

## NOTE

Refer to Section 1.6 UNITS OF MEASUREMENT for conversion of SI units to US units and vice versa.

## 6.2 DATUM PLANE

The Datum Plane (DP) is a plane which is normal to the airplane's longitudinal axis and in front of the airplane as seen from the direction of flight. The airplane's longitudinal axis is parallel with the upper surface of a 600:31 wedge which is placed on top of the rear fuselage in front of the vertical stabilizer. When the upper surface of the wedge is aligned horizontally, the Datum Plane is vertical. The Datum Plane is located 2.194 meters (86.38 in) forward of the most forward point of the root rib on the stub wing.

## 6.3 MASS AND BALANCE REPORT

The empty mass and the corresponding CG position established before delivery are the first entries in the Mass and Balance Report. Every change in permanently installed equipment, and every repair to the airplane which affects the empty mass or the empty mass CG must be recorded in the Mass and Balance Report.

For the calculation of flight mass and corresponding CG position (or moment), the *current* empty mass and the corresponding CG position (or moment) in accordance with the Mass and Balance Report must always be used.

Condition of the airplane for establishing the empty mass:

- Equipment as per Equipment Inventory (see Section 6.5)
- Including brake fluid, lubricant (6.0 liters = 6.3 qts), coolant (6.0 liters = 6.3 qts), gearbox oil (0.9 liters = 0.95 qts), plus unusable fuel (2 US gal = approx. 7.6 liters).

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## 6.4 FLIGHT MASS AND CENTER OF GRAVITY

The following information enables you to operate your DA 40 D within the permissible mass and balance limits. For the calculation of the flight mass and the corresponding CG position the following tables and diagrams are required:

- 6.4.1 - MOMENT ARMS
- 6.4.2 - LOADING DIAGRAM
- 6.4.3 - CALCULATION OF LOADING CONDITION
- 6.4.4 - PERMISSIBLE CENTER OF GRAVITY RANGE
- 6.4.5 - PERMISSIBLE MOMENT RANGE

The diagrams should be used as follows:

1. Take the empty mass and the empty mass moment of your airplane from the Mass and Balance Report, and enter the figures in the appropriate boxes under the column marked 'Your DA 40 D' in Table 6.4.3 - CALCULATION OF LOADING CONDITION.
2. Read the fuel quantity indicators to determine the fuel quantity. If an indicator shows 15 US gal, up to 19.5 US gal can be in the Long Range Tank. In this case, the exact quantity must be determined with the alternate mean for fuel quantity indication.
3. Multiply the individual masses by the moment arms quoted to obtain the moment for every item of loading and enter these moments in the appropriate boxes in Table 6.4.3 - CALCULATION OF LOADING CONDITION.
4. Add up the masses and moments in the respective columns. The total moments may be rounded to whole numbers. The CG position is calculated by dividing the total moment by the total mass (using row 5 for the condition with empty fuel tanks, and row 7 for the pre take-off condition). The resulting CG position must be inside the limits.

As an illustration the total mass and the CG position are entered on Diagram 6.4.4 - PERMISSIBLE CENTER OF GRAVITY RANGE. This checks graphically that the current configuration of the airplane is within the permissible range.

