TABLE OF CONTENTS

SECTION 6

WEIGHT AND BALANCE

# SECTION 6

# WEIGHT AND BALANCE

## 6.1 GENERAL

In order to achieve the performance and good 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 insure 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 delivered, 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 baggage can be boarded so as to keep the C.G. 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.

THIS PAGE INTENTIONALLY LEFT BLANK

## 6.3 AIRPLANE WEIGHING PROCEDURES

At the time of delivery, 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 each engine until all undrainable fuel is used and engine stops. Then add the unusable fuel (5.0 gallons total, 2.5 gallons each wing).

(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.

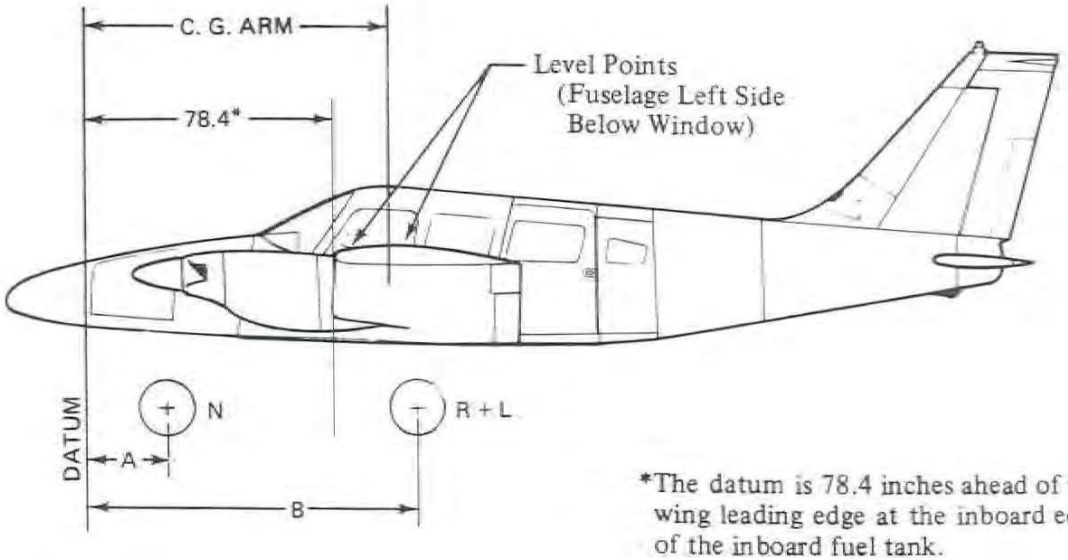
| Scale Position and Symbol | Scale Reading | Tare | Net Weight |
|---|---|---|---|
| Nose Wheel (N) | | | |
| Right Main Wheel (R) | | | |
| Left Main Wheel (L) | | | |
| Basic Empty Weight, as Weighed (T) | — — | — — | |

WEIGHING FORM

Figure 6-1

(d) Basic Empty Weight Center of Gravity

(1) The following geometry applies to the PA-34-200T 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 inboard edge of the inboard fuel tank.

A = 25.3
B = 109.8

LEVELING DIAGRAM

Figure 6-3

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

$$\text{C.G. Arm} = \frac{N(A) + (R+L)(B)}{T} \quad \text{inches}$$

Where: $T = N + R + L$

## 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 plane as delivered from the factory. These figures apply only to the specific airplane serial number and gistration number shown.

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

**FLUGZEUGINSTANDHALTUNG SCHÖNHAGEN GmbH**
Flugplatz, 14959 Schönhagen
JAR LBA.0139

# Gewichtsübersicht

Muster : PIPER PA-34-200T  Auftrags-Nr.: 012702  Werk-Nr.: 34-7870066  Kennz.: D-GCVP

Grund der Wägung: Auftrag

## Daten nach Kennblatt bzw. Flughandbuch

Bezugspunkt BP

Bezugsebene BE: 199 cm vor Flügelvorderkante

Bezugslinie horiz. BL: 2 Schrauben an der linken Seitenwand waagerecht

| Luftüchtigk. - Gruppe | Höchstgewicht | Fluggewichts - Schwerpunktlagen | | bei Fluggewicht |
|---|---|---|---|---|
| Dimension | kg | x vorn m | m x hinten | kg |
| Normalflugzeug (N) | 2073,0 | 2,30 | 2,40 | 2073,0 |
| | | 2,08 | 2,40 | 1542,0 |
| Nutzflugzeug (U) | | | | |
| | | | | |
| | | | | |
| | | | | |

## Wägung und Leergewichts - Schwerpunktlage

Ausrüstungsliste Stand vom 14.02.78 (siehe Flughandbuch)

| Wägung | Auflage | | Brutto - Gewicht | Tara - Gewicht | Netto - Gewicht | Hebelarm | Moment |
|---|---|---|---|---|---|---|---|
| | | Dim. | | kg | kg | m | mkg |
| | links | Gl l | | | 536,0 | 2,780 | 1490,080 |
| | rechts | Gl r | | | 539,0 | 2,780 | 1498,420 |
| | vorn/hinten | G 2 | | | 402,0 | 0,640 | 257,280 |
| | | | | Summe A | 1477,0 | | 3245,780 |

Abzüge: Ausfliegbarer Kraftstoff

| | Spezifisches Gewicht | Menge | Dim. | | |
|---|---|---|---|---|---|
| Rumpfbehälter 1 | | | | | |
| Rumpfbehälter 2 | | | | | |
| Flügelbehälter 1 | | | | | |
| Flügelbehälter 2 | | | | | |
| Flügelbehälter 3 | | | | | |
| Flügelbehälter 4 | | | | | |
| | | | | | |
| | | | | | |

Dim. siehe Flugzeughandbuch+

| | | | |
|---|---|---|---|
| Summe B | | | |
| Wägung (Summe A) | 1477,0 | | 3245,780 |
| Abzüge (Summe B) | | | |
| Leergewicht | 1477,0 | 2,197 | 3245,780 |

