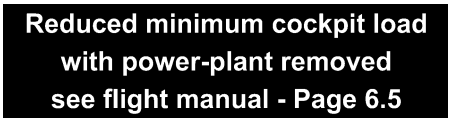

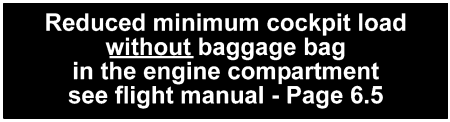

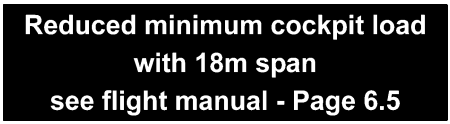

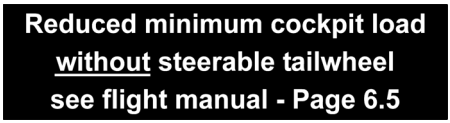

Reduced minimum cockpit load by fitting removable trim ballast in front of the pedal assembly: see Section 7.13

The baggage compartment load must not exceed 15 kg = 33 lb

As the steerable tailwheel is installed so far behind the C.G. it must be observed in any case for C.G. determination when installed!
An additional placard must be affixed in the cockpit:

Reduced minimum cockpit load
without steerable tailwheel
see flight manual - Page 6.5

See also Section 7.13.

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procedure cannot be accomplished with the control springs hooked in, they may be unhooked at the wheel fork of the steerable tail wheel.

Finally the fairing has to be installed. Therefore the wheel has to be disassembled from the wheel fork to plus the fairing from the bottom on. The fairing is clicked in the axle bolt hollow on the fuselage and taped all-round. The wheel has to be reassembled afterwards.

When the steerable tailwheel is installed in the rear of the engine compartment, the minimum seat load may be higher than 70 kg or 154 lbs (including the parachute). The necessarily **increased** minimum load will then be indicated on the **Data and Loading Placard** in the cockpit.
The possible **reduced** minimum cockpit load **without** steerable tailwheel installed is given **only** in the **Mass and Balance Form** in Section 6.2.

If the steerable tail wheel is dismantled in order to fly again with the standard tail wheel, the connecting unit for the control springs at the rudder must also be removed!

If rubber skids are fitted at the wing tips these must be removed (two hexagonal socket head screws A/F 5 respectively) and replaced by the wing tip wheels. Pay attention to the correct mounting (left and right wheels are different).

NOTE: *The original screws only must be used otherwise damage to the wing skin cannot be excluded.*

Fig. 7.6-1 Exemplary Cockpit View

For safety reasons - if the baggage bag is installed - only a maximum load of 2 kg (4.4 lb) is allowed, the **Data and Loading Placard in the cockpit** has to show the higher minimum load due to the 2 kg (4.4 lb) of baggage.

If the steerable tailwheel is installed, the **Data and Loading Placard in the cockpit** has to show the higher minimum load due to the steerable tailwheel.

A placard affixed near the **Data and Loading Placard** in the cockpit had to point to the **flight manual section 6.2**. Here a lower minimum cockpit load **without** trim ballast in the fin, baggage bag or steerable tailwheel is registered.

EXAMPLES for using the Diagram of Empty Mass and Mass and Balance Form:

The following examples are supposed to supply information to inspector's how to fill in a Mass and Balance Form.
Examples of in-flight C.G. calculations for pilots are given in section 6.8.

(1) A weighing with 21 m (68.9 ft) according to Section 6.2 resulted in following values:

m_E	=	445kg	(981 lb)	(Empty Mass)
x_E	=	525mm	(20.67 inch)	(Empty Mass C.G. position)
m_{nlp}	=	235kg	(518 lb)	(Mass of non-lifting parts, without useful load as given in section 6.2)

By use of Fig. 6.4-1 it is found that:

The measured point $\mathbf{P_1}$ is below the line with 70 kg (154 lb) minimum cockpit load in the seat and over the line of the maximum cockpit load of 120 kg (265 lb).

