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WEIGHT AND BALANCE

6.1 GENERAL

In order to achieve the performance and flying characteristics which are designed into the airplane, it must be flown with the weight and center of gravity (C.G.) position within the approved operating range (envelope). Although the airplane offers flexibility of loading, it cannot be flown with the maximum number of adult passengers, full fuel tanks and maximum baggage. With the flexibility comes responsibility. The pilot must ensure that the airplane is loaded within the loading envelope before he makes a takeoff.

Misloading carries consequences for any aircraft. An overloaded airplane will not take off, climb or cruise as well as a properly loaded one. The heavier the airplane is loaded, the less climb performance it will have.

Center of gravity is a determining factor in flight characteristics. If the C.G. is too far forward in any airplane, it may be difficult to rotate for takeoff or landing. If the C.G. is too far aft, the airplane may rotate prematurely on takeoff or tend to pitch up during climb. Longitudinal stability will be reduced. This can lead to inadvertent stalls and even spins; and spin recovery becomes more difficult as the center of gravity moves aft of the approved limit.

A properly loaded airplane, however, will perform as intended. Before the airplane is licensed, it is weighed, and a basic empty weight and C.G. location is computed (basic empty weight consists of the standard empty weight of the airplane plus the optional equipment). Using the basic empty weight and C.G. location, the pilot can easily determine the weight and C.G. position for the loaded airplane by computing the total weight and moment and then determining whether they are within the approved envelope.

The basic empty weight and C.G. location are recorded in the Weight and Balance Data Form (Figure 6-5) and the Weight and Balance Record (Figure 6-7). The current values should always be used. Whenever new equipment is added or any modification work is done, the mechanic responsible for the work is required to compute a new basic empty weight and C.G. position and to write these in the Aircraft Log Book and the Weight and Balance Record. The owner should make sure that it is done.

A weight and balance calculation is necessary in determining how much fuel or cargo can be boarded so as to keep within allowable limits. Check calculations prior to adding fuel to insure against improper loading.

The following pages are forms used in weighing an airplane in production and in computing basic empty weight, C.G. position, and useful load. Note that the useful load includes usable fuel, baggage, cargo and passengers. Following this is the method for computing takeoff weight and C.G.

6.3 AIRPLANE WEIGHING PROCEDURE

At the time of licensing, Piper Aircraft Corporation provides each airplane with the basic empty weight and center of gravity location. This data is supplied by Figure 6-5.

The removal or addition of equipment or airplane modifications can affect the basic empty weight and center of gravity. The following is a weighing procedure to determine this basic empty weight and center of gravity location:

(a) Preparation

(1) Be certain that all items checked in the airplane equipment list are installed in the proper location in the airplane.

(2) Remove excessive dirt, grease, moisture, foreign items such as rags and tools from the airplane before weighing.

(3) Defuel airplane. Then open all fuel drains until all remaining fuel is drained. Operate engine on each tank until all undrainable fuel is used and engine stops. Then add the unusable fuel (4.0 gallons total, 2.0 gallons each wing).

CAUTION

Whenever the fuel system is completely drained and fuel is replenished it will be necessary to run the engine for a minimum of 3 minutes at 1000 RPM on each tank to insure that no air exists in the fuel lines.

(4) Fill with oil to full capacity.

(5) Place pilot and copilot seats in fourth (4th) notch, aft of forward position. Put flaps in the fully retracted position and all control surfaces in the neutral position. Tow bar should be in the proper location and all entrance and baggage doors closed.

(6) Weigh the airplane inside a closed building to prevent errors in scale readings due to wind.

(b) Leveling

(1) With airplane on scales, block main gear oleo pistons in the fully extended position.

(2) Level airplane (refer to Figure 6-3) deflating nose wheel tire, to center bubble on level.

(c) Weighing - Airplane Basic Empty Weight

(1) With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.