Im Leergewicht sind enthalten :
Schmierstoff, Hydraulik und Enteisungsflüssigkeit
bei jeweils maximal zulässiger Füllung

ster: PIPER PA-34-200T Auftrags-Nr.: 012702 Werk-Nr.: 34-7870066 Kennz.: D-GCVP

| Veränderliche Lasten | Gewicht | Hebelarm | Moment |
|---|---|---|---|
| Kraftstoff Spezif.Gewicht ____ Dim. | kg | m | mkg |
| Rumpftreibstoffbehälter 1 | | | |
| Rumpftreibstoffbehälter 2 | | | |
| Flügelbehälter 1 | | 2,377 | |
| Flügelbehälter 2 | | 2,377 | |
| Flügelbehälter 3 | | | |
| Flügelbehälter 4 | | | |
| Sitzplätze : Flgz.führer | | 2,171 | |
| | | | |
| | | | |
| | | | |
| Gepäck vorn | | 0,571 | |
| hinten | | 4,538 | |
| Einsatzausrüstung | | | |
| | | | |

Flugzeuggewichtsschwerpunktlagen (mögliche vordere und hintere Lage X und X )

| Beladung | Leergewicht | | |
|---|---|---|---|
| Leergewicht: | 1477,0 | 2,197 | 3245,780 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Gewichtstrimmung Einbauort | | | |

Höchstzulassige Zuladung

| Luftüchtigkeits - Gruppe | Normalflugzeug | Nutzflugzeug | |
|---|---|---|---|
| Höchstgewicht | 2073,0 | | |
| - Leergewicht | 1477,0 | | |
| höchstzul. Zuladung ____ kg Dim. | 596,0 | | |

zusätzliche Angaben fur Flughandbuch und Hinweisschilder :

Daten für den Eintrag ins Flughandbuch

| Leergewicht | Leergewichts - Moment |
|---|---|
| 1477,0 kg | 3245,7 mkg |

Schönhagen, den 15.04.02

Prüfleiter — Ort und Datum — Prüfer

R. Jańczyk „AIR SERVICE" Sp. z o.o.
LOTNISKO MODLIN
ul. Gen. Wiktora Thommego 1
05-160 Nowy Dwór Mazowiecki 5
NIP 531-14-21-255

# KARTA CIĘŻARU I WAŻENIA

## SAMOLOT PA-34-200T

Znaki rejestracyjne SP-FPP Nr fabryczny 34-7870066

Data kontroli ciężaru samolotu 10.05.2000 r.

## CIĘŻAR WŁASNY SAMOLOTU

| | Ciężar KG /Lbs/ | Ramię cm /Inch./ | Moment /In-Lbs/ |
|---|---|---|---|
| Ciężar pustego samolotu | 1461<br>3232 | 218.2<br>85.9 | 318790.2<br>277628.8 |
| Paliwo, olej | niezużywalne stan | | |
| Ciężar własny samolotu | | | |

Kontroler

KONTROLA TECHNICZNA AIR SERVICE

AIR SERVICE CERTYFIKAT IKCSP 04/95

„AIR SERVICE" Sp. z o.o.
KIEROWNIK ODPOWIEDZIALNY
Ryszard Jańczyk

MODEL PA-34-200T SENECA II

Airplane Serial Number 34-7870066

Registration Number D - G A R A

Date 14.02.1978

Unqültig

AIRPLANE BASIC EMPTY WEIGHT

| Item | Weight (Lbs) | x | C.G. Arm (Inches Aft of Datum) | = | Moment (In-Lbs) |
|---|---|---|---|---|---|
| Standard Empty Weight* Actual ~~Computed~~ | 3.112,8 | | 88.5 | | 275.626,8 |
| ~~Optional Equipment~~ + Uns. Fuel | 30,0 | | 103.0 | | 3.090,0 |
| Basic Empty Weight | 3.142,8 | | 88.7 | | 278.716,8 |

*The standard empty weight includes full oil capacity and 5.0 gallons of unusable fuel.

AIRPLANE USEFUL LOAD - NORMAL CATEGORY OPERATION

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

(4407 lbs) - ( 3143 lbs) = 1264 lbs.
1999 kg - (1425 kg) = 574 kg

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

WEIGHT AND BALANCE DATA FORM

Figure 6-5

THIS PAGE INTENTIONALLY LEFT BLANK

| PA-34-200T | Serial Number 34-7870066 | Registration Number D-GARA | Page Number |
|---|---|---|---|

| Date | Item No. In | Item No. Out | Description of Article or Modification | Weight Change Added (+) Wt. (Lb.) | Added (+) Arm (In.) | Added (+) Moment /100 | Removed (-) Wt. (Lb.) | Removed (-) Arm (In.) | Removed (-) Moment /100 | Running Basic Empty Weight Wt. (Lb.) | Running Basic Empty Weight Moment /100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14.02.78 | | | As Delivered | | | | | | | 3143 | 278716 |
| 19.05.83 | | | | | | | | | | 3177 | 281130 |

WEIGHT AND BALANCE RECORD

Figure 6-7

| PA-34-200T | Serial Number | Registration Number | Page Number |
|---|---|---|---|

| Date | Item No. In | Item No. Out | Description of Article or Modification | Weight Change Added (+) Wt. (Lb.) | Added (+) Arm (In.) | Added (+) Moment /100 | Removed (-) Wt. (Lb.) | Removed (-) Arm (In.) | Removed (-) Moment /100 | Running Basic Empty Weight Wt. (Lb.) | Running Basic Empty Weight Moment /100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | As Delivered | | | | | | | | |

WEIGHT AND BALANCE RECORD (cont)

Figure 6-7 (cont)

