versions):	115 kg	(254 lbs)
Mass of non-lifting structural parts (both versions):	max.245 kg	(540 lbs)
Max. flight mass, 15,00 m:	525 kg	(1158 lbs)
16,59 m:	430 kg	(948 lbs)
Wing loading, 15,00 m:	32,4-50,0 kg/m^2	(6,64-10,24 lb/sqft)
16,59 m:	31,6-39,0 kg/m^2	(6,47-7,99 lb/sqft)

II. DESCRIPTION OF SYSTEMS

II.1. THE ASW 20 BL GLIDER

Midwing single-seat glider, featuring camber-changing flaps, T-tailplane, retractable landing gear and water ballast system. The dive brakes feature resilient sealing bands, and extend from the top surface of the wings only.

II.1.1 Wings

Two-part wing with FRP-rigid foam sandwich surface, extendible from 15 m span to 16,59 m by means of two attachable tip extensions, each 0,8 m long. The I-spar consists of fiberglass caps with FRP-hard foam webs. The wings are assembled to the fuselage by means of a tongue and fork joint and two cylindrical main pins. The attachable tip extensions are assembled to the wing with a connecting bolt. This connection between wing and attachable tip extension respectively tip strip of the 15 m version is retained by a spring-loaded bolt.

Contrary to the ASW 20 CL, the ASW 20 BL features extra reinforcements in the wings; therefore the larger waterbags of the ASW 20 B (going up to the root rib) can be used in this glider.