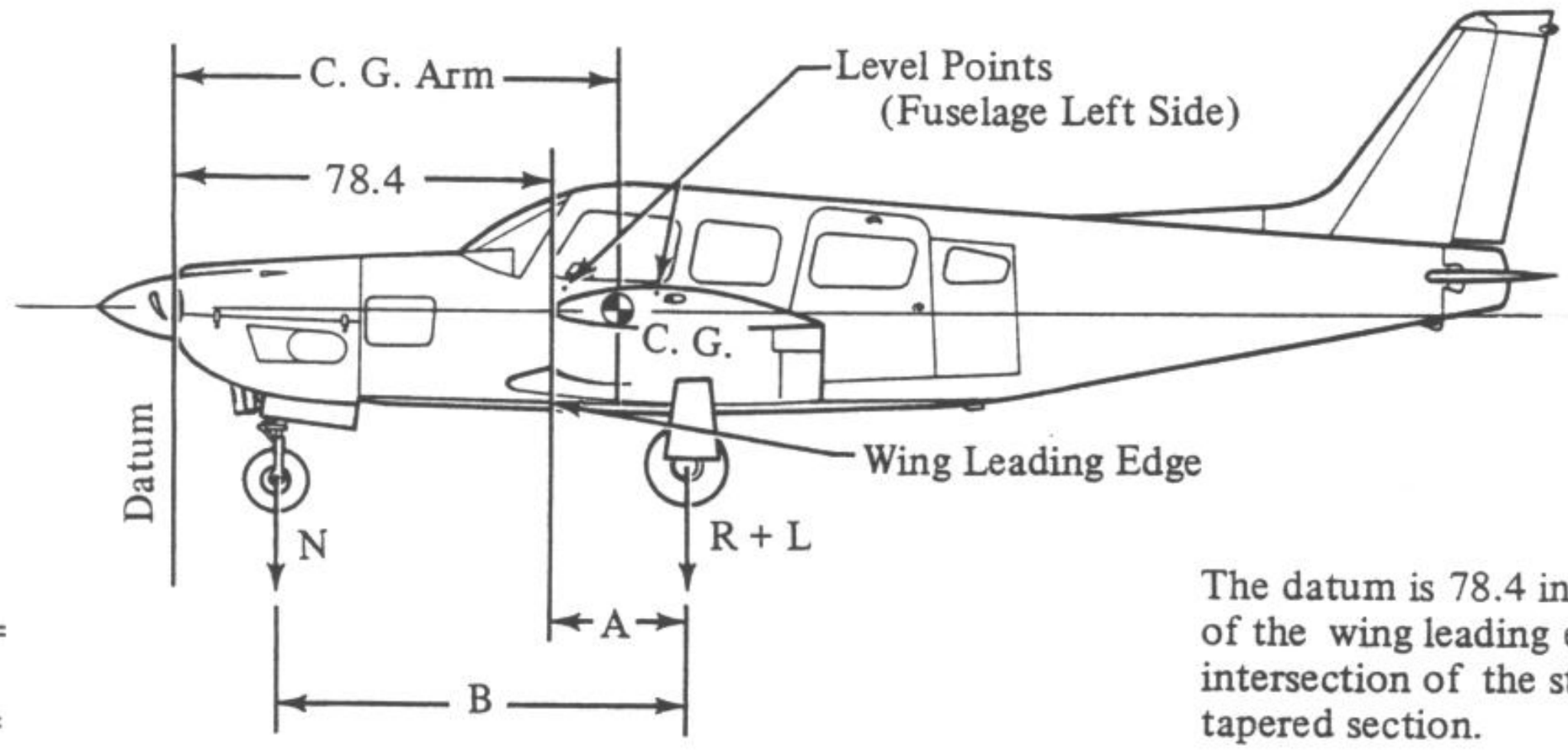
Scale Position and Symbol	Scale Reading	Tare	Net Weight
Nose Wheel (N)			
Right Main Wheel (R)			
Left Main Wheel (L)			
Basic Empty Weight, as Weighed (T)	— —	— —	

WEIGHING FORM

Figure 6-1

(d) Basic Empty Weight Center of Gravity

(1) The following geometry applies to the PA-32R-300 airplane when it is level. Refer to Leveling paragraph 6.3 (b).



The datum is 78.4 inches ahead of the wing leading edge at the intersection of the straight and tapered section.

LEVELING DIAGRAM

Figure 6-3

(2) Obtain measurement "A" by measuring from a plumb bob dropped from the wing leading edge, at the intersection of the straight and tapered section, horizontally and parallel to the airplane centerline, to the main wheel centerline.

(3) Obtain measurement "B" by measuring the distance from the main wheel centerline, horizontally and parallel to the airplane centerline, to each side of the nose wheel axle. Then average the measurements.

(4) The basic empty weight center of gravity (as weighed including optional equipment, full oil and unusable fuel) can be determined by the following formula:

$$\text{C.G. Arm} = 78.4 + A - \frac{B(N)}{T}$$

$$\text{C.G. Arm} = 78.4 + (\quad) - \frac{(\quad)(\quad)}{(\quad)} = \quad \text{inches}$$

6.5 WEIGHT AND BALANCE DATA AND RECORD

The Basic Empty Weight, Center of Gravity Location and Useful Load listed in Figure 6-5 are for the airplane as licensed at the factory. These figures apply only to the specific airplane serial number and registration number shown.

The basic empty weight of the airplane as licensed at the factory has been entered in the Weight and Balance Record (Figure 6-7). This form is provided to present the current status of the airplane basic empty weight and a complete history of previous modifications. Any change to the permanently installed equipment or modification which affects weight or moment must be entered in the Weight and Balance Record.