365kg - 235kg = 130kg (805 lb - 518 lb = 287 lb)

The aircraft is within the required limits and may therefore be flown by a pilot weighing from 70kg (154 lb) to 120kg (265 lb) (including parachute).

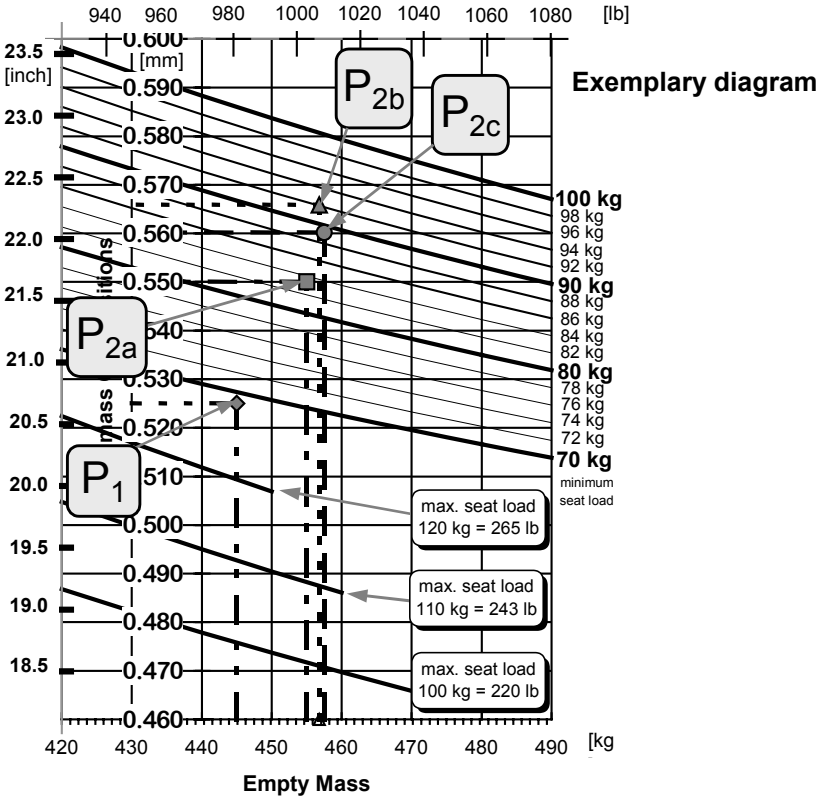
The amount of water ballast which is allowed with both wing span versions may be derived from the tables given in section 6.3 in the **flight manual**.

(2a) A second weighing with 21 m (68.9 ft) resulted in following values:

m_E	=	455kg	1003 lb	(Empty Mass)
x_E	=	550mm	21.65 inch	(Empty Mass C.G. position)
m_{npl}	=	245kg	540 lb	(Mass of non-lifting parts, without useful load as given in section 6.2)

By use of Fig. 6.4-1 follows:

The point P_{2a} is now above the line of 70kg (154 lb), but below the line of 84kg (185 lb). The minimum cockpit load now would be 83kg.
In order to stay within the Airworthiness Requirements limits, either a fixed trim ballast mass may be fitted in the fuselage nose, or the **Data and Loading Placard** in the cockpit and the Mass and Balance Form in section 6.2 of the flight manual has to show a minimum cockpit load of 83kg (183 lb) (pilot including parachute).