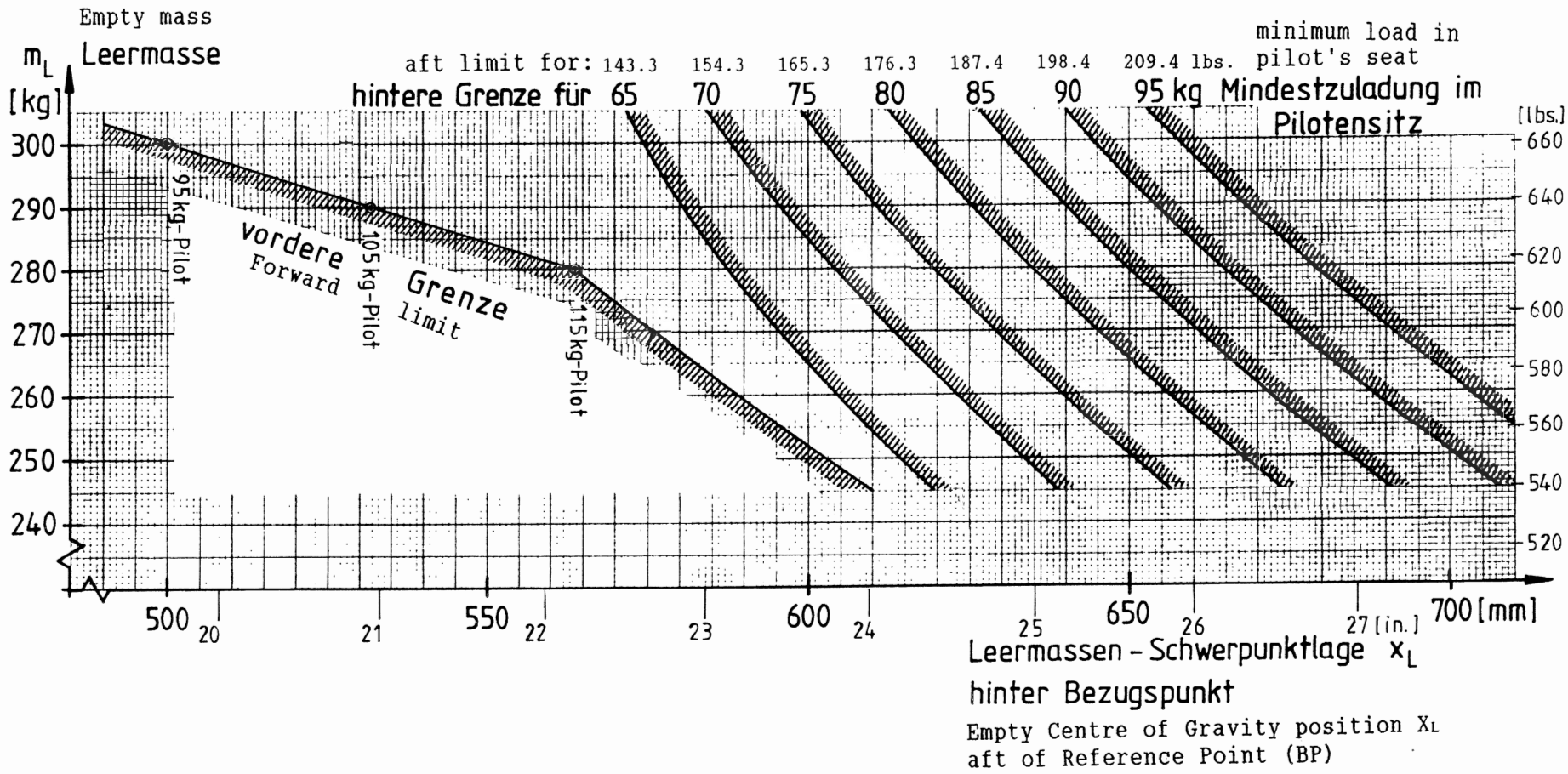

Fig. 3.2.-1

Applies to both span versions; the more critical 15 m version is used for the weighing.

DATE: Oct. 1, 1984 | AUTHOR: Jumtow | CORRECTION: TN-no. 35 of 30.01.90

Reading off the graph 3.2.-1, you will see that the minimum load in the pilot's seat is now 70 kg (154,35 lbs). The new values must now be entered in Chapter II.9. to update the current state of the aircraft, by a person licensed to do this (e.g. building inspector of any licensed repair station).

3. Example of calculating the flight mass C.G. position:

a) An ASW 20 BL with an empty mass of m_L = 266 kg (586,53 lbs) and an empty mass C.G. position x_L = 619 mm (24,37 in), is to be flown by a pilot weighing 85 kg (187,43 lbs) including parachute. He takes 2 kg (4,41 lbs) of rations with him in the cockpit, plus 4 kg (8,82 lbs) of baggage (e.g. barograph, retaining straps, canopy cover, rainwear etc.) in the baggage compartment.
What will the in flight C.G. position be ?
In this case the cockpit payload will be:

m_P = 85 kg; i.e. 187,43 lbs (pilot + parachute) + 2 kg; i.e. 4,41 lbs (rations) = 87 kg; i.e. 191,84 lbs.

Following the formula given in Chapter III.2.4 , the calculation runs as follows:

$$x_S = \frac{x_L \cdot m_L + x_P \cdot m_P + x_G \cdot m_G}{m_L + m_P + m_G}$$

($m_W = m_{O_2} = 0$)

$$x_S = \frac{619 \cdot 266 - 592 \cdot 87 + 190 \cdot 4}{266 + 87 + 4}$$

= 319 mm (12,56 in).

The in flight C.G. is now in the rear third of the permissible range, which is a very favorable position.

b) If the aircraft, equipped as in example 3.a), takes on a a further load of 80 l (21,14 US Gal.) water bal-

V.8. MAINTENANCE INSTRUCTIONS

The following Maintenance Instructions have been written over the long period of service of the ASW 20 to meet the problems which have arisen. In dealing with the maintenance of the ASW 20 BL, we can in many cases fall back on the experience gained with the ASW 20. Results of this experience have naturally been incorporated in the ASW 20 BL as standard; e.g. Maintenance Instruction A no longer applies, as a very effective disc brake system has been fitted to the ASW 20 BL. Similarly, the Tesamoll tape strips, the installation of which is covered in Maintenance Instruction B, are now fitted as standard; a check needs to be made from time to time that the strips still fit closely against the control surfaces; for this reason Maintenance Instruction B is now presented as the instructions for renewing the Tesamoll seal. It should be noted that the installation procedures in Maintenance Instruction H (tow release rake and wedge-shaped plywood blocks) have also been incorporated as standard in the ASW 20 BL. Maintenance Instruction F concerns repair workshops abroad (Repair instructions for replacing a wing).

Maintenance Instruction B	dated 02.10.78
Maintenance Instruction C	dated 15.02.79
Maintenance Instruction D	dated 25.06.79
Maintenance Instruction E	dated 28.06.79
Maintenance Instruction F	dated 15.07.80
Maintenance Instruction G	dated 13.01.81
Maintenance Instruction H	dated 30.08.81
Maintenance Instruction I	dated 09.09.82
Maintenance Instruction J	dated 24.04.87
Repair Instruction K	dated 18.05.84
Maintenance Instruction L	dated 26.01.90

This series of Maintenance Instructions will be extended and supplemented as and when required.