MODEL PA-32R-300 CHEROKEE LANCE

Airplane Serial Number _____

Registration Number _____

Date _____

AIRPLANE BASIC EMPTY WEIGHT

Item	Weight (Lbs)	x	C. G. Arm (Inches Aft of Datum)	=	Moment (In-Lbs)
Standard Empty Weight*					
Optional Equipment					
Basic Empty Weight					

*The standard empty weight includes full oil capacity and 4.0 gallons of unusable fuel.

AIRPLANE USEFUL LOAD - NORMAL CATEGORY OPERATION

(Gross Weight) - (Basic Empty Weight) = Useful Load

(3600 lbs) - (lbs) = lbs.

THIS BASIC EMPTY WEIGHT, C.G. AND USEFUL LOAD ARE FOR THE AIRPLANE AS LICENSED AT THE FACTORY. REFER TO APPROPRIATE AIRCRAFT RECORD WHEN ALTERATIONS HAVE BEEN MADE.

WEIGHT AND BALANCE DATA FORM

Figure 6-5

PA-32R-300			Serial Number	Registration Number						Page Number		
Date	Item No.		Description of Article or Modification	Weight Change						Running Basic Empty Weight	
				Added (+)			Removed (-)				
	In	Out		Wt. (Lb.)	Arm (In.)	Moment /100	Wt. (Lb.)	Arm (In.)	Moment /100	Wt. (Lb.)	Moment /100
			As Licensed								

WEIGHT AND BALANCE RECORD

Figure 6-7

PA-32R-300			Serial Number	Registration Number					Page Number		
Date	Item No.		Description of Article or Modification	Weight Change						Running Basic Empty Weight	
				Added (+)			Removed (-)				
	In	Out		Wt. (Lb.)	Arm (In.)	Moment /100	Wt. (Lb.)	Arm (In.)	Moment /100	Wt. (Lb.)	Moment /100

WEIGHT AND BALANCE RECORD (cont)

Figure 6-7 (cont)

6.7 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT

(a) Add the weight of all items to be loaded to the basic empty weight.

(b) Use the Loading Graph (Figure 6-13) to determine the moment of all items to be carried in the airplane.

(c) Add the moment of all items to be loaded to the basic empty weight moment.

(d) Divide the total moment by the total weight to determine the C.G. location.

(e) By using the figures of item (a) and item (d) (above), locate a point on the C.G. range and weight graph (Figure 6-15). If the point falls within the C.G. envelope, the loading meets the weight and balance requirements.

	Weight (Lbs)	Arm Aft Datum (Inches)	Moment (In-Lbs)
Basic Empty Weight			
Pilot and Front Passenger	340.0	85.5	29070
Passengers (Center Seats)	340.0	118.1	40154
Passengers (Rear Seats)	340.0	155.7	52938
Passenger (Jump Seat) (Optional)		118.1	
Fuel (94 Gallon Maximum)		93.6	
Baggage (Forward)		42.0	
Baggage (Aft)		178.7	
Moment due to Retraction of Landing Gear			819
Total Loaded Airplane			

The center of gravity (C.G.) of this sample loading problem is at inches aft of the datum line. Locate this point ( ) on the C.G. range and weight graph. Since this point falls within the weight - C.G. envelope, this loading meets the weight and balance requirements.

IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY.

SAMPLE LOADING PROBLEM (NORMAL CATEGORY)

