

Introduction

This section describes the procedure for establishing the basic empty weight and moment of the airplane. Sample forms are provided for reference. Procedures for calculating the weight and moment for various operations are also provided. A comprehensive list of all equipment available for this airplane is included at the back of this section.

It should be noted that specific information regarding the weight, arm, moment, and installed equipment for this airplane as delivered from the factory can only be found in the plastic envelope carried in the back of this handbook.

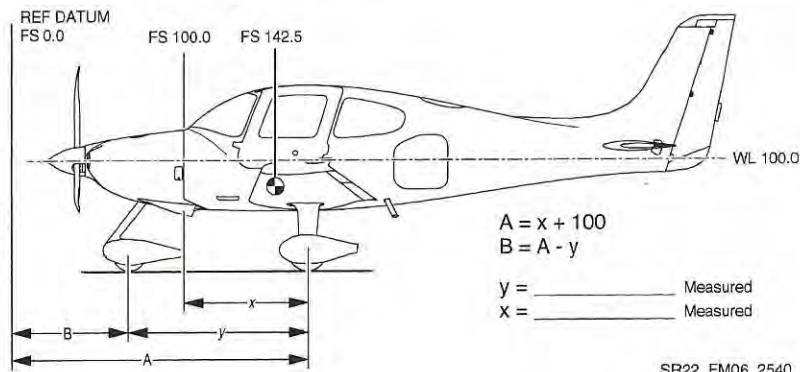
It is the responsibility of the pilot to ensure that the airplane is loaded properly.

Section 6: Weight and Balance Data

Table of Contents

Introduction	3
Airplane Weighing Form	4
Airplane Weighing Procedures	5
Loading Instructions	8
Weight and Balance Loading Form.....	9
Loading Data.....	10
Moment Limits.....	11
Weight & Balance Record.....	12
Equipment List	13

Airplane Weighing Form



Weighing Point	Scale Reading	- Tare	= Net Weight	X Arm	= Moment
L Main				A=	
R Main				A=	
Nose				B=	
Total As Weighed				CG=	
CG = Total Moment / Total Weight <i>Space below provided for additions or subtractions to as weighed condition</i>					
Empty Weight				CG=	
Engine Oil (if oil drained) <i>15 lb at FS 78.4, moment = 1176</i>					
Unusable Fuel					
Basic Empty Weight				CG=	

Figure 6-1

Airplane Weighing Procedures

A basic empty weight and center of gravity were established for this airplane when the airplane was weighed just prior to initial delivery. However, major modifications, loss of records, addition or relocation of equipment, accomplishment of service bulletins, and weight gain over time may require re-weighing to keep the basic empty weight and center of gravity current. All changes to the basic empty weight and center of gravity are the responsibility of the operator.

1. Preparation:
 - a. Inflate tires to recommended operating pressures.
 - b. Service brake reservoir.
 - c. Drain fuel system.
 - d. Drain ice protection system.
 - e. Service engine oil.
 - f. Move crew seats to the most forward position.
 - g. Raise flaps to the fully retracted position.
 - h. Place all control surfaces in neutral position.
 - i. Verify equipment installation and location against equipment list.
2. Leveling:
 - a. Level longitudinally with a spirit level placed on the pilot door sill and laterally with of a spirit level placed across the door sills. Alternately, level airplane by sighting the forward and aft tool holes along waterline 95.9.
 - b. Place scales under each wheel (minimum scale capacity, 500 pounds nose, 1000 pounds each main).
 - c. Deflate the nose tire and/or shim underneath scales as required to properly center the bubble in the level.
3. Weighing:
 - a. With the airplane level, doors closed, and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.
4. Measuring:
 - a. Obtain measurement 'x' by measuring horizontally along the airplane center line (BL 0) from a line stretched between the

main wheel centers to a plumb bob dropped from the forward side of the firewall (FS 100). Add 100 to this measurement to obtain left and right weighing point arm (dimension 'A'). Typically, dimension 'A' will be in the neighborhood of 157.5.

- b. Obtain measurement 'y' by measuring horizontally and parallel to the airplane centerline (BL 0), from center of nosewheel axle, left side, to a plumb bob dropped from the line stretched between the main wheel centers. Repeat on right side and average the measurements. Subtract this measurement from dimension 'A' to obtain the nosewheel weighing point arm (dimension 'B').

