Maximum permissible recovery loads

Maximum positive load + 5.3g ) at 180 km/h
Maximum negative load - 2.65g )

With increasing speed the limits decrease linearly to:
Maximum positive load + 4.0g ) at 280 km/h
Maximum negative load - 1.5g )

II.6. CREW
The crew of the ASW 22 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.

<table>
<thead>
<tr>
<th></th>
<th>24 m</th>
<th>22 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty mass with min. equipment</td>
<td>ca.410 kg</td>
<td>ca.400 kg</td>
</tr>
<tr>
<td>Max. permissible flight mass</td>
<td>650 kg</td>
<td>750 kg</td>
</tr>
<tr>
<td>Max. permissible mass of the non-lifting structural parts</td>
<td>275 kg</td>
<td>275 kg</td>
</tr>
<tr>
<td>Water ballast in the wing tanks, depending on empty mass and cockpit load (see tables in Chapter 11.9.)</td>
<td>185 kg max.</td>
<td>240 kg max.</td>
</tr>
</tbody>
</table>

II.8. LIMITS OF C.G. POSITION IN FLIGHT
The Datum Point (BP) is the leading edge of the wing root rib (disregarding the rounded part of the wing-fuselage transition).
Maximum permissible water ballast for the 24 m version

<table>
<thead>
<tr>
<th>AIRFRAME MASS (kg)</th>
<th>75</th>
<th>85</th>
<th>95</th>
<th>105</th>
<th>115</th>
</tr>
</thead>
<tbody>
<tr>
<td>390</td>
<td>185°</td>
<td>175°</td>
<td>165°</td>
<td>155°</td>
<td>145°</td>
</tr>
<tr>
<td>400</td>
<td>175°</td>
<td>165°</td>
<td>155°</td>
<td>145°</td>
<td>135°</td>
</tr>
<tr>
<td>410</td>
<td>165°</td>
<td>155°</td>
<td>145°</td>
<td>135°</td>
<td>125°</td>
</tr>
<tr>
<td>420</td>
<td>155°</td>
<td>145°</td>
<td>135°</td>
<td>125°</td>
<td>115°</td>
</tr>
<tr>
<td>430</td>
<td>145°</td>
<td>135°</td>
<td>125°</td>
<td>115°</td>
<td>*</td>
</tr>
</tbody>
</table>

* First fill outboard wing tanks with approx. 120 kg (120 l water); the remainder may be loaded into the inboard tanks.

* These combinations are not permissible, as the maximum permissible mass of non-lifting structural parts will be exceeded.

Maximum permissible water ballast for the 22 m version

<table>
<thead>
<tr>
<th>AIRFRAME MASS (kg)</th>
<th>75</th>
<th>85</th>
<th>95</th>
<th>105</th>
<th>115</th>
</tr>
</thead>
<tbody>
<tr>
<td>390</td>
<td>full</td>
<td>full</td>
<td>full</td>
<td>full</td>
<td>full</td>
</tr>
<tr>
<td>400</td>
<td>full</td>
<td>full</td>
<td>full</td>
<td>full</td>
<td>full</td>
</tr>
<tr>
<td>410</td>
<td>full</td>
<td>full</td>
<td>full</td>
<td>full</td>
<td>225°</td>
</tr>
<tr>
<td>420</td>
<td>full</td>
<td>full</td>
<td>full</td>
<td>225°</td>
<td>215°</td>
</tr>
<tr>
<td>430</td>
<td>full</td>
<td>full</td>
<td>225°</td>
<td>215°</td>
<td>*</td>
</tr>
</tbody>
</table>

DATE: 15.03.85
AUTHOR: Waibel
LBA - APPROVAL: only for TN. No. 3
DATE: 01.04.85
Horizontal tailplane
Span 3.125 m
Area 1.27 m²
Aspect ratio 7.69
Section Wortmann FX 71-L-150/30
12 % thickness

Elevator
Area 0.381 m²
Control surface chord ratio 30 %

Airbrakes
Schempp-Hirth, top surface only
Length 1.20 m
Area (both) 0.336 m²
Height 0.15 m

Weights
Empty weight approx. 410 kg
Useful load 125 kg
Weight of non-lifting structural parts max. 275 kg
Max. flying weights, 24 m 650 kg
22 m 750 kg
Wing loadings, 24 m 31.6 +42.0 kg/m²
22 m 32.0 +50.3 kg/m²

II. DESCRIPTION OF SYSTEMS

II.1. ASW 22 glider
Midwing, single-seat glider, featuring camber-changing flaps, T-tailplane, retractable landing gear and water ballast system. The wingspan can be increased by means of two
value for non-lifting structural parts is 275 kg, a payload of up to 115 kg was permitted in the pilot’s seat.
The alterations to the equipment raise the mass of the non-lifting structural parts by \(m_{02} + m_{12} - m_{11} = 5.5 + 0.8 - 0.3 = 6.0\) kg to \(m_{\text{ltr}} = 156\) kg.
The new maximum payload in the seat now amounts to 275 - 156 = 119 kg.
The C.G. position alters as follows:

\[
X_{L\text{new}} = \frac{(m_L \cdot X_L)\text{old} + (m_{12} - m_{11}) \cdot X_1 + m_{02} \cdot X_0}{m_{L\text{new}}}
\]

\[
m_{L\text{new}} = m_{L\text{old}} + m_{12} - m_{11} + m_{02}
\]

\[
= 509 + 0.8 - 0.3 + 5.5 = 515\text{ kg}.
\]

\[
X_{L\text{new}} = \frac{508 \cdot 598 - (0.8 - 0.3) \cdot 1450 + 5.5 \cdot 300}{515}
\]

\[
= 391.66 \approx 592\text{ mm}.
\]

Reading off the graph Fig. 3.2.-1, you will see that the minimum payload in the pilot’s seat is now 75 kg.
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 company).

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

a) An ASW 22 with an empty mass of \(m_L = 408\) kg and an empty mass C.G. position \(X_L = 598\) mm is to be flown by a pilot of 90 kg weight (including parachute). He takes 2 kg of rations with him in the cockpit, plus 4 kg of baggage (barograph, restraining straps, canopy cover, rainwear etc.) in the baggage compartment.
What will the in flight C.G. position be?