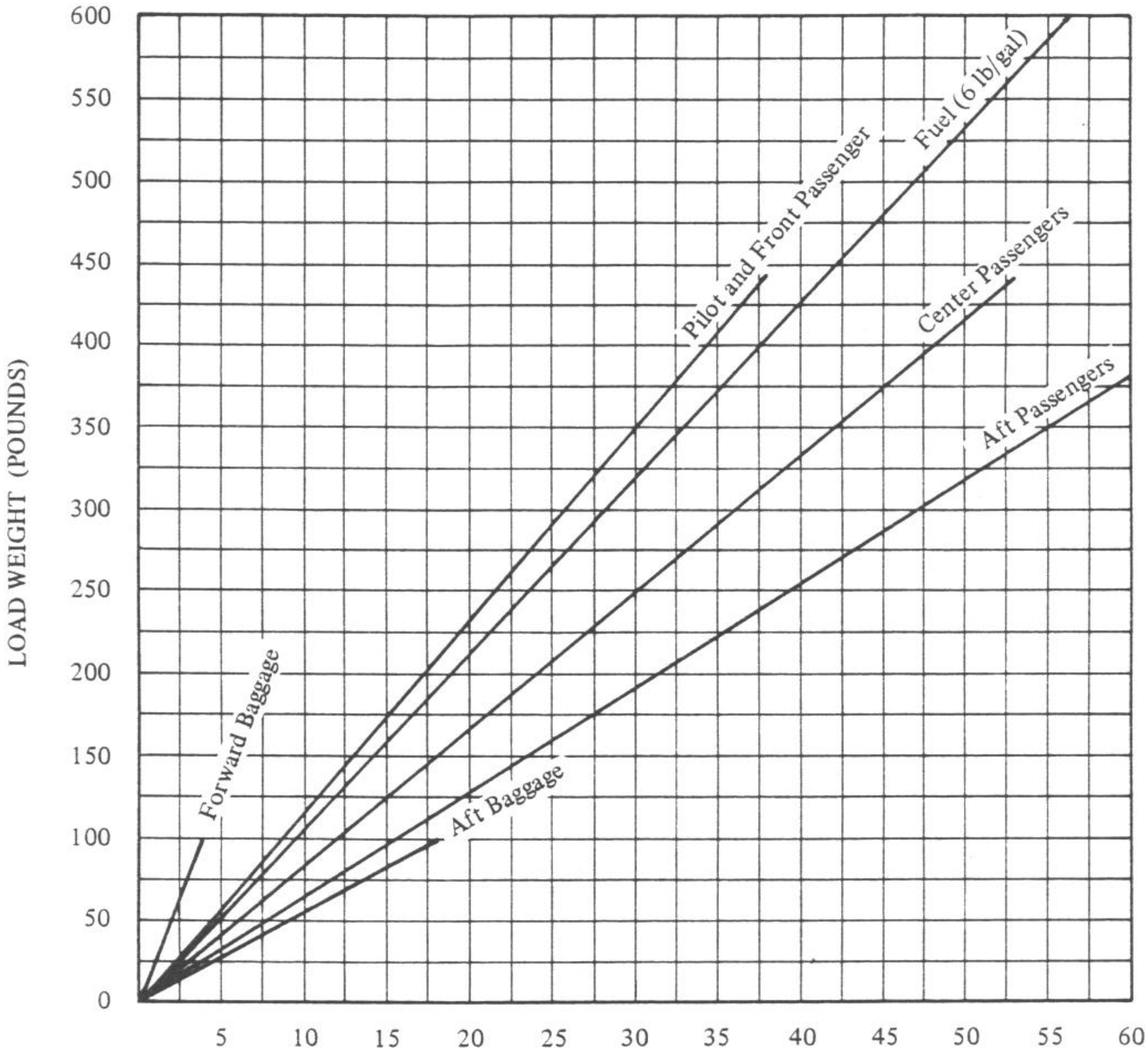
Figure 6-9

	Weight (Lbs)	Arm Aft Datum (Inches)	Moment (In-Lbs)
Basic Empty Weight			
Pilot and Front Passenger		85.5	
Passengers (Center Seats)		118.1	
Passengers (Rear Seats)		155.7	
Passenger (Jump Seat) (Optional)		118.1	
Fuel (94 Gallon Maximum)		93.6	
Baggage (Forward)		42.0	
Baggage (Aft)		178.7	
Moment due to Retration of Landing Gear			819
Total Loaded Airplane			

Totals must be within approved weight and C.G. limits. It is the responsibility of the airplane owner and the pilot to insure that the airplane is loaded properly. The Basic Empty Weight C.G. is noted on the Weight and Balance Data Form (Figure 6-5). If the airplane has been altered, refer to the Weight and Balance Record for this information.

WEIGHT AND BALANCE LOADING FORM

Figure 6-11



LOADING GRAPH

Figure 6-13

Moment due to retracting landing gear = +819 in. lbs.

C. G. RANGE AND WEIGHT

Figure 6-15

6.9 EQUIPMENT LIST

The following is a list of equipment which may be installed in the PA-32R-300. It consists of those items used for defining the configuration of an airplane when the basic empty weight is established at the time of licensing. Only those standard items which are alternate standard items and those required to be listed by the certificating authority (FAA) are presented. Items marked with an "X" are those items which were installed on the airplane described below when licensed by the manufacturer.