## 6.9 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) (Forward Facing) | | 118.1 | |
| Passengers (Center Seats) (Aft Facing) (Optional) | | 119.1 | |
| Passengers (Rear Seats) | | 157.6 | |
| Passenger (Jump Seat) (Optional) | | 118.1 | |
| Baggage (Forward) | | 22.5 | |
| Baggage (Aft) | | 178.7 | |
| Zero Fuel Weight (4000 Lbs Max - Std.) (See pages ~~6.61~~ and ~~6.62~~.) 6.65 + 6.66 | | | |
| Fuel (93 Gallons Maximum) - Standard (123 Gallons Maximum) - Optional | | 93.6 | |
| 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

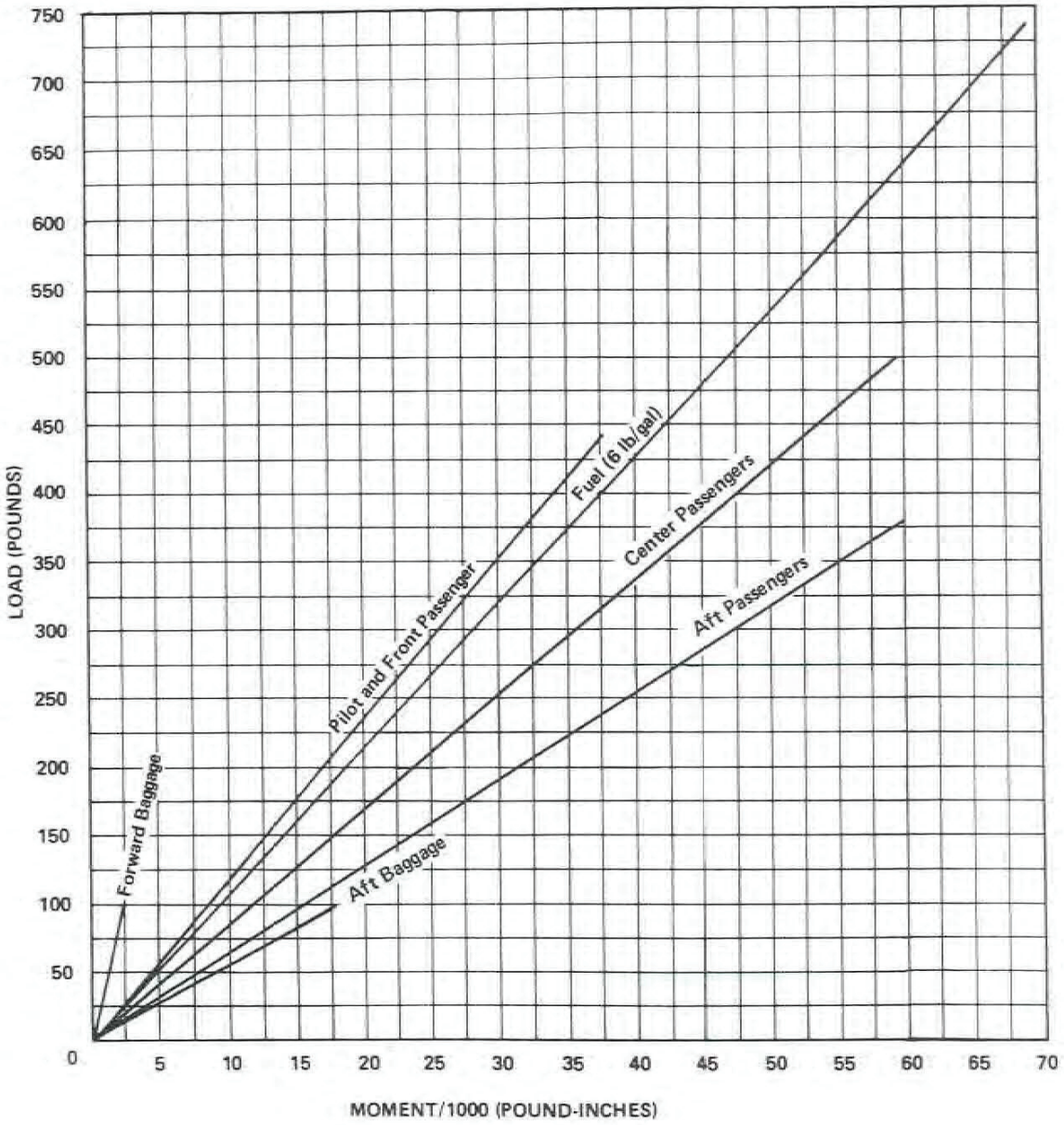
| | Weight (Lbs) | Arm Aft Datum (Inches) | Moment (In-Lbs) |
|---|---|---|---|
| Basic Empty Weight | | | |
| Pilot and Front Passenger | | 85.5 | |
| Passengers (Center Seats) (Forward Facing) | | 118.1 | |
| Passengers (Center Seats) (Aft Facing) (Optional) | | 119.1 | |
| Passengers (Rear Seats) | | 157.6 | |
| Passenger (Jump Seat) (Optional) | | 118.1 | |
| Baggage (Forward) | | 22.5 | |
| Baggage (Aft) | | 178.7 | |
| Zero Fuel Weight (4000 Lbs Max - Std.) (See pages 6-61 and 6-62.) | | | |
| Fuel (93 Gallons Maximum) - Standard (123 Gallons Maximum) - Optional | | 93.6 | |
| 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

