

## SECTION 3 WEIGHT & BALANCE

### 3 Introduction

This section describes the procedure for establishing the basic empty weight and moment of the aircraft. Loading procedure information is also provided.

#### 3.1 Aircraft weighing procedures

##### 3.1.1 Preparation

- Carry out weighing procedure inside closed hangar
- Remove from cabin any objects left unintentionally
- Insure Flight Manual is on board
- Align nose wheel
- Drain fuel via the specific drain valve
- Oil, hydraulic fluid and coolant to operating levels
- Move sliding seats to most forward position
- Raise flaps to fully retracted position (0°)
- Place control surfaces in neutral position
- Place scales (min. capacity 200 kg/440 pounds) under each wheel
- Level the aircraft using baggage floor as datum
- Center bubble on level by deflating nose tire
- Record weight shown on each scale
- Repeat weighing procedure three times

##### 3.1.2 Calculate empty weight Weighing

- Record weight shown on each scale
- Repeat weighing procedure three times
- Calculate empty weight

##### 3.1.3 Determination of C.G. location

- Drop a plumb bob tangent to the leading edge (approximately one meter from wing root) and trace reference mark on the floor.
- Repeat operation for other half-wing.
- Stretch a taught line between the two marks
- Measure the distance between the reference line and main wheel axis
- Using recorded data it is possible to determine the aircraft's C.G. location and moment (see following table)



# AVIATION

MOBILE REPAIRS, INSPECTIONS AND MAINTENANCE

Date	08/18/2020
Tail Number	N363X
Make	Tecnam
Model	P2008
SN	070
Aft CG Limit	77.87
Fwd CG Limit	72.48

Gross Weight	1320
Empty Weight	827.20
Usefull Load	492.80

EWCG	73.08
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Weighing Point	Scale Reading	Tare	Net Weight	Arm	Moment
Right Side	327.00		327.00	88.00	28,776.00
Left Side	328.00		328.00	88.50	29,028.00
Nose/Tail	172.20		172.20	15.40	2,651.88
			827.20	73.08	60,455.88

Kevin Kane

Name

Signature

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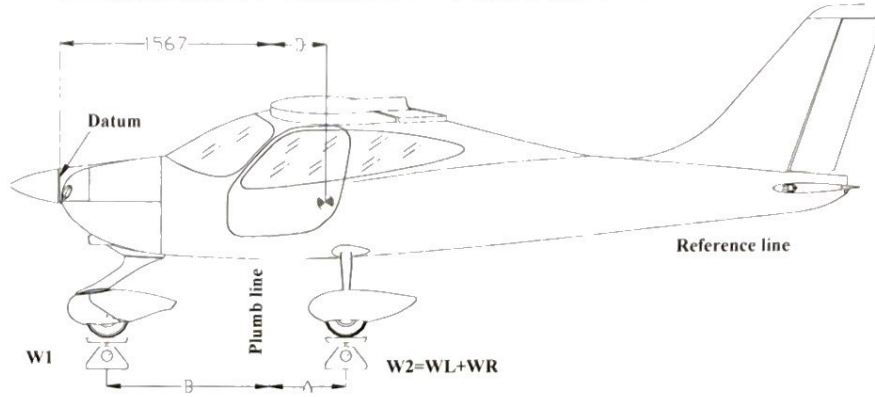
Certification #

8/18/2020

Date

## 3.2 Weighing report

Model P2008is **N363X** S/N **070** Date **08/18/2020**



Datum: Propeller support flange w/o spacer. - Equipment list, date: \_\_\_\_\_

	Lbs		Inches
Nose wheel weight	$W_1 = 172.2$	Plumb bob distance LH wheel	$A_L = 88.0$
LH wheel weight	$W_L = 327$	Plumb bob distance RH wheel	$A_R = 88.5$
RH wheel weight	$W_R = 328$	Average distance $(A_L + A_R)/2$	$A = 88.25$
$W_2 = W_L + W_R$		Bob distance from nose wheel	$B = 88.25$