PIPER AIRCRAFT CORPORATION PA-32R-300 CHEROKEE LANCE

SERIAL NO. _____ REGISTRATION NO. _____ DATE: _____

(a) Propeller and Propeller Accessories

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
1	Propeller, Hartzell HC-C2YK-1/8475D-4 Cert. Basis - TC P920				
3	Propeller Governor Piper Dwg. 66634-8 Cert. Basis - TC P920				

(b) Engine and Engine Accessories

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
5	Lycoming Model IO-540-K1A5D (Serial Nos. 32R-7680001 through 32R-7680140) Cert. Basis - TC 1E4				
6	Lycoming Model IO-540-K1G5D (Serial Nos. 32R-7680141 through 32R-7680525) Cert. Basis - TC 1E4				
7	Air Filter - Fram Model *CA-161 PL Cert. Basis - TC 1E4				

(c) Landing Gear and Brakes

Item No.	Item	Mark if Instl.	Weight Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
11	Two Main Wheel Assemblies a. Cleveland Aircraft Products Wheel Assy. No. 40-90 Brake Assy. No. 30-65 Cert. Basis - TSO C26a				
	b. 6.00-6 Type III 8 Ply Rating Tires with Regular Tubes Cert. Basis - TSO C26b				
13	Nose Wheel Assembly a. Cleveland Aircraft Products Wheel Assy. No. 40-77 Cert. Basis - TSO C26a				
	b. 5.00-5 Type III 6 Ply Rating Tire with Regular Tube Cert. Basis - TSO C26b				

(d) Electrical Equipment

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)

(e) Instruments

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
21	Altimeter, Piper PS50008-2, -3, -4 or -5 Cert. Basis - TSO C10b				
23	Airspeed Indicator Piper PS50049-22 Cert. Basis - TSO C2b				
25	Manifold Pressure and Fuel Flow Indicator Piper PS50031-7 Cert. Basis - TSO C45, C47				

(f) Miscellaneous

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
33	Front Seat Belts (2) Piper PS50039-4-2A Cert. Basis - TSO C22f				
35	Center Seat Belts (2) Piper PS50039-4-3A Cert. Basis - TSO C22f				
37	Aft Seat Belts (2) Piper PS50039-4-4A Cert. Basis - TSO C22f				

(g) Engine and Engine Accessories
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
49	Vacuum Filter, Piper Dwg. 66673 Cert. Basis - TC A3SO	_____	.3	57.0	17
51	Vacuum Pump, Airborne Mfg. Co., Model 211cc and Drive, Piper Dwg. 79399-0 Cert. Basis - TC A3SO	_____	3.4	25.9	88
53	Low Vacuum Annunciator Light, Cert. Basis - TC A3SO	_____	Negligible		
55	Vacuum Regulator, Airborne Mfg. Co., *2H3-19 Cert. Basis - TC A3SO	_____	.5	57.0	28

(h) Propeller and Propeller Accessories
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)

(i) Landing Gear and Brakes
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
	Heavy Duty Group No. 1				
65	a. Cleveland Aircraft Products 40-120 Wheel Assy. (2) 30-83 Brake Assy. (2) Cert. Basis - TSO C26a Goodrich 6.00 x 6 Ribbed Type III 8 Ply Rating Tire with Tube (2) Cert. Basis - TSO C62	_____	*2.9	109.8	318
67	b. Goodrich 5.00 x 5 Ribbed Type III 6 Ply Rating Tire with Tube Cert. Basis - TSO C62	_____	(Same as standard equipment)		

*Weight and moment difference between standard and optional equipment.

(j) Electrical Equipment (Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
79	Landing Light, G. E. Model 4509				
	Cert. Basis - TC A3SO	_____	.5	-2.6	-1
81	Auxiliary Power Receptacle, Piper Dwg. 68815				
	Cert. Basis - TC A3SO	_____	2.6	48.4	126
83	External Power Cable, Piper Dwg. 62355-2				
	Cert. Basis - TC A3SO	_____	4.6	42.0	193
85	Cabin Speaker, Piper Dwg. 63239-2				
	Cert. Basis - TC A3SO	_____	.8	97.5	78
87	Instrument Light (2), Grimes 15-0083-7				
	Cert. Basis - TC A3SO	_____	.2	99.0	20
89	Forward Baggage Light, Piper Dwg. 68697				
	Cert. Basis - TC A3SO	_____	.2	43.5	9
91	a. Reading Light (2), Grimes #10-0154-1				
	Cert. Basis - TC A3SO	_____	0.5	149.3	75
	b. Reading Light (2), Grimes #10-0154-1				
	Cert. Basis - TC A3SO	_____	0.5	115.0	58
93	Heated Pitot Head, Piper Dwg. 65797-5				
	Cert. Basis - TC A3SO	_____	.4	100.0	40
95	Battery 12V 35 A.H. Rebat R35 (Wt. 27.2 lbs.)				
	Cert. Basis - TC A3SO	_____	*5.3	41.4	219

*Weight and moment difference between standard and optional equipment.