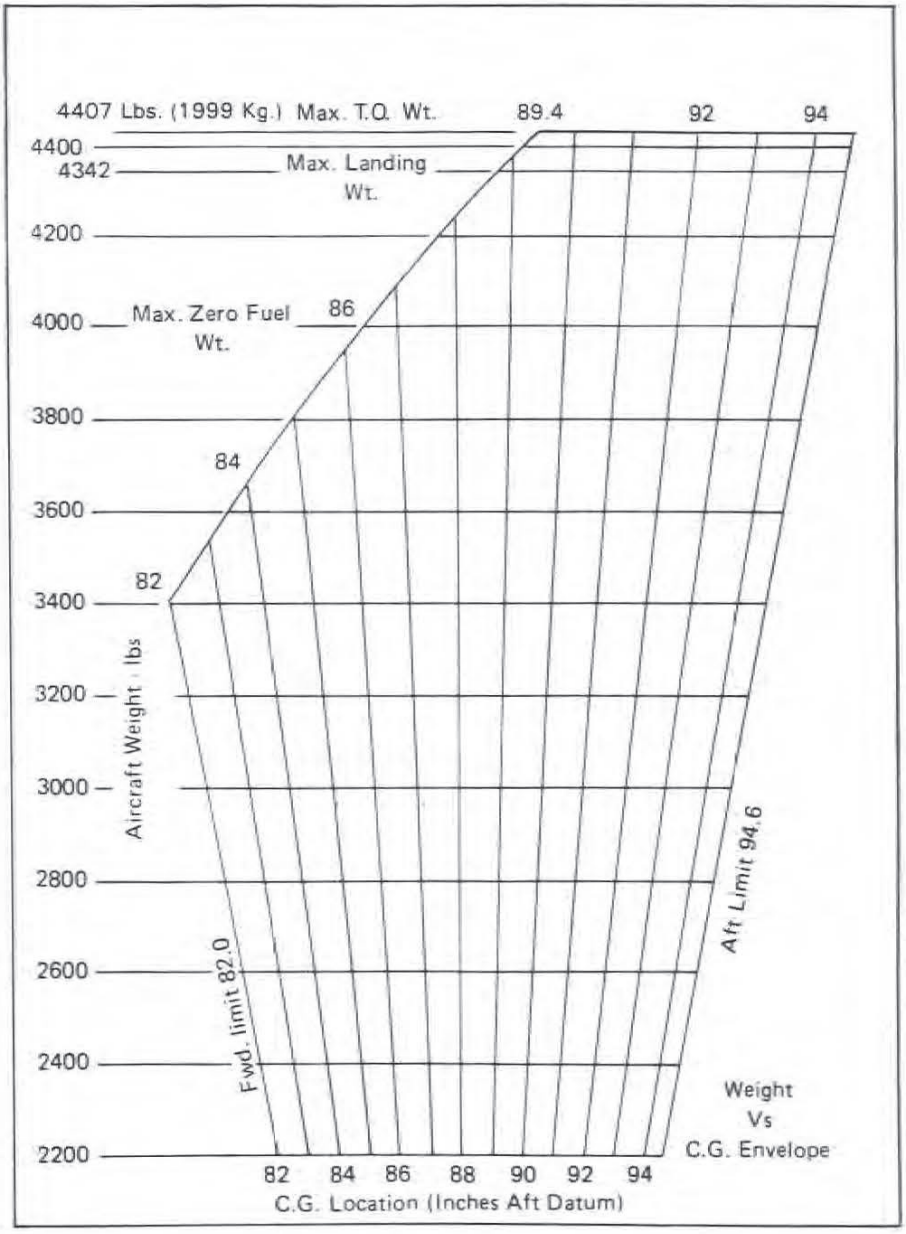
Figure 6-11

## LOADING GRAPH




LOADING GRAPH

Figure 6-13




Moment change due to retracting Landing Gear = - 32 in.-lbs.

C. G. RANGE AND WEIGHT

Figure 6-15

## 6.11 INSTRUCTIONS FOR USING THE WEIGHT AND BALANCE PLOTTER

This plotter is provided to enable the pilot quickly and conveniently to:
(a) Determine the total weight and C.G. position
(b) Decide how to change his load if his first loading is not within the allowable envelope.

Heat can warp or ruin the plotter if it is left in the sunlight. Replacement plotters may be purchased from Piper dealers and distributors.

When the airplane is delivered, the basic weight and basic C.G. will be recorded on the computer. These should be changed any time the basic weight or C.G. location is changed.

The plotter enables the user to add weights and corresponding moments graphically. The effect of adding or disposing of useful load can easily be seen. The plotter does not cover the situation where cargo is loaded in locations other than on the seats or in the baggage compartments.

Brief instructions are given on the plotter itself. To use it, first plot a point on the grid to locate the basic weight and C.G. location. This can be put on more or less permanently because it will not change until the airplane is modified. Next, position the zero weight end of one of the six slots over this point. Using a pencil, draw a line along the slot to the weight which will be carried in that location. Then position the zero weight end of the next slot over the end of this line and draw another line representing the weight which will be located in this second position. When all the loads have been drawn in this manner, the final end of the segmented line locates the total load and the C.G. position of the airplane for takeoff. If this point is not within the allowable envelope it will be necessary to remove fuel, baggage, or passengers and/or to rearrange baggage and passengers to get the final point to fall within the envelope.

Fuel burn-off and gear movement do not significantly affect the center of gravity.

### SAMPLE PROBLEM

A sample problem will demonstrate the use of the weight and balance plotter.

Assume a basic weight and C.G. location of 2850 pounds at 83.5 inches respectively. We wish to carry a pilot and 5 passengers. Two men weighing 180 and 200 pounds will occupy the front seats, two women weighing 115 and 135 pounds will occupy the middle seats and two children weighing 80 and 100 pounds will ride in the rear. Two 25 pound suitcases will be tied down in the front baggage compartment and two suitcases weighing 25 pounds and 20 pounds respectively, will be carried in the rear compartment. We wish to carry 60 gallons of fuel. Will we be within the safe envelope?

(1) Place a dot on the plotter grid at 2850 pounds and 83.5 inches to represent the basic airplane. (See illustration.)

(2) Slide the slotted plastic into position so that the dot is under the slot for the forward seats, at zero weight.

(3) Draw a line up the slot to the 380 pound position (180 + 200) and put a dot.

(4) Move the slotted plastic again to get the zero end of the middle seat slot over this dot.

(5) Draw a line up this slot to the 250 pound position (115 +135) and place the 3rd dot.