Empty weight <sup>(1)</sup>  $W_e = W_1 + W_2 = 827.2$

$$D = \frac{W_2 \cdot A - W_1 \cdot B}{W_e} = m \quad \mathbf{73.08 \text{ in}} \quad D\% = \frac{D}{1.373} \cdot 100 =$$

Empty weight moment:  $M = [(D + 1.567) \cdot W_e] = Kg \cdot m \quad \mathbf{60455.88}$

Maximum takeoff weight	$W_T = 1320$
Empty weight	$W_e = 827.2$
Maximum payload $W_T - W_e$	$W_u = 492.8$

See aircraft weight and balance report, weighed 8/18/2020

1 - Including unusable fuel

NOTE: The distances A and B vary from the aircraft with pivoting NLG configuration and the aircraft with steerable NLG. This weighing report remains valid.

### 3.2.1 Center of Gravity Limits

Forward limit	20% MAC for all weights
Aft limit	33% MAC for all weights
Datum	Propeller support flange w/o spacer
Bubble Level	Cabin floor

### 3.2.2 Distances from the datum

The mean distances of the occupants, baggage and fuel from the datum are:

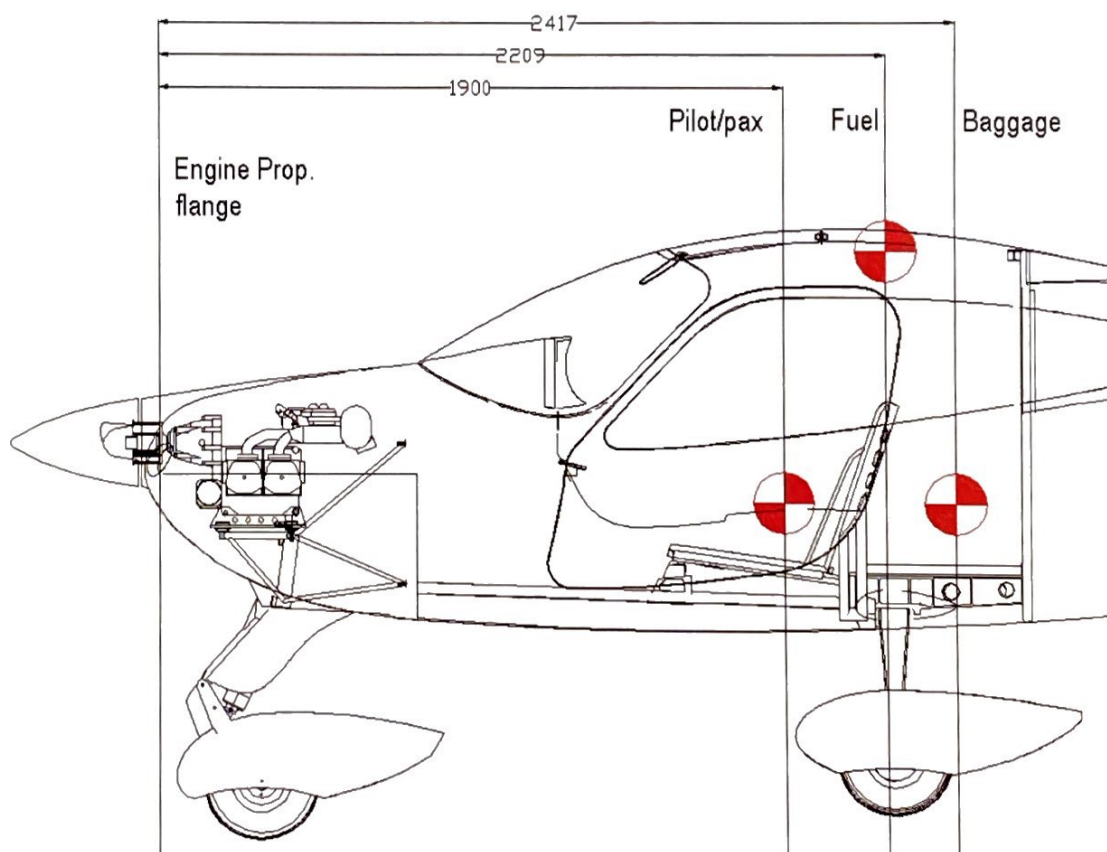


Figure 3-1



### 3.3 Weight and Balance

In order to compute the weight and balance of this aircraft, we have provided the following loading charts. This will reduce the amount of math you need. To compute weight and balance use the formula:

