

# Airborne Elite, LLC

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## Bristell LSA Loading Procedure

### Summary

The Bristell LSA aircraft is sensitive to proper balance. Burning fuel in flight shifts the CG aft and can cause the aircraft to be out of balance for landing. Care should be taken to properly calculate the landing CG. Precise fuel sensors in the tanks can assist you with safe loading.

Proper loading procedure can be summarized as follows:

1. Load as much fuel as possible within the allowable maximum gross weight of 1320 lbs.
2. Calculate minimum fuel for landing and start preparing for landing when the fuel supply approaches that limit.

### Detailed Procedure

Open your event in Holdshort Day view. Click on the link Manage Passengers / Weight and Balance. Enter the weights of the pilot, passenger (instructor) and baggage and press Save. Place items that are not required in flight in the wing lockers. Maximum weight for each locker is 44 lbs. Confirm that the fuel amount is set to 0.

Make a note of the airplane Ramp weight without fuel.

In the following example, The weight of the pilot is 212 lbs, and the instructor weight is 165 lbs. The weight of the airplane without fuel is 1,166.20 lbs.

Regular Event / Manage passengers & Weight and Balance Day View

Crew:

	Weight (lbs)	Arm (in)	Moment (lbs x in)
Basic Empty Weight	789.20	31.42	24,796.664
Crew	377.00	45.50	17,153.50
Baggage - Behind Seats (max. 33 lbs.)	0.00	71.10	0.00
Baggage - Wing Lockers (max 44 lbs each, 88 lbs total)	0.00	40.80	0.00
Fuel Load	0 gal		
Fuel Weight	0.00	23.90	0.00
Ramp Weight & CG	1,166.20	35.97	41,950.16
Taxi & Run-up Fuel Burn	0	23.90	0.00
Takeoff Weight & CG	1,166.20	35.97	41,950.16
Duration of Flight	2.500000	-	-
Fuel Burn in Flight	-60.00	23.90	-1,434.00
Landing Weight & CG	1,106.20	36.63	40,516.16

Time % Lbs Gal

Min Fuel	3.00	37.85	72.00	12.00
Fuel At Take-Off	0.00	0.00	0.00	0.00
Fuel At Landing	-2.50	-31.55	-60.00	-10.00
Max Fuel	0.00	0.00	0.00	0.00
Fuel Reserve (Min)	0.50	6.31	12.00	2.00

Center of Gravity Limits Graph

Recalculate

- Ramp CG out of limits
- Takeoff CG out of limits
- Landing CG out of limits
- Maximum fuel load is below minimum required

Close Print Load Manifest Save

Calculate the weight available for fuel by subtracting the airplane weight from 1320:  
 $1320 - 1,166.20 = 153.8 \text{ lbs}$

Divide that weight by fuel density of 6 lbs/gal and round down to the gallons:

$153.8 / 6 = 25.63 \text{ gal.}$  -> round down to 25 gal

If the fuel amount is greater than the total fuel capacity of 31.70 gal, use 31.70 gal for subsequent calculations.

Enter calculated fuel into Holdshort and press Recalculate. Notice that the landing CG is slightly aft of the aft CG limit:

**Regular Event / Manage passengers & Weight and Balance** Day View

**Crew:**  
 Pilot: 212 lbs  
 Instructor: 105 lbs

**Baggage - Behind Seats (max. 33 lbs.):**  
 Row without seats

**Baggage - Wing Lockers (max 44 lbs each, 88 lbs total):**  
 Row without seats

	Weight (lbs)	Arm (in)	Moment (lbs x in)
Basic Empty Weight	789.20	31.42	24,796.664
Crew	377.00	45.50	17,153.50
Baggage - Behind Seats (max. 33 lbs.)	0.00	71.10	0.00
Baggage - Wing Lockers (max 44 lbs each, 88 lbs total)	0.00	40.80	0.00
Fuel Load	25 gal		
Fuel Weight	150.00	23.90	3,585.00
Ramp Weight & CG	1,316.20	34.60	45,535.16
Taxi & Run-up Fuel Burn	0	23.90	0.00
Takeoff Weight & CG	1,316.20	34.60	45,535.16
Duration of Flight	2.500000	-	-
Fuel Burn in Flight	-80.00	23.90	-1,434.00
Landing Weight & CG	1,256.20	35.11	44,101.16