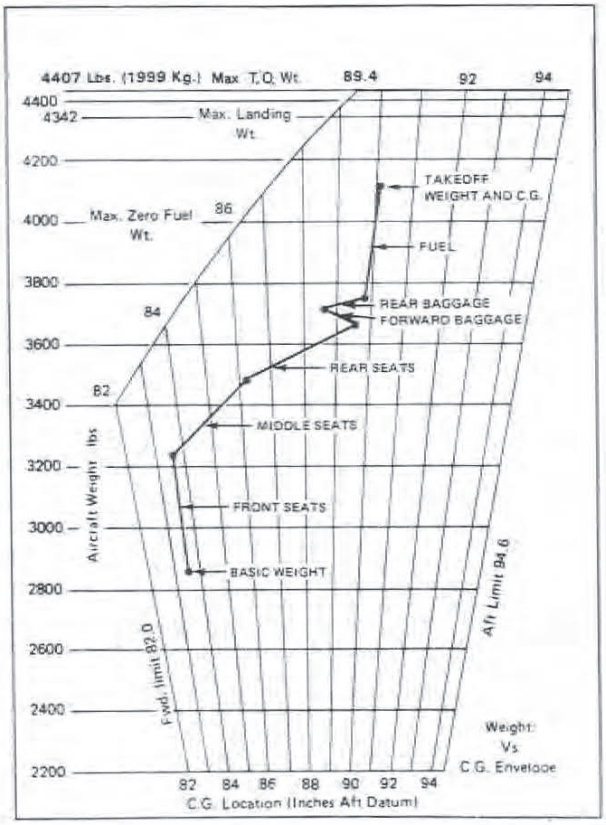
(6) Continue moving the plastic and plotting points to account for weight in the rear seats (80 + 100), forward baggage compartment (50), rear baggage compartment (45), and fuel tanks (360).

(7) As can be seen from the illustration, the final dot shows the total weight to be 4115 pounds with the C.G. at 90.1. This is well within the envelope.

(8) There will be room for more fuel.

As fuel is burned off, the weight and C.G. will follow down the fuel line and stay within the envelope or landing.

SAMPLE PROBLEM




Moment change due to retracting Landing Gear = -32 in.-lbs.

## 6.13 EQUIPMENT LIST

The following is a list of equipment which may be installed in the PA-34-200T. It consists of those items used for defining the configuration of an airplane when the basic empty weight is established at the time of delivery. 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 as delivered by the manufacturer.

PIPER AIRCRAFT CORPORATION PA-34-200T SENECA II

SERIAL NO. 34-7870066 REGISTRATION NO. D - G A R A DATE: 14.02.1978

(a) Propeller and Propeller Accessories

| Item No | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 1 | Two Propellers<br>Cert. Basis - TC P920<br>Hartzell Model BHC-C2YF-2CKF/<br>FC8459-8R or FC8459B-8R<br>(Left Wing)<br>Hartzell Model BHC-C2YF-2CLKF/<br>FJC8459-8R or FJC8459B-8R<br>(Right Wing)<br>OR<br>Hartzell Model BHC-C2YF-2CKUF/<br>FC8459-8R or FC8459B-8R<br>(Left Wing)<br>Hartzell Model BHC-C2YF-2CLKUF/<br>FJC8459-8R or FJC8459B-8R<br>(Right Wing) | | | | |
| 3 | Two Hydraulic Governors<br>Cert. Basis - TC P920 | | | | |
| | Woodward Governor, Piper<br>Dwg. 37476-0 (Left Wing) | X | 2.7 | 28.1 | 76 |
| | Woodward Governor, Piper<br>Dwg. 37476-2 (Right Wing) | X | 2.7 | 28.1 | 76 |
| | OR | | | | |
| | Hartzell Governor<br>Model E-3 (Left Wing) | ____ | 3.9 | 28.1 | 110 |
| | Hartzell Governor<br>Model E-3L (Right Wing) | ____ | 3.9 | 28.1 | 110 |

THIS PAGE INTENTIONALLY LEFT BLANK

(b) Engine and Engine Accessories

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 5 | Two Engines<br>Cert. Basis - TC E9CE<br>Teledyne Continental Model TSIO-360-E or TSIO-360-EB Fuel Injected Turbocharged (Left Wing) Teledyne Continental Model LTSIO-360-E or LTSIO-360-EB Fuel Injected Turbocharged (Right Wing) | | | | |

THIS PAGE INTENTIONALLY LEFT BLANK

(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<br>a. Cleveland Aircraft Products<br>Wheel Assy. No. 40-90<br>Brake Assy. No. 30-65<br>Cert. Basis - TSO C26a | | | | |
| | b. 6.00-6 Type III 8 Ply<br>Rating Tires with Regular Tubes<br>Cert. Basis - TSO C62 | | | | |
| 13 | Nose Wheel Assembly<br>a. Cleveland Aircraft Products<br>Wheel Assy. No. 40-76F<br>Cert. Basis - TSO C26a | ____ | 4.3 | 25.3 | 109 |
| | b. McCauley Industrial Corp.<br>Wheel Assy. No. D-30625<br>Cert. Basis - TSO C26b | X | 5.5 | 25.3 | 139 |
| | c. 6.00-6 Type III 6 Ply<br>Rating Tire with Regular Tubes<br>Cert. Basis - TSO C62 | | | | |

THIS PAGE INTENTIONALLY LEFT BLANK

(d) Electrical Equipment

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 17 | Navigation Light (Rear)<br>Grimes A2064<br>Cert. Basis - TSO C30b | | | | |
| 19 | Navigation Light (Wing) (2)<br>Grimes A1285-G-12<br>A1285-R-12<br>Cert. Basis - TSO C30b | | | | |
| 21 | Stall Warning Devices<br>Piper Dwg. 37063-0<br>(Safe Flight P/N 186-501) | _____ | 0.4 | 80.2 | 32 |
| 23 | Stall Warning Horn<br>Piper Dwg. 37063-0<br>(Safe Flight P/N 35214) | _____ | 0.2 | 60.9 | 12 |