$$\text{Weight} * \text{Arm} = \text{Moment.}$$

Pilot & Passenger				Fuel			Baggage	
Weight (lbs)	Moment (lbs x in)	Weight (lbs)	Moment (lbs x in)	Gallons	Weight (lbs)	Moment	Weight (lbs)	Moment (lbs x in)
10	748	260	19448	1	6,26	544	5	476
20	1496	270	20196	2	12,52	1089	10	952
30	2244	280	20944	3	18,78	1633	15	1427
40	2992	290	21692	4	25,04	2178	20	1903
50	3740	300	22440	5	31,3	2722	25	2379
60	4488	310	23188	6	37,56	3267	30	2855
70	5236	320	23936	7	43,82	3811	35	3331
80	5984	330	24684	8	50,08	4355	40	3806
90	6732	340	25432	9	56,34	4900	44	4187
100	7480	350	26180	10	62,6	5444		
110	8228	360	26928	11	68,86	5989		
120	8976	370	27676	12	75,12	6533		
130	9724	380	28424	13	81,38	7078		
140	10472	390	29172	14	87,64	7622		
150	11220	400	29920	15	93,9	8166		
160	11968	410	30668	16	100,16	8711		
170	12716	420	31416	17	106,42	9255		
180	13464	430	32164	18	112,68	9800		
190	14212	440	32912	19	118,94	10344		
200	14960	450	33660	20	125,2	10889		
210	15708	460	34408	21	131,46	11433		
220	16456	470	35156	22	137,72	11978		
230	17204	480	35904	23	143,98	12522		
240	17952	490	36652	24	150,24	13066		
250	18700	500	37400	25	156,5	13611		
				26	162,76	14155		

	Meter	Inches
PAX	1.900	74,80
FUEL	2.209	86,97
BAGGAGE	2.417	95,16

To compute weight and balance:

1. Get moments from loading charts
2. Obtain the empty weight and moment from the most recent weight and balance
3. Insert the weights and the moments for fuel, occupants and baggage from the previous chart
4. Total the weight and the moment columns
5. Divide the total moment by the total weight to get the arm
6. Check that the total weight does not exceed maximum gross weight of 1320 pounds
7. Check that the arm falls within the C.G. range

CoG Position Computation Chart			
	Weight (lbs)	Arm (inches)*	Moment
Empty Weight	827.2	73.08	60455.88
Fuel		86.97	
Pilot & Passenger		74.80	
Baggage		95.16	
Total <b>MOMENT</b>			
Total <b>WEIGHT</b>			
Distance "D"= <b>MOMENT/WEIGHT</b>			

\*ADD to the distance "D" the value 1567mm (62in)

<b>C.G.Range</b>		
Meters		
Inches	72.48	78.87
<b>Max Weight</b>	<b>Pounds</b>	<b>Kilograms</b>
	1320.00	600.00

Example Problem			
	Weight (lbs)	Arm (inches)	Moment
Empty Weight	827.2	73.08	60455.88
Fuel 16 gallons	96.32	86.97	8376.95
Pilot & Passenger	350	74.80	26120
Baggage	20	95.16	1903.20
Totals	1293.52	74.88	96856.03

In this example, the gross weight is under the max gross weight of 1320 pounds and the Arm or C.G. is within the C.G. range listed above.

### 3.3.1 Loading

Baggage compartment is designed for a maximum load of 44 pounds. Baggage size shall prevent excessive loading of utility shelf (maximum pressure 12.5 kg/dm<sup>2</sup>). Maximum baggage size is: 80x45x32 cm . Baggage shall be secured using a tie-down net to prevent any baggage movement during maneuvers.