(j) Electrical Equipment (Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
97	Instrument Panel Lights Cert. Basis - TC A3SO	_____	0.3	67.8	20
99	Anti-Collision Lights (Wing Tip) (Whelen) Piper Dwg. 38221 Cert. Basis - STC SA 615 EA	_____	5.5	186.5	1026
100	Navigation Lights (Wing) (2) Grimes A1285 (Red and Green) Cert. Basis - TC A3SO	_____	0.4	106.6	43
101	Navigation Light (Rear) (1), Grimes Model A2064 (White) Cert. Basis - TC A3SO	_____	.2	311.7	62
103	Piper Pitch Trim Piper Dwg. 69378-2 Cert. Basis - TC A3SO	_____	4.7	183.2	861
105	Rotating Beacon Cert. Basis - TC A3SO	_____	1.5	290.3	435

(k) Instruments (Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
113	Suction Gauge, Piper Dwg. 99480-0 or -2 Cert. Basis - TC A3SO	_____	.5	67.2	34
115	a. Vertical Speed, Piper Dwg. 99010-2, -4 or -5 Cert. Basis - TSO C8b	_____	1.0	65.9	66
	b. Vertical Speed, Piper Dwg. 99010-3 Cert. Basis - TSO C8b	_____	.5	67.2	34
117	Attitude Gyro, Piper Dwg. 99002-2, -3, -4 or -5 Cert. Basis - TSO C4c	_____	2.2	64.4	142
119	Directional Gyro, Piper Dwg. 99003-2, -3, -4 or -5 Cert. Basis - TSO C5c	_____	2.6	64.7	168
121	Air Temperature Gauge, Piper Dwg. 99479-0 or -2 Cert. Basis - TC A3SO	_____	.2	77.6	16
123	Clock Cert. Basis - TC A3SO	_____	.4	67.4	27
125	Tru-Speed Indicator, Piper Dwg. 62143-9 and -23 Cert. Basis - TSO C2b	_____	(same as standard equipment)		
127	Turn and Slip Indicator, Piper PS50030-2 or -3 Cert. Basis - TSO C3b	_____	2.6	64.7	168
129	Exhaust Gas Temperature, Piper Dwg. 99026 Cert. Basis - TC A3SO	_____	.7	60.4	42
131	Encoding Altimeter, Piper PS50008-6 or -7 Cert. Basis - TSO C10b C88	_____	* .9	65.3	59

*Weight and moment difference between standard and optional equipment.

(k) Instruments (Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
133	Engine Hour Meter Piper Dwg. 69889-0 Cert. Basis - TC A3SO	_____	0.3	66.2	20
135	MK10 Radar Altimeter Piper Dwg. 37693-2 Cert. Basis - TC A3SO	_____	5.4	181.3	979
137	NSD-360 Gyro Cert. Basis - STC C6c, C9c, C52c	_____	4.1	64.9	266
	a. Narco OC-110 Converter and Mount Cert. Basis - TSO C36c C40a	_____	2.1	217.6	457

(l) Autopilots (Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
147	AutoFlite II				
	Cert. Basis - STC SA3054SW-D	_____	5.2	92.8	483
149	AutoControl IIIB				
	Cert. Basis - STC SA3053SW-D	_____	6.7	88.5	593
	a. Directional Gyro *52D54	_____	2.9	64.0	186
	b. Omni Coupler 1C-388	_____	1.0	64.3	64
151	AltiMatic IIIC				
	Cert. Basis - STC SA3052SW-D	_____	21.3	126.6	2697
	a. Directional Gyro *52D54	_____	2.9	64.9	188
	b. Omni Coupler 1C-388	_____	1.0	64.3	64
	c. G/S Coupler 1C-493	_____	1.5	56.7	85

(m) Radio Equipment
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
161	King KX 170 ( ) (VHF Comm/Nav)				
	Transceiver, Single	_____	7.5	61.6	462
	Transceiver, Dual	_____	15.0	61.6	924
	Cert. Basis - TC A3SO				
163	King KX 175 ( ) VHF				
	Transceiver,	_____	8.1	61.6	499
	King KN 73 Glide Slope Receiver,	_____	2.8	214.8	601
	King KN 77 VOR/LOC Converter,	_____	3.1	214.8	666
	King KNI 520 VOR/ILS Indicator	_____	1.7	65.5	111
	Cert. Basis - TSO C3bc, C37b, C38b, C40a				
165	King KX 175 ( ) VHF				
	Transceiver (2nd),	_____	7.8	61.6	480
	King KN 77 VOR/LOC Converter,	_____	3.5	214.8	752
	King KNI 520 VOR/ILS Indicator	_____	1.7	65.5	111
	Cert. Basis - TSO C36c, C37b, C38b, C40a				
167	King KI 201 ( ) VOR/ LOC Ind.				
	Cert. Basis - TC A3SO				
	a. Single	_____	2.5	64.9	162
	b. Dual	_____	5.0	64.9	325
169	King KI 213 VOR/LOC/GS Indicator				
	Cert. Basis - TC A3SO	_____	2.5	64.9	162
171	King KI 214 ( ) VOR/ LOC/GS Ind.				
	Cert. Basis - TC A3SO	_____	3.3	64.9	214
173	Narco Comm 10A VHF Transceiver				
	Cert. Basis - TC A3SO	_____	3.9	62.4	243