THIS PAGE INTENTIONALLY LEFT BLANK

(e) Instruments

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 25 | Altimeter - Piper PS50008-4 or -5<br>Cert. Basis - TSO C10b | | | | |
| 27 | Airspeed Indicator - Piper PS50049-40S<br>Cert. Basis - TSO C2b | | | | |
| 29 | Compass - Piper Dwg. 67462<br>Cert. Basis - TSO C7c | | | | |
| 31 | Manifold Pressure (Dual) - Piper 37554<br>Cert. Basis - TSO C45 | | | | |
| 33 | Fuel Flow Gauge (Dual) - Piper 37341<br>Cert. Basis - TSO C47 | | | | |

THIS PAGE INTENTIONALLY LEFT BLANK

(f) Miscellaneous

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 41 | Front Seat Belts (2)<br>Piper PS50039-4-2<br>Cert. Basis - TSO C22f | | | | |
| 43 | Center Seat Belts (2)<br>Piper PS50039-4-3<br>Cert. Basis - TSO C22f | | | | |
| 45 | Aft Seat Belts (2)<br>Piper PS50039-4-4<br>Cert. Basis - TSO C22f | | | | |
| 47 | Shoulder Harness - Fixed (Front) (2)<br>Piper PS 50039-4-24 | ——— | 1.1 | 120.1 | 132 |
| 49 | 4407 Lbs. Max. Gross Weight Kit<br>Piper Dwg. 78858<br>Cert. Basis - TC A750 | | | | |

THIS PAGE INTENTIONALLY LEFT BLANK

(g) Engine and Engine Accessories (Optional Equipment)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 51 | Optional Engine Primer System, Piper Dwg. 37865-2 Cert. Basis - TC A7SO | X | 3.1 | 38.5 | 119 |

THIS PAGE INTENTIONALLY LEFT BLANK

(h) Propeller and Propeller Accessories (Optional Equipment)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 59 | Two Propellers<br><br>McCauley Model 3AF34C502/80HA-4 (Left Wing)<br>McCauley Model 3AF34C503/L80HA-4 (Right Wing)<br>Cert. Basis - P 57GL | _____ | *37.2 | 20.3 | 755 |
| 60 | Synchrophasers<br>Piper Dwg. 36890<br>Cert. Basis - TCA7SO | _____ | 5.9 | 61.3 | 362 |

*Weight and moment difference between standard and optional equipment.

THIS PAGE INTENTIONALLY LEFT BLANK

(i) Landing Gear and Brakes
(Optional Equipment)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 67 | Heavy Duty Group No. 1<br>a. Cleveland Aircraft Products<br>40-120 Wheel Assy. (2)<br>30-83 Brake Assy. (2)<br>Cert. Basis - TSO C26a<br><br>Goodrich 6.00 x 6 Ribbed Type III 8 Ply Rating Tire with Tube (2)<br>Cert. Basis - TSO C62 | X | *2.9 | 109.8 | 318 |
| 69 | b. Goodrich 6.00 x 6 Ribbed Type III 8 Ply Rating Tire with Tube<br>Cert. Basis - TSO C62 | X | (Same as standard equipment) | | |

*Weight and moment difference between standard and optional equipment.

THIS PAGE INTENTIONALLY LEFT BLANK

(j) Electrical Equipment
(Optional Equipment)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 79 | Reading Lights | | | | |
| | a. (2) Grimes *10-0154-1 | X | 0.5 | 149.3 | 75 |
| | b. (2) Grimes *10-0154-1 | X | 0.5 | 115.0 | 58 |
| | Cert. Basis - TC A7SO | | | | |
| 81 | Strobe Lights (Wing Tip) (Whelen) Piper Dwg. 95267 Cert. Basis - TC A7SO | X | *2.9 | 137.9 | 400 |
| 83 | Piper Pitch Trim Piper Dwg. 95242-3 Cert. Basis - STC SA3023SW-D | | 2.6 | 178.8 | 465 |
| 85 | Auxiliary Power Receptacle, Piper Dwg. 68815 Cert. Basis - TC A7SO | X | 2.6 | -7.8 | -20 |
| 87 | External Power Cable, Piper Dwg. 62355-2 Cert. Basis - TC A7SO | X | 4.6 | 33.0 | 152 |
| 89 | Lighter, *200462, 12 Volt Universal Cert. Basis - TC A7SO | X | .2 | 67.9 | 14 |

* 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.) |
|---|---|---|---|---|---|

(k) Instruments
(Optional Equipment)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 113 | Vacuum System Installation | X | 2.2 | 67.3 | 148 |
| | a. Two Vacuum Pumps, Piper Dwg. 79399-0 & -2 | ____ | 4.6 | 54.3 | 250 |
| | b. Two Vacuum Pumps, Piper Dwg. 36535-2 (Edo-Aire P/N IU128A) | ____ | 4.4 | 54.3 | 239 |
| | Cert. Bais - TC A7S0 | | | | |
| 115 | Attitude Gyro, Piper Dwg. 99002-2, -3, -4 or -8 Cert. Basis - TSO C4c | ____ | 2.2 | 64.4 | 142 |
| 117 | Directional Gyro, Piper Dwg. 99003-2, -3, -4 or -7 Cert. Basis - TSO C5c | ____ | 2.6 | 64.7 | 168 |
| 119 | NSD-360 Gyro Cert. Basis - TSO C6c, C9c, C52c | ____ | 5.0 | 77.8 | 389 |
| 121 | Tru-Speed Indicator Piper PS50049-40T Cert. Basis - TSO C2b | X | (Same as standard equipment) | | |
| 123 | Encoding Altimeter, Piper PS50008-6 or -7 Cert. Basis - TSO C10b, C88 | ____ | * .9 | 65.9 | 59 |
| 124 | Altitude Digitizer (United Instruments P/N 5125-P3) Cert. Basis - TSO C88 | ____ | 1.0 | 56.2 | 56 |
| 125 | Vertical Speed | | | | |
| | a. Piper Dwg. 99010-2, -4 or -5 | X | 1.0 | 65.9 | 66 |
| | b. Piper Dwg. 99010-3 | ____ | .5 | 67.2 | 34 |
| | Cert. Basis - TSO C8b | | | | |
| 127 | Turn and Slip Indicator, Piper PS50030-2 or -3 Cert. Basis - TSO C3b | X | 2.6 | 64.7 | 168 |