5. Determine and record the moment for each of the main and nose gear weighing points using the following formula:

$$\text{Moment} = \text{Net Weight} \times \text{Arm}$$

6. Calculate and record the as-weighed weight and moment by totaling the appropriate columns.

7. Determine and record the as-weighed CG in inches aft of datum using the following formula:

$$\text{CG} = \text{Total Moment} / \text{Total Weight}$$

8. Add or subtract any items not included in the as-weighed condition to determine the empty condition. Application of the above CG formula will determine the C.G for this condition.

9. Add the correction for engine oil (15 lb at FS 78.4), if the airplane was weighed with oil drained. Add the correction for unusable fuel (15.0 lb at FS 154.9) to determine the Basic Empty Weight and Moment. Calculate and record the Basic Empty Weight CG by applying the above CG formula.

10. Record the new weight and CG values on the Weight and Balance Record.

The above procedure determines the airplane Basic Empty Weight, moment, and center of gravity in inches aft of datum. CG can also be expressed in terms of its location as a percentage of the airplane Mean Aerodynamic Cord (MAC) using the following formula:

$$\text{CG\% MAC} = 100 \times (\text{CG Inches} - \text{LEMAC}) / \text{MAC}$$

Where:

$$\text{LEMAC} = 133.1$$

$$\text{MAC} = 47.7$$

Airplane Leveling

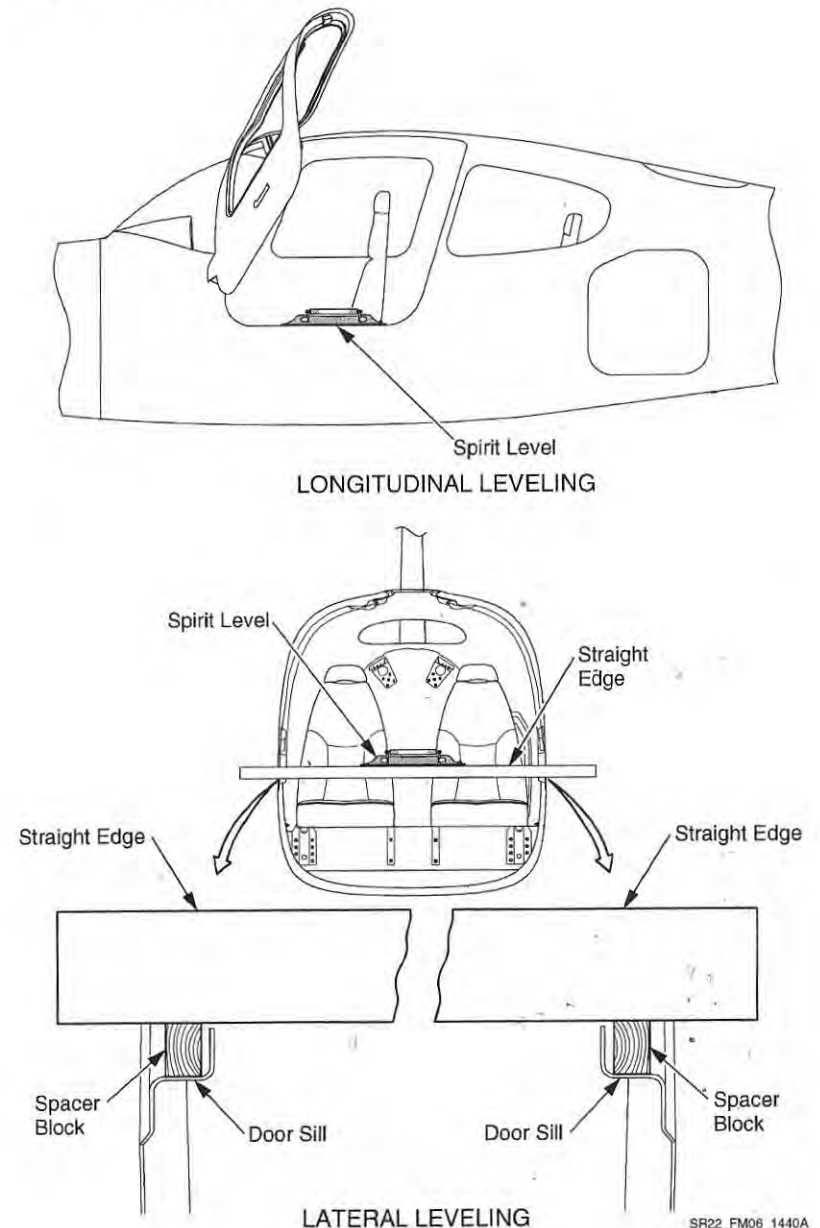


Figure 6-2

Loading Instructions

It is the responsibility of the pilot to ensure that the airplane is properly loaded and operated within the prescribed weight and center of gravity limits. The following information enables the pilot to calculate the total weight and moment for the loading. The calculated moment is then compared to the Moment Limits chart or table (Figure 6-5) for a determination of proper loading.