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
175	Narco Nav 10 VHF Receiver Cert. Basis - TC A3SO	_____	1.9	63.6	121
177	Narco Nav 11 VHF Receiver Cert. Basis - TC A3SO				
	a. Single	_____	2.8	63.6	178
	b. Dual	_____	5.6	63.6	356
179	Narco Comm 11A VHF Transceiver Cert. Basis - TC A3SO				
	a. Single	_____	3.6	62.4	225
	b. Dual	_____	7.1	62.4	443
181	Narco Comm 11B VHF Transceiver Cert. Basis - TC A3SO				
	a. Single	_____	3.9	62.4	243
	b. Dual	_____	7.8	62.4	487
183	Narco Nav 12 VHF Receiver Cert. Basis - TC A3SO	_____	3.4	63.6	216
185	Narco Nav 14 VHF Receiver Cert. Basis - TC A3SO	_____	2.5	62.4	156
187	Narco Comm 111 VHF Transceiver Cert. Basis - TSO C37b, C38b				
	a. Single	_____	3.0	62.4	187
	b. Dual	_____	6.0	62.4	374
189	Narco Nav 111 Cert. Basis - TSO C36c, C40a, C66a	_____	2.5	63.6	159

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
191	Narco Comm 111B VHF Transceiver				
	Cert. Basis - TSO C37b, C38b				
	a. Single	_____	3.9	62.4	243
	b. Dual	_____	7.8	62.4	487
193	Narco Nav 112 Receiver				
	Cert. Basis - TSO C36c, C40a, C66c, C34c	_____	3.3	63.6	210
195	Narco Nav 114 VHF Receiver				
	Cert. Basis - TSO C38b, C40a, C36c, C34c, C66a	_____	2.5	62.4	156
197	Narco UGR-3 Glide Slope				
	Receiver	_____	2.3	215.6	496
	Cable	_____	1.5	139.3	209
	Antenna	_____	0.4	92.4	37
	Cable, Antenna	_____	0.5	150.0	75
	Cert. Basis - TC A3SO				
198	Narco UGR-2A Glide Slope				
	Receiver	_____	2.3	215.6	496
	Cable	_____	1.5	139.3	209
	Antenna	_____	0.4	92.4	37
	Cable, Antenna	_____	0.5	150.0	75
	Cert. Basis - TSO C34b				
199	Narco MBT-12-R, Marker Beacon				
	Cert. Basis - TC A3SO	_____	3.0	113.2	340
201	King KN 74 R-Nav				
	Cert. Basis - TC A3SO	_____	4.7	61.3	288
202	Narco CLC-60A R-Nav				
	Cert. Basis - TC A3SO	_____	11.5	133.9	1540
203	King KN 60C DME				
	Cert. Basis - TC A3SO	_____	7.3	64.1	468

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
204	King KN 61 DME Cert. Basis - TC A3SO	_____	13.3	189.5	2520
205	King KN 65 DME Cert. Basis - TSO C66a	_____	9.1	205.1	1866
206	King KN 65A DME Cert. Basis - TSO C66a	_____	13.8	185.4	2559
207	Narco DME-190 Cert. Basis - TC A3SO	_____	5.9	65.9	389
209	King KR 85 Digital ADF Cert. Basis - TSO C41b	_____	8.6	96.6	831
	a. Audio Amplifier	_____	0.8	54.1	43
211	King KR 86 ADF Cert. Basis - TC A3SO				
	a. First	_____	6.7	104.8	702
	b. Second	_____	9.7	108.9	1057
	c. Audio Amplfier	_____	0.8	54.1	43
213	Narco ADF-140 Cert. Basis - TSO C41c				
	a. Single	_____	6.0	94.3	566
	b. Dual	_____	18.3	110.7	2026
215	King KMA 20 ( ) Audio Panel	_____	2.8	65.2	183
	Antenna	_____	.5	116.3	58
	Cable	_____	.4	90.0	36
	Cert. Basis - TSO C35c, C50b				
217	Narco CP-125 Audio Selector Panel Cert. Basis - TC A3SO	_____	2.2	76.2	168