**Time % Lbs Gal**

Min Fuel	3.00	37.85	72.00	12.00
Fuel At Take-Off	6.25	78.86	150.00	25.00
Fuel At Landing	3.75	47.32	90.00	15.00
Max Fuel	0.00	0.00	0.00	0.00
Fuel Reserve (Min)	0.50	6.31	12.00	2.00

**Recalculate**

✗ Landing CG out of limits  
 ✗ Maximum fuel load is below minimum required

Close Print Load Manifest Save

**Note:** Holdshort prefills the Duration of flight equal to your event duration. However, you are free to change it. The planned fuel burn is set to 4 gal/hr. If you plan to fly at a lower power setting, you would need to perform this procedure manually or use the MS Excel W&B worksheet downloadable from our website <https://flyforreal.com/fleet/>.

Assuming a typical training flight is 1.5 hours, enter the expected duration of flight from takeoff to landing and press Recalculate. The airplane is now within the CG limits for all phases of flight.

Regular Event / Manage passengers & Weight and Balance Day View

**Crew:**

Pilot  
212 lbs

Instructor  
195 lbs

**Baggage - Behind Seats (max. 33 lbs.):**

Row without seats

**Baggage - Wing Lockers (max 44 lbs each, 88 lbs total):**

Row without seats

	Weight (lbs)	Arm (in)	Moment (lbs x in)
Basic Empty Weight	789.20	31.42	24,796.664
Crew	377.00	45.50	17,153.50
Baggage - Behind Seats (max. 33 lbs.)	0.00	71.10	0.00
Baggage - Wing Lockers (max 44 lbs each, 88 lbs total)	0.00	40.80	0.00
Fuel Load	25	gal	
Fuel Weight	150.00	23.90	3,585.00
Ramp Weight & CG	1,316.20	34.60	45,535.16
Taxi & Run-up Fuel Burn	0	23.90	0.00
<b>Takeoff Weight &amp; CG</b>	<b>1,316.20</b>	<b>34.60</b>	<b>45,535.16</b>
Duration of Flight	1.500000		
Fuel Burn in Flight	-36.00	23.90	-860.40
<b>Landing Weight &amp; CG</b>	<b>1,280.20</b>	<b>34.90</b>	<b>44,674.76</b>

Recalculate

	Time	%	Lbs	Gal
Min Fuel	2.00	25.24	48.00	8.00
Fuel At Take-Off	6.25	78.86	150.00	25.00
Fuel At Landing	4.75	59.94	114.00	19.00
Max Fuel	6.41	80.86	153.80	25.63
Fuel Reserve (Min)	0.50	6.31	12.00	2.00

Close
Print Load Manifest
Save

To determine minimum fuel load required for landing, change the duration of flight in desired increments (0.5 hr or 0.25 hr) using bracketing until the plane is out of limits for landing.

