Maximum permissible recovery loads

Max. positive load  
  + 5.3 g  
Max. negative load  
  - 2.65 g  
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.

| 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.)

DATE: Oct.1, 1984  LBA-APPROVAL: TN-no.35 of 30.01.90
AUTHOR: Waibel  DATE: 06.12.84
15.59 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 cockpit 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:

<table>
<thead>
<tr>
<th>Airframe mass (kg)</th>
<th>Cockpit load (kg) mass of pilot</th>
<th>parachute</th>
<th>baggage</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 m - VARIANT:</td>
<td>65</td>
<td>75</td>
<td>85</td>
</tr>
<tr>
<td>760</td>
<td>full</td>
<td>full</td>
<td>full</td>
</tr>
<tr>
<td>770</td>
<td>full</td>
<td>full</td>
<td>full</td>
</tr>
<tr>
<td>780</td>
<td>full</td>
<td>full</td>
<td>full</td>
</tr>
<tr>
<td>790</td>
<td>full</td>
<td>full</td>
<td>150</td>
</tr>
<tr>
<td>800</td>
<td>full</td>
<td>150</td>
<td>140</td>
</tr>
<tr>
<td>Airframe mass see Page 17</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Airframe mass (kg)</th>
<th>Cockpit load (kg) mass of pilot</th>
<th>parachute</th>
<th>baggage</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.59 m - VARIANT:</td>
<td>65</td>
<td>75</td>
<td>85</td>
</tr>
<tr>
<td>260</td>
<td>105</td>
<td>95</td>
<td>85</td>
</tr>
<tr>
<td>270</td>
<td>95</td>
<td>85</td>
<td>75</td>
</tr>
<tr>
<td>280</td>
<td>85</td>
<td>75</td>
<td>65</td>
</tr>
<tr>
<td>290</td>
<td>75</td>
<td>65</td>
<td>55</td>
</tr>
<tr>
<td>300</td>
<td>65</td>
<td>55</td>
<td>45</td>
</tr>
</tbody>
</table>
| Airframe mass see Page 17 | incl. in the 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 / 125 lbs ± 132 lbs).

II.11. EXTREME 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

DATE: Oct.1, 1984
AUTHOR: Walbel
LBA APPROVAL DATE: 06.12.84
TN-no. 35 of 30 01.90
Loading with water ballast

### 15 m - Variant

<table>
<thead>
<tr>
<th>Airframe mass (lbs)</th>
<th>Cockpit load (lbs)</th>
<th>Mass of pilot</th>
<th>Parachute</th>
<th>Baggage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150</td>
<td>175</td>
<td>200</td>
<td>225</td>
</tr>
<tr>
<td>575</td>
<td>full</td>
<td>full</td>
<td>full</td>
<td>39.75</td>
</tr>
<tr>
<td>600</td>
<td>full</td>
<td>full</td>
<td>full</td>
<td>39.75</td>
</tr>
<tr>
<td>625</td>
<td>full</td>
<td>full</td>
<td>39.75</td>
<td>36.75</td>
</tr>
<tr>
<td>650</td>
<td>full</td>
<td>full</td>
<td>36.75</td>
<td>33.75</td>
</tr>
</tbody>
</table>

Airframe mass see Page 17

### 16,59 m Variant

<table>
<thead>
<tr>
<th>Airframe mass (lbs)</th>
<th>Cockpit load (lbs)</th>
<th>Mass of pilot</th>
<th>Parachute</th>
<th>Baggage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150</td>
<td>175</td>
<td>200</td>
<td>225</td>
</tr>
<tr>
<td>575</td>
<td>26.75</td>
<td>23.75</td>
<td>26.75</td>
<td>17.75</td>
</tr>
<tr>
<td>600</td>
<td>23.75</td>
<td>20.75</td>
<td>17.75</td>
<td>14.75</td>
</tr>
<tr>
<td>625</td>
<td>20.75</td>
<td>17.75</td>
<td>14.75</td>
<td>11.75</td>
</tr>
<tr>
<td>650</td>
<td>17.75</td>
<td>14.75</td>
<td>11.75</td>
<td>8.75</td>
</tr>
</tbody>
</table>

3) Inclusive wing extension
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.
- Wing span, optional: 15.00 m (49.21 ft) 16.59 m (54.43 ft)
- Wing area: 10.50 m² (113.02 sq ft) 11.015 m² (118.54 sq ft)
- Wing aspect ratio: 21.43
- Flap settings: -12°, -8°, 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 m² (10.76 sq ft)
- Section: Wortmann FX 71-L-150/30 13.50% thickness

**Rudder**
- Rudder chord ratio: 35.00 %
- Area: 0.30 m² (3.23 sq ft)

**Horizontal tailplane**
- Span: 2.20 m (7.22 ft)
- Area: 0.997 m² (10.75 sq ft)
- Aspect ratio: 4.85
- Section: Wortmann FX 71-L-150/30 12.00% thickness
Elevator
Area: 0.299 m² (3.22 sq ft)
Control surface chord ratio: 30.00 %
Airbrakes: Schempp-Hirth, top surface only.
Length: 1.36 m (4.46 ft)
Area (both): 0.256 m² (2.76 sq ft)
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: 450 kg (948 lbs)
Wing loading, 15.00 m: 32.4-50.0 kg/m² (6.64-10.24 lb/sq ft)
16.59 m: 31.6-59.0 kg/m² (6.47-7.99 lb/sq ft)

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 1-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 droop 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.

DATE: Oct. 1, 1984
AUTHOR: Heide
CORRECTION: TN no. 35 of 30.01.90
Fig. 3.2.1 Applies to both span versions; the more critical 15 m version is used for the weighing.
Reading off the graph 3.2.1, you will see that the minimum load in the pilot’s seat is now 70 kg (154.33 lbs). The new values must now be entered in Chapter 11.9, 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 \( m_e = 266 \text{ kg (586.53 lbs)} \) and an empty mass C.G. position \( x_e = 619 \text{ mm (24.37 in)} \), is to be flown by a pilot weighing 85 kg (187.45 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:

   \[ m_p = 85 \text{ kg (187.45 lbs (pilot + parachute)} + 2 \text{ kg (4.41 lbs (rations)) = 87 kg (191.84 lbs).} \]

   Following the formula given in Chapter 11.2.4, the calculation runs as follows:

   \[ x_C = \frac{x_e + x_p + x_r + x_b + x_S}{m_e + m_p + m_r} \]

   \[ (m_p = m_r = 0) \]

   \[ x_C = \frac{619 + 256 + 592 + 87 + 190}{266 + 87 + 4} \]

   \[ = 319 \text{ mm (12.56 in)}. \]

   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 further load of 80 l (21.14 US Gal.) water bal-
V.B. 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.

DATE: Oct.1, 1984
AUTHOR: Heide
CORRECTION: TN no.31 of 24.06.87
TN no.35 of 30.01.90