Airplane loading determinations are calculated using the Weight & Balance Loading Form (Figure 6-3), the Loading Data chart and table (Figure 6-4), and the Moment Limits chart and table (Figure 6-5).

1. **Basic Empty Weight** – Enter the current Basic Empty Weight and Moment from the Weight & Balance Record (Figure 6-6).
2. **Front Seat Occupants** – Enter the total weight and moment/1000 for the front seat occupants from the Loading Data (Figure 6-4).
3. **Rear Seat Occupants** – Enter the total weight and moment/1000 for the rear seat occupants from the Loading Data (Figure 6-4).
4. **Baggage** – Enter weight and moment for the baggage from the Loading Data (Figure 6-4).
 - If desired, subtotal the weights and moment/1000 from steps 1 through 4. This is the *Zero Fuel Condition*. It includes all useful load items excluding fuel.
5. **Fuel Loading** – Enter the weight and moment of usable fuel loaded on the airplane from the Loading Data (Figure 6-4).
 - Subtotal the weight and moment/1000. This is the *Ramp Condition* or the weight and moment of the aircraft before taxi.
6. **Fuel for start, taxi, and run-up** – This value is pre-entered on the form. Normally, fuel used for start, taxi, and run-up is approximately 9 pounds at an average moment/1000 of 1.394.
7. **Takeoff Condition** – Subtract the weight and moment/1000 for step 8 (start, taxi, and run-up) from the Ramp Condition values (step 7) to determine the Takeoff Condition weight and moment/1000.
 - The total weight at takeoff must not exceed the maximum weight limit of 3600 pounds. The total moment/1000 must not be above the maximum or below the minimum moment/1000 for the Takeoff Condition Weight as determined from the Moment Limits chart or table (Figure 6-5).

Weight and Balance Loading Form

• Note •

The Takeoff Condition Weight must not exceed 3600 lb.

The Takeoff Condition Moment must be within the Minimum Moment to Maximum Moment range at the Takeoff Condition Weight. (Refer to *Moment Limits*).