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
219	King KT 76/78 Transponder				
	Panel Unit	_____	3.1	63.1	196
	Antenna and Cable	_____	–	–	–
	Cert. Basis - TSO C74b				
221	Narco AT50A Transponder				
	Panel Unit	_____	*3.0	62.3	187
	Cert. Basis - TSO C74b				
223	Nav Receiving Antenna				
	Cert. Basis - TC A3SO				
	a. Antenna	_____	.5	291.0	146
	b. Cable	_____	1.1	172.0	189
225	VHF Comm Antennas				
	Cert. Basis - TC A3SO				
	a. *1 Antenna	_____	.3	186.8	56
	b. *1 Cable	_____	.5	122.0	61
	c. *2 Antenna	_____	.3	222.0	67
	d. *2 Cable	_____	.6	160.0	96
226	Single ADF Sense				
	Antenna and Cable				
	Cert. Basis - TC A3SO	_____	0.4	160.0	64
227	Anti Static Kit				
	Cert. Basis - TC A3SO				
	a. *1 VHF Comm Antenna and Cable	_____	1.5	162.7	252
	b. *2 VHF Comm Antenna and Cable	_____	1.6	192.5	308
	c. Low Frequency Antenna	_____	0.6	160.0	96
	d. Static Wicks	_____	–	–	–

*Weight includes antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
229	Emergency Locator Transmitter Cert. Basis - TC A3SO				
	a. Transmitter, Piper Dwg. 79265-0	_____	1.7	267.2	454
	b. Transmitter, Piper Dwg. 79265-6	_____	1.3	267.2	347
	c. Antenna and Coax	_____	0.2	255.4	51
231	Microphone Cert. Basis - TC A3SO				
	a. Piper Dwg. 68856-10	_____	0.3	69.9	21
	b. (Dynamic) Piper Dwg. 68856-11	_____	0.6	74.9	45
	c. (Dynamic) Piper Dwg. 68856-12	_____	0.3	69.9	21
233	Headset, Piper Dwg. 68856-10 Cert. Basis - TC A3SO	_____	.5	65.0	33
235	Radio Shelf, Piper Dwg. 67367-0 Cert. Basis - TC A3SO	_____	2.3	201.8	464

(n) Miscellaneous (Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
263	Assist Step, Piper Dwg. 65384 Cert. Basis - TC A3SO	_____	1.5	147.5	221
265	Jump Seat (with seat belts), Piper Dwg. 69595-4 Cert. Basis - TC A3SO	_____	9.2	122.3	1125
267	Alternate Static Source Cert. Basis - TC A3SO	_____	.4	66.0	26
	Calibrated Alternate Static Source Placard Required: Yes _____ No _____				
269	Ground Ventilating Blower, Piper Dwg. 79273-5 Cert. Basis - TC A3SO	_____	7.7	201.4	1551
271	Super Cabin Sound Proofing, Piper Dwg. 78480 Cert. Basis - TC A3SO	_____	24.4	107.2	2616
273	Assist Straps, Piper Dwg. 79455 Cert. Basis - TC A3SO	_____	.3	120.0	36
275	Inertia Safety Belts (Center) (2) .75 lbs. each, Piper PS50039-4-15 Cert. Basis - TC A3SO	_____	1.5	133.9	201
277	Inertia Safety Belts (Rear) (2) 0.8 lbs. each, Piper PS50039-4-14 Cert. Basis - TC A3SO	_____	1.6	181.5	290
279	Lighter, *200462, 12 Volt Universal Cert. Basis - TC A3SO	_____	.2	67.9	14

(n) Miscellaneous (Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
281	Fire Extinguisher, Piper Dwg. 76167-2 Cert. Basis - TC A3SO	_____	4.6	71.0	327
283	Adjustable Front Seat (Left), Piper Dwg. 79592-0 Cert. Basis - TC A3SO	_____	*4.6	84.7	390
285	Adjustable Front Seat (Right), Piper Dwg. 79592-1 Cert. Basis - TC A3SO	_____	*4.6	84.1	387
287	Headrests (2) Front, Piper Dwg. 79337-18 Cert. Basis - TC A3SO	_____	2.0	99.5	199
289	Headrests (2) Center, Piper Dwg. 79337-18 Cert. Basis - TC A3SO	_____	2.0	132.1	264
291	Headrests (2) Rear, Piper Dwg. 79337-18 Cert. Basis - TC A3SO	_____	2.0	169.7	339
293	Air Conditioner, Piper Dwg. 99750-3 Cert. Basis - TC A3SO	_____	69.5	113.5	7888

*Weight and moment difference between standard and optional equipment.

(n) Miscellaneous (Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
295	Zinc Chromate Finish Cert. Basis - TC A3SO	_____	7.5	113.2	849
297	Stainless Steel Control Cables Cert. Basis - TC A3SO	_____	–	–	–
	TOTAL OPTIONAL EQUIPMENT	_____	_____	_____	_____

EXTERIOR FINISH

Base Color _____ Registration No. Color _____

Trim Color _____ Type Finish _____

Accent Color _____