Regular Event / Manage passengers & Weight and Balance Day View

**Crew:**

Pilot  
212 lbs

Instructor  
195 lbs

**Baggage - Behind Seats (max. 33 lbs.):**

Row without seats

**Baggage - Wing Lockers (max 44 lbs each, 88 lbs total):**

Row without seats

	Weight (lbs)	Arm (in)	Moment (lbs x in)
Basic Empty Weight	789.20	31.42	24,796.664
Crew	377.00	45.50	17,153.50
Baggage - Behind Seats (max. 33 lbs.)	0.00	71.10	0.00
Baggage - Wing Lockers (max 44 lbs each, 88 lbs total)	0.00	40.80	0.00
Fuel Load	25	gal	
Fuel Weight	150.00	23.90	3,585.00
Ramp Weight & CG	1,316.20	34.60	45,535.16
Taxi & Run-up Fuel Burn	0	23.90	0.00
<b>Takeoff Weight &amp; CG</b>	<b>1,316.20</b>	<b>34.60</b>	<b>45,535.16</b>
Duration of Flight	2.000000		
Fuel Burn in Flight	-48.00	23.90	-1,147.20
<b>Landing Weight &amp; CG</b>	<b>1,268.20</b>	<b>35.00</b>	<b>44,387.96</b>

Recalculate

	Time	%	Lbs	Gal
Min Fuel	2.50	31.55	60.00	10.00
Fuel At Take-Off	6.25	78.86	150.00	25.00
Fuel At Landing	4.25	53.63	102.00	17.00
Max Fuel	6.41	80.86	153.80	25.63
Fuel Reserve (Min)	0.50	6.31	12.00	2.00

Close
Print Load Manifest
Save

Regular Event / Manage passengers & Weight and Balance Day View

**Crew:**

- Pilot: 212 lbs
- Instructor: 185 lbs

**Baggage - Behind Seats (max. 33 lbs.):**

- Row without seats

**Baggage - Wing Lockers (max 44 lbs each, 88 lbs total):**

- Row without seats

	Weight (lbs)	Arm (in)	Moment (lbs x in)
Basic Empty Weight	789.20	31.42	24,796.664
Crew	377.00	45.50	17,153.50
Baggage - Behind Seats (max. 33 lbs.)	0.00	71.10	0.00
Baggage - Wing Lockers (max 44 lbs each, 88 lbs total)	0.00	40.80	0.00
Fuel Load	25 gal		
Fuel Weight	150.00	23.90	3,585.00
Ramp Weight & CG	1,316.20	34.60	45,535.16
Taxi & Run-up Fuel Burn	0	23.90	0.00
Takeoff Weight & CG	1,316.20	34.60	45,535.16
Duration of Flight	2.250000		
Fuel Burn in Flight	-54.00	23.90	-1,290.60
Landing Weight & CG	1,262.20	35.05	44,244.56

Recalculate

✗ Landing CG out of limits  
✗ Maximum fuel load is below minimum required

	Time	%	Lbs	Gal
Min Fuel	2.75	34.70	66.00	11.00
Fuel At Take-Off	6.25	78.86	150.00	25.00
Fuel At Landing	4.00	50.47	96.00	16.00
Max Fuel	0.00	0.00	0.00	0.00
Fuel Reserve (Min)	0.50	6.31	12.00	2.00

Close Print Load Manifest Save

The last longest duration of flight that was still within CG limits is 2 hours. The corresponding landing weight is 1,268.20 lbs. Divide Fuel Burn in Flight by 6 and subtract from the initial fuel load. This is the amount of fuel that must be in the tanks for landing:

$$48 \text{ lbs} / 6 \text{ lbs/gal} = 8 \text{ gal}$$

$$25 \text{ gal} - 8 \text{ gal} = 17 \text{ gal.}$$

When the fuel available as indicated by fuel gauges approaches 17 gal, plan preparing for landing adding a safe margin for delays and maneuvering.

When extensive delays are expected due to ATC delays, traffic saturation, or airport emergency, you will need to plan to land at a different airport for refueling. If unable, do not hesitate to declare Minimum Fuel State with ATC or even emergency.

Landing with an out of balance airplane can result in loss of control upon landing with no altitude for recovery!

If the planned duration of flight of 1.5 hours indicates the plane will be out of limits on the first calculation, keep decreasing the duration of flight until the in-balance conditions are met for all phases of flight. If such condition cannot be achieved, then leave some baggage behind. If unable, you may not fly.