Serial Num: _____ Date: _____

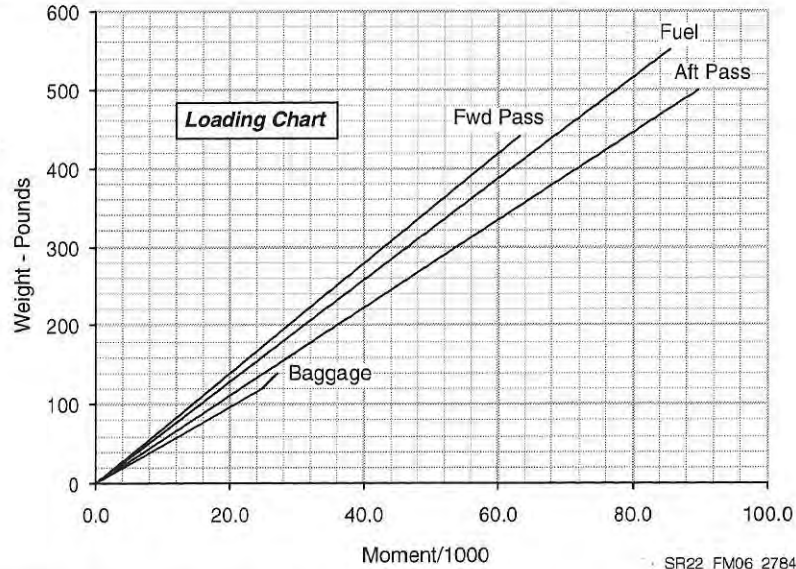
Reg. Num: _____ Initials: _____

Item	Description	Weight LB	Moment/1000
1.	Basic Empty Weight <i>Includes unusable fuel & full oil</i>		
2.	Front Seat Occupants <i>Pilot & Passenger (total)</i>		
3.	Rear Seat Occupants		
4.	Baggage Area <i>130 lb maximum</i>		
5.	Zero Fuel Condition Weight <i>Sub total item 1 thru 4 3400 lb maximum</i>		
6.	Fuel Loading <i>92 Gallon @ 6.0 lb/gal. Maximum</i>		
7.	Ramp Condition Weight <i>Sub total item 5 and 6</i>		
8.	Fuel for start, taxi, and run-up (negative number) <i>Normally 9 lb at average moment of 1394 (1.4).</i>		
9.	Takeoff Condition Weight <i>Subtract item 8 from item 7</i>		

Figure 6-3

Loading Data

Use the following chart or table to determine the moment/1000 for fuel and payload items to complete the Loading Form.



Weight LB	Fwd Pass FS 143.5	Aft Pass FS 180.0	Baggage FS 208.0	Fuel FS 154.9	Weight LB	Fwd Pass FS 143.5	Aft Pass FS 180.0	Fuel FS 154.9
20	2.9	3.6	4.2	3.1	300	43.1	54.0	46.5
40	5.7	7.2	8.3	6.2	320	45.9	57.6	49.6
60	8.6	10.8	12.5	9.3	340	48.8	61.2	52.7
80	11.5	14.4	16.6	12.4	360	51.7	64.8	55.8
100	14.4	18.0	20.8	15.5	380	54.5	68.4	58.9
120	17.2	21.6	25.0	18.6	400	57.4	72.0	62.0
140	20.1	25.2	27.04*	21.7	420	60.3	75.6	65.1
160	23.0	28.8		24.8	440	63.1	79.2	68.2
180	25.8	32.4		27.9	460		82.8	71.3
200	28.7	36.0		31.0	480		86.4	74.4
220	31.6	39.6		34.1	500		90.0	77.5
240	34.4	43.2		37.2	520			80.5
260	37.3	46.8		40.3	552**			85.5
280	40.2	50.4		43.4				

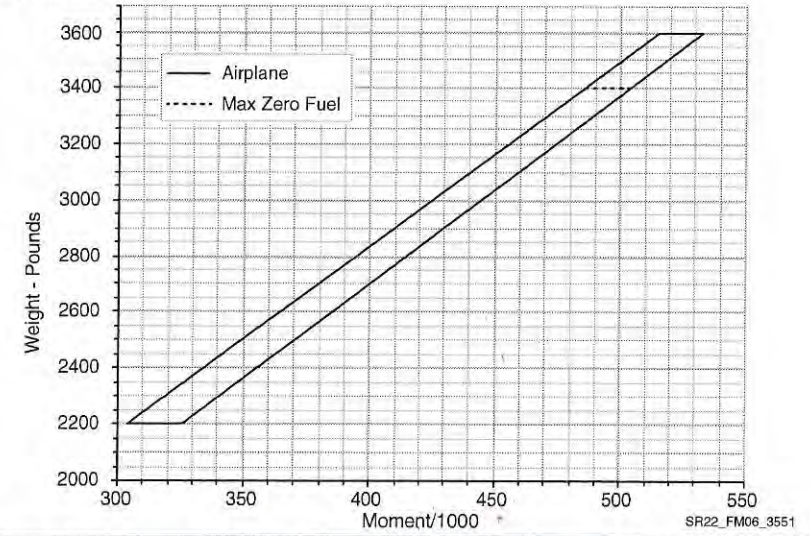
*130 lb Maximum

**92 U.S. Gallons Usable

Figure 6-4

Moment Limits

Use the following chart or table to determine if the weight and moment from the completed Weight and Balance Loading Form (Figure 6-3) are within limits.