x_E	(mm)	Empty mass C.G. position
m_E	(kg)	Empty mass
x_P	(mm)	Pilot mass arm
m_P	(kg)	Mass of pilot including parachute
x_W	(mm)	Distance of water ballast from datum point
m_W	(kg)	Mass water ballast (1 litre = 1kg or 2.2 lb)
x_{O2}	(mm)	Distance of oxygen bottle from datum point in standard fitting location
m_{O2}	(kg)	Mass of oxygen bottle
x_G	(mm)	Distance of baggage compartment
m_G	(kg)	Mass of baggage in baggage compartment
x_K	(m)	Mean mass arm of fuel in the fuselage tank
m_K	(kg)	Mass of fuel load (1 litre = 0.73 kg or 1.6 lb)
x_{GS}	(m)	Distance of baggage bag behind engine compartment from datum point
m_{GS}	(kg)	Mass of the baggage bag
x_I	(m)	Instrument mass arm in instrument panel
m_I	(kg)	Mass of instruments in instrument panel
x_{Tv}	(m)	Trim weights mass arm in front of pedals
x_{Th}	(m)	Trim weights mass arm in fin
x_{PPe}	(m)	Distance propeller extended
x_{PPr}	(m)	Distance propeller retracted
m_{PP}	(kg)	Mass of power-plant with propeller, coolant and engine oil
x_{MB}	(m)	Distance from datum of engine battery in the box in front of control stick (2 positions are listed as the battery may be located at the very front or very end inside the box).
m_{MB}	(kg)	Mass of engine battery in the box in front of control stick
x_T	(mm)	Trim weights in front of pedals
m_T	(kg)	Mass of trim weights in front of pedals
x_{st}	(m)	Distance of steerable tailwheel from datum point
m_{st1}	(kg)	Mass of steerable tailwheel original version
m_{st2}	(kg)	Mass of steerable tailwheel TM 2

Table of established Arms and Masses:

Designation	Dimension	Value	Remark
x_W	Meter inch	+0,201 +7.91	Water ballast distance from datum
x_{O2}	Meter inch	+0,280 + 11.02	In factory-standard fitting location
x_G	Meter inch	+0,160 + 6.30	Baggage in baggage compartment top, front of spar
x_K	Meter inch	+0,304 +11.97	Mean mass arm of fuel in the fuselage tank
x_{GS}	Meter inch	+2,410 + 94.88	Baggage bag behind engine compartment
x_I	Meter inch	-1,120 -44.09	Instrument mass arm in instrument panel
x_{Tv}	Meter inch	-1,800 -70.87	Trim weights in front of pedals
x_{Th}	Meter inch	+4.581 +180.35	Trim ballast** in fin
x_{PPr}	Meter inch	+ 1,026 + 40.39	Propeller retracted
x_{PPe}	Meter inch	+ 0,919 + 36.18	Propeller extended
m_{PPa}	kg lb	66,0* 145.5	Power-plant with propeller
x_{MBv}	Meter inch	- 1,150 - 45.28	in front of the box

Designation	Dimension	Value	Remark
x_{MBh}	Meter inch	- 0,990 - 38.98	In the back of the box
m_{MB}	kg lb	6,23 13.7	Engine battery or avionic battery in front of control stick
x_{st}	Meter inch	+ 4,688 + 184.57	distance for both versions of the steerable tailwheel
m_{st1}	kg lb	1,2 2,6	steerable tailwheel original version
m_{st2}	kg lb	1,8 4,0	steerable tailwheel TM 2

* The exact mass of the battery (see section 2.8), of the trim ballast or the power-plant has to be weighed!

** The maximum permissible mass of **6 kg (13.23 lb)** for trim ballast in the fin must not be exceeded!

EXAMPLES for the calculation of the in-flight C.G. position:

1. For the following examples the results of this **Empty Mass C.G. weighing** are applied:

$$x_E = \frac{m_2 * b}{m_E} - a$$

m_E = 439kg from weighing of all components (**18m!**) (59.1 ft!)
m_2 = 61.7kg
b = 4659mm
a = 57mm
For weighing the sailplane was levelled correctly.

$$x_E = \frac{61.7kg * 4659mm}{439kg} - 57mm$$

x_E = 598 mm (23.54 inch) aft of datum

It may not be calculated in different measurements. In one formula only use either metrical dimensions [mm/m] or American dimensions [inch]. If applicable convert at the end of the calculation.

2. Example of changes to **empty mass** and **empty mass C.G.:**

In the ASH 31 Mi in example 1 with the weighing results m_E = 439 kg (968 lb) and x_E = 598 mm (23.5 in) a pneumatic variometer (m_{I1} = 0.3 kg / 0.66 lb) is exchanged for an electronic variometer (m_{I2} = 1.3kg / 2.86 lb); the capacities will not be changed.

How do the data of this ASH 31 Mi change?