*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.) |
|---|---|---|---|---|---|
| 129 | MK10 Radar Altimeter<br>Piper Dwg. 37693-2<br>Cert. Basis - TC A7SO | ____ | 5.4 | 181.3 | 979 |
| 130 | King KRA-10<br>Radio Altimeter | ____ | 4.3 | 188.2 | 809 |
| 131 | Engine Hour Meter<br>Piper Dwg. 37731-0<br>Cert. Basis - TC A7SO | ____ | 0.3 | 62.9 | 19 |
| 133 | Clock<br>Cert. Basis - TC A7SO | X | .4 | 67.4 | 27 |
| 135 | Air Temperature Gauge,<br>Piper Dwg. 79316<br>Cert. Basis - TC A7SO | X | .2 | 77.6 | 16 |

(k) Instruments
(Optional Equipment) (cont)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| | Copilot's Advanced Instrumentation: | | | | |
| 137 | Attitude Gyro, Piper<br>Dwg. 99002-2, -3, -4 or -8<br>Cert. Basis - TSO C4c | _____ | 2.2 | 64.4 | 142 |
| 139 | Directional Gyro, Piper<br>Dwg. 99003-2, -3, -4 or -7<br>Cert. Basis - TSO C5c | _____ | 2.6 | 64.7 | 168 |
| 141 | Tru-Speed Indicator,<br>Piper PS50049-40T<br>Cert. Basis - TSO C2b | _____ | 0.6 | 66.8 | 40 |
| 143 | Vertical Speed<br>a. Piper Dwg. 99010-2, -4 or -5<br>b. Piper Dwg. 99010-3<br>Cert. Basis - TSO C8b | _____<br>_____ | 1.0<br>.5 | 65.9<br>67.2 | 66<br>34 |
| 145 | Altimeter, Piper<br>PS50008-4 or -5<br>Cert. Basis - TSO C10b | _____ | 1.0 | 65.9 | 66 |
| 147 | Turn and Slip Indicator,<br>Piper PS50030-2 or -3<br>Cert. Basis - TSO C3b | _____ | 2.6 | 64.7 | 168 |
| 149 | Clock<br>Cert. Basis - TC A7SO | _____ | 0.4 | 67.4 | 27 |

THIS PAGE INTENTIONALLY LEFT BLANK

(l) Autopilots
(Optional Equipment)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 161 | AutoControl IIIB | ____ | 6.7 | 89.4 | 599 |
| | a. Directional Gyro * 52D54 | ____ | 3.2 | 63.8 | 204 |
| | b. Omni Coupler 1C-388P | ____ | 0.9 | 64.4 | 58 |
| | Cert. Basis - STC SA3024SW-D | | | | |
| 163 | AltiMatic IIIC | X | 20.1 | 110.8 | 2227 |
| | a. Directional Gyro * 52D54 | X | 3.2 | 63.8 | 204 |
| | b. Omni Coupler 1C-388P | ____ | 0.9 | 64.4 | 58 |
| | c. G/S Coupler 1C-493 | ____ | 0.9 | 60.1 | 54 |
| | Cert. Basis - STC SA3023SW-D | | | | |
| 165 | King KFC-200 Flight Control System. KI-256 Flight Director and 3" Gyros. | | | | |
| | Cert. Basis - STC SA1147CE | ____ | 49.4 | 145.0 | 7163 |
| 167 | King KFC-200 Flight Control System. KG-258 Attitude Horizon Indicator and 3" Gyros. | | | | |
| | Cert. Basis - STC SA1147CE | ____ | 49.4 | 145.0 | 7163 |
| 167a | S-Tec System 65 Flight Control- and ST-361 Single Cue Flight Director System | | | | |
| | Cert. Basis - STC SA 7157SW-D | X | 30.6 | 85.5 | 2616 |

THIS PAGE INTENTIONALLY LEFT BLANK

(m) Radio Equipment
(Optional Equipment)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 168 | Bendix 2011<br>Dual Comm Nav<br>Cert. Basis - TSO C34c, C35d, C36c, C37b, C40a | _____ | 16.8 | 66.8 | 1122 |
| 169 | Bendix IU 2014B<br>Indicator | | | | |
| | Single | _____ | 1.9 | 63.4 | 121 |
| | Dual | _____ | 3.8 | 63.4 | 241 |
| | Cert. Basis - TSO C34c, C36c, C40a, C66c | | | | |
| 170 | Bendix TR-2060 Transponder<br>Cert. Basis - TSO C74c | _____ | 2.8* | 63.6 | 178 |
| 171 | Bendix ADF 2070<br>Cert. Basis - TSO C41c, C2a | _____ | 6.0* | 118.1 | 709 |
| 172 | Bendix DME 2030<br>Cert. Basis - TSO C66a | _____ | 10.3* | 22.9 | 236 |
| 173 | Bendix NCP-2040<br>Nav Programmer | _____ | 5.4 | 64.2 | 347 |
| 174 | Bendix IU 2016A<br>Interface<br>Cert. Basis - TS DOT-160, C2a | _____ | 4.9 | 27.2 | 133 |
| 175 | Bendix Blower 14VDC | _____ | 1.1 | 58.6 | 64 |

*Weight includes antenna and cable.