Weight LB	Moment/1000		Weight LB	Moment/1000	
	Minimum	Maximum		Minimum	Maximum
2200	304	326	2950	414	437
2250	311	333	3000	422	444
2300	318	341	3050	430	452
2350	325	348	3100	438	459
2400	332	356	3150	445	467
2450	340	363	3200	453	474
2500	347	370	3250	461	481
2550	354	378	3300	469	489
2600	361	385	3350	477	496
2650	368	393	*3400	484	504
2700	375	400	3450	494	511
2750	383	407	3500	501	519
2800	391	415	3550	508	526
2850	399	422	3600	515	533
2900	407	430			

*NOTE: Maximum zero fuel weight.

Figure 6-5

Delivered Weight Data & Equipment List

Model SR22T

Serial Number: 0817
Registration Number: N217SK
Basic Empty Weight: 2512 lb
Total Moment/1000: 351.122
Center of Gravity: F.S.139.8

The following pages list required, standard, and optional equipment, as well as gives the weight and arm of each listed item. This listing represents the airplane and all options available at the time of delivery and does not include any equipment installed after delivery.

Note:

Not all optional equipment in this listing was installed in the above serial number airplane. Equipment listed as optional but not installed in the airplane is indicated by a hyphen (-) in the quantity column for that piece of equipment.

ATA - Item:

Each item in the listing is provided a unique number. The first two digits of the number represent the ATA or GAMA Chapter reference number. These numbers are used industry wide and in the Cirrus Design SR22T Maintenance Documentation to locate items in the Maintenance Manuals and or Parts Catalogs. The two digits following the hyphen are sequence numbers for each item in that chapter.

Description:

This is the component, assembly, or installation name.

Sym:

Items in this listing are coded by a symbol indicating the status of the item. These codes are:

C Required item for FAA Certification.

S Standard equipment. Most standard equipment is applicable to all airplanes. Some equipment may be replaced by optional equipment.

O Optional equipment. Optional equipment may be installed in addition to or to replace standard equipment.

Qty:

The quantity of the listed item in the airplane. A hyphen (-) in this column indicates that the equipment was not installed

Part Number

This is the Cirrus Design Part Number for the component, assembly, or installation

Unit Wt

The weight, in pounds, of one each of the listed item.

Arm

The arm, in inches, of the listed item.

ATA / Item	Description	Sym	Qty	Part Number	Unit Wt	Arm
21	Air Conditioning					
21-01	Blower Fan Only	O	-	20970-003	7.3	133.0
21-02	Compressor Assembly	O	1	21119-006	15.0	93.1
21-03	Condenser Assembly	O	1	21209-002	17.0	132.8
21-04	Evaporator Assembly	O	1	21114-006	17.5	199.5
22	AutoFlight					
22-02	Garmin Autopilot Controller, GMC 705	S	1	24645-xxx	0.8	126.5
22-03	Altitude Transducer	S	1	12722-002	0.2	112.4
25	Equipment & Furnishings					
25-01	Emergency Locator Transmitter & Batteries (406 MHz)	C	1	17190-101	3.4	229.5
25-02	Fwd Seat & Restraint Inst. (Leather: add 0.4 lb each)	C	2	31981-xxx	27.0	149.3
25-03	Rear Seat Installation (Leather: add 0.4 lb each)	C	-	29492-0xx	21.8	180.0
25-04	Rear Seat Restraint	C	-	12491-001	2.3	180.0
25-05	Rear bench seat installation (Leather: add 0.8 lb)	C	1	31986, 31985, 31983	26.9	183.0
25-06	Rear Seat Restraint 3 point - 2 seat belt	C	-	29405-001	3.3	200.0
25-07	Rear Seat Restraint 3 point - 3 seat belt	C	1	29405-002	5.1	200.0
26	Fire Protection					
26-01	Portable Fire Extinguisher	C	1	12533-003	1.5	118.4
27	Flight Controls					
27-01	Flap Actuator, Modified	C	1	11787-002	4.4	173.9
27-02	Roll Trim Cartridge Assy	C	1	15660-001	0.4	161.8
27-03	Roll Trim Motor Assembly	C	1	12546-003	1.3	159.8
27-06	Pitch Trim Cartridge Assy	C	1	15560-002	0.4	310.9
27-07	Pitch Trim Motor Assy	C	1	14832-001	1.3	303.5
27-08	Yaw Servo Installation	C	1	29680-xxx	5.4	236.0
33	Lights					
33-03	Landing Light Installation	S	1	18983-007	1.9	80.0
34	Navigation & Pitot Static					
34-02	Com 1 Antenna	C	1	12740-004	0.5	178.5
34-03	Com 2 Antenna	S	1	12741-002	0.5	204.6
34-01	Garmin 12" Display	O	1	24655-003	9.3	118.5
34-02	Garmin 12" Display	C	1	24655-004	9.3	117.0
34-05	Altimeter	C	1	12102-002	1.1	116.1
34-06	Airspeed Indicator	C	1	13562-xxx	0.7	116.9
34-07	Magnetic Compass	C	1	12451-002	0.3	132.7
34-08	Attitude Gyro	C	1	24668-001	2.2	114.5
34-09	Marker Beacon Antenna	S	1	12743-003	0.6	200.0
34-10	GPS 1 Antenna	C	1	12744-004	0.4	136.2
34-11	GPS 2 Antenna/Iridium Combo Antenna	S	1	29301-001	0.4	200.0
34-12	Transponder Antenna	C	1	12739-001	0.1	105.0
34-13	VOR/LOC Antenna	C	1	12742-001	0.4	331.0
34-16	GMA 350 Audio Panel	O	1	29396-001	1.6	125.8
34-20	GPS/NAV/COM#1 GIA63W	O	1	24662-002	6.3	110.5
34-21	GPS/NAV/COM#2 GIA63W	O	1	24662-002	6.3	111.0
34-22	AIR DATA COMPUTER, GDC 74	O	2	24651-001	2.0	112.5
34-23	AHRS UNIT, GRS 77	O	2	24661-003	3.3	110.0
34-24	CO Detector	O	1	24660-xxx	0.2	104.0
34-25	FMS Keyboard, GCU 478 Controller	O	1	24654-002	1.0	124.0
34-26	ADF Receiver (KR87)	O	-	24659-001	3.2	120.0
34-27	ADF Antenna (KA44B)	O	-	24659-100	4.2	162.0
34-28	DME (KNA61)	O	-	24658-001	2.8	122.0
34-29	DME Antenna (KA61)	O	-	24658-100	0.2	114.5
	Engine Monitoring					