Prior to the exchange of the varios the mass of the non-lifting parts was m_{nlp} = 240 kg (529 lb). The maximum mass of the non-lifting parts being $m_{nlp\ MAX}$ = 365 kg (805 lb), the aircraft could be loaded in the fuselage with 125 kg (276 lb).
Due to of the exchange of the instruments the mass of the non-lifting parts increases by (without useful load, see section 6.2):

$m_{I2} - m_{I1}$ = 1.3 - 0.3 = 1.0 kg to m_{nlp} = <u>241 kg</u> (531.3 lb).

The new maximum load in the fuselage is now
125 kg - 1.0 kg = <u>124 kg</u> (273.4 lb).

The C.G. changes accordingly:

$$m_{Enew} = m_{Eold} + m_{I2} - m_{I1}$$

$$m_{Enew} = 439 + 1.3 - 0.3 = \underline{440\ kg} \quad (970.0\ lb)$$

$$x_{Enew} = \frac{(m_E * x_E)_{alt} + (m_{I2} - m_{I1}) * x_I}{m_{Enew}}$$

$$x_{Enew} = \frac{439\ kg * 598\ mm + 1.0\ kg * (-1120\ mm)}{440\ kg}$$

$$x_{Enew} = \underline{594\ mm} \quad (23.38\ inch)$$

It may not be calculated in different measurements. In one formula only use either metrical dimensions [mm/m] or American dimensions [inch]. If applicable convert at the end of the calculation.

24a

Reduced minimum cockpit load
<u>without</u> steerable tailwheel
see flight manual - Page 6.5

This placard is affixed, if applicable, right beside the Data and Loading placard (20)

25

Prior to take-off check the weight of the trim plates and their secure fixing

Only fitted, when the mounting support for trim weights has been installed

26

One trim plate equals a pilot mass of 3.0 kg (6.6 lbs)

Only fitted, when the mounting support for trim weights has been installed

27

Maximum loading of
2 kg (4.4 lbs)
must not be exceeded!

This placard is affixed on the mounting support of the luggage bag

28

Baggage compartment load **max. 15 kg (33 lbs)**

This placard is affixed between the shoulder strap fittings

29

30

V_{NE} Speed Limit for high altitude	
Altitude msl [m]	V_{max} IAS [km/h]
0 - 3500	270
< 5000	259
< 7000	231
< 9000	206
< 11000	182
< 13000	159

ASH 31 Mi

V_{NE} Speed Limit for high altitude	
Altitude msl [ft]	V_{max} IAS [mph]
0 - 11500	168
< 16000	162
< 23000	144
< 30000	127
< 36000	113
< 43000	98

ASH 31 Mi

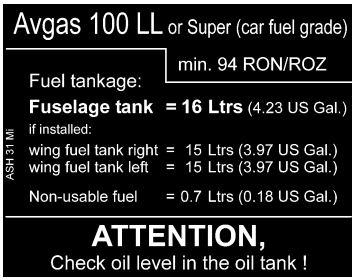
V_{NE} Speed Limit for high altitude	
Altitude msl [ft]	V_{max} IAS [kts]
0 - 11500	146
< 16000	141
< 23000	125
< 30000	110
< 36000	98
< 43000	85

ASH 31 Mi

The appropriate of these placards is affixed close to the air-speed indicator

Placards regarding the Power-plant:

31



With a permanently installed fuel filling equipment, this placard is affixed right beside the refuelling coupling in the rear engine compartment.

When equipped with an external fuel filling equipment, this placard is affixed on the front cross tube next to the filling hose.

32 **Fire**

This placard is affixed right beside the red flashing diode in the instrument panel.

33 **Engine Master Switch**

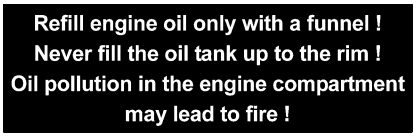
This placard is affixed right beside the Circuit Breaker in the instrument panel.

34 **Fuel shut-off valve** **shut** **open**

35

This placard is affixed on the right wall of the engine compartment near the oil tank.

36



This placard is affixed on the right wall of the engine compartment right beside the “Oil Placard” (35)