ATA / Item	Description	Sym	Qty	Part Number	Unit Wt	Arm
34-31	Rack/Unit Installation, GEA 71	O	1	24666-001	2.2	111.5
	Traffic Option					
34-36	Avidyne TAS Processor	O	-	71-2420-X-TAS610	6.7	139.0
34-37	Single Blade TAS Antenna	O	-	S72-1750-31L	0.7	157.2
34-38	Twin Blade TAS Antenna	O	-	S72-1750-32L	0.8	180.0
34-40	Garmin Traffic GTS 800	O	1	26659-001	9.9	139.0
34-41	Antenna, Monopole	O	1	26656-001	0.2	180.0
34-42	Antenna, Directional, GA 58	O	1	26659-050	0.8	157.2
	Weather Option					
34-45	Stormscope Processor	O	-	12745-050	1.7	199.0
34-46	Stormscope Antenna	O	-	12745-070	0.9	191.0
34-42	GSR 55 Iridium Satellite Receiver	O	-	29307-001	4.2	231.1
	Transponder Option					
34-47	GTX 32 Transponder (Mode C)	O	-	24652-001	1.6	230
34-48	GTX 33 Transponder (Mode S)	O	-	24653-001	2.6	230.0
34-49	GTX 33 Transponder w/ ES (Mode S)	O	1	24653-002	2.6	230.0
	XM Satellite Options					
34-50	XM WX/Radio Receiver (Perspective)	O	1	24657-001/-002	2.7	228.0
34-51	XM Radio Remote Control	O	1	24641-001	0.2	149.3
35	Oxygen					
35-01	Bottle Assembly - Empty	O	1	100N0020-4	19.9	262.3
35-02	Full				23.8	265.3
61	Propeller					
61-04	Light Weight Hub Propeller Installation	O	1	15319-xxx	63.2	48.0
61-06	Propeller Governor	C	1	21285-001	3.2	61.7
72	Engine					
72-04	Tanis Engine Pre-heater	O	1	25028-xxx	2.1	61.0
95	Special Equipment					
95-03	Enhanced Vision System	O	1	24737-007	1.2	161.0