THIS PAGE INTENTIONALLY LEFT BLANK

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

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 176 | Collins VHF-250 or VHF-251 Comm Transceiver | | | | |
| | Single | _____ | 4.0 | 61.9 | 248 |
| | Dual | _____ | 8.1 | 61.9 | 501 |
| | Cert. Basis - TSO C37b, C38b | | | | |
| 177 | Collins VIR-350 or VIR-351 Nav Receiver | | | | |
| | Single | _____ | 3.9 | 62.4 | 243 |
| | Dual | _____ | 7.9 | 62.4 | 493 |
| | Cert. Basis - TSO C40a, C36c | | | | |
| 178 | Collins IND-350 ( ) VOR LOC Indicator | | | | |
| | Single | _____ | 1.0 | 65.2 | 65 |
| | Dual | _____ | 2.0 | 65.2 | 130 |
| | Cert. Basis - TSO C40a, C36c | | | | |
| 179 | Collins IND-351 ( ) VOR LOC/GS Indicator | | | | |
| | Cert. Basis - TSO C40a, C36c | _____ | 1.3 | 65.2 | 85 |
| 180 | Collins GLS-350 Glide Slope Receiver | | | | |
| | Cert. Basis - TSO C34c | _____ | *3.6 | 86.8 | 312 |
| 181 | Collins ANS 351 R-NAV | | | | |
| | Cert. Basis - TSO C36c | _____ | 3.8 | 63.2 | 240 |
| 182 | Collins DCE 400 Distance Computing Equipment | | | | |
| | Cert. Basis - TSO C40a | _____ | 2.1 | 63.9 | 134 |
| 183 | Collins DME-451 with Ind. 450/451 | | | | |
| | Cert. Basis - TSO C66a | _____ | 8.8 | 185.4 | 1632 |

*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.) |
|---|---|---|---|---|---|
| 184 | Collins RCR-650 ADF Receiver and Antenna and IND-650 Indicator Cert. Basis - TSO C41c | _____ | 7.0 | 122.1 | 855 |
| 185 | Collins RCR-650A ADF Receiver and Antennas and IND-650A Indicator Cert. Basis - TSO C41c | _____ | 7.7 | 116.7 | 899 |
| 186 | Collins AMR-350 Audio/Marker Panel Cert. Basis - TSO C35d, C50b | _____ | *3.3 | 123.9 | 409 |
| 187 | Collins TDR-950 Transponder Cert. Basis - TSO C74c | _____ | *2.8 | 62.5 | 175 |
| 188 | King KX 170 ( ) (VHF Comm/Nav) | | | | |
| | Transceiver, Single | _____ | 7.5 | 61.6 | 462 |
| | Transceiver, Dual | _____ | 15.0 | 61.6 | 924 |
| | Cert. Basis - TC A7SO | | | | |
| 189 | King KN-53 NAV/REC. with GS Receiver | _____ | 3.2 | 63.0 | 202 |
| 190 | King KN-53 NAV/Rec. | _____ | 2.8 | 63.0 | 176 |

*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.) |
|---|---|---|---|---|---|
| 191 | King KX 175 ( ) VHF | | | | |
| | a. Transceiver | _____ | 7.5 | 61.6 | 462 |
| | b. King KN 72 VOR/LOC Converter | _____ | 1.3 | 12.0 | 16 |
| | c. King KN 73 Glide Slope Receiver | _____ | 2.4 | 12.7 | 30 |
| | d. King KN 75 Glide Slope Receiver | _____ | 1.6 | 12.7 | 20 |
| | e. King KN 77 VOR/LOC Converter | _____ | 2.2 | 12.0 | 26 |
| | f. King KI-204 VOR/ILS Indicator | _____ | 2.8 | 65.5 | 183 |
| | g. King KNI 520 VOR/ILS Indicator | _____ | 2.8 | 65.5 | 183 |
| | Cert. Basis - TSO C36c, C37b, C38b, C40a | | | | |
| 192 | King KX 175 ( ) VHF | | | | |
| | a. Transceiver (2nd), | _____ | 7.5 | 61.6 | 462 |
| | b. King KN 72 VOR/LOC Converter | _____ | 1.3 | 12.0 | 16 |
| | c. King KN 77 VOR/LOC Converter | _____ | 2.2 | 12.0 | 26 |
| | d. King KI-203 VOR/LOC Indicator | _____ | 1.6 | 65.5 | 105 |
| | e. King KNI 520 VOR/ILS Indicator | _____ | 2.8 | 65.5 | 183 |
| | Cert. Basis - TSO C36c, C37b, C38b, C40a | | | | |
| 193 | King KY-197 Transceiver<br>Cert. Basis - TSO C37B, C38B | _____ | 4.2 | 63.7 | 267 |
| 194 | King KI 201 ( ) VOR/LOC Indicator<br>Cert. Basis - TC A7SO | _____ | 2.5 | 64.9 | 162 |
| 195 | King KI-208 VOR/LOC Indicator<br>Cert. Basis TSO C34c, C36c, C40a | _____ | 1.0 | 64.9 | 65 |
| 196 | King KI-209 VOR/LOC/GS Indicator<br>Cert. Basis - TSO C34c, C36c, C40a | _____ | 1.2 | 64.9 | 78 |

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

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 197 | King KI 213 VOR/LOC/GS Indicator<br>Cert. Basis - TC A7SO | _____ | 2.5 | 64.9 | 162 |
| 198 | King KI 214 ( ) VOR/ LOC/GS Ind.<br>Cert. Basis - TC A7SO | _____ | 3.3 | 64.9 | 214 |
| 199 | King KR-21 Marker Beacon<br>Cert. Basis - TC A7SO | _____ | *2.2 | 128.3 | 282 |
| 200 | King KN-74 R-Nav<br>Cert. Basis - TC A7SO | _____ | 4.7 | 61.3 | 288 |
| 201 | King KNS-80 R-NAV | _____ | 7.0 | 62.3 | 436 |
| 202 | King KI-206 R-Nav Indicator<br>Cert. Basis - TSO C34c, C36c, C40a | _____ | 1.3 | 61.6 | 80 |
| 203 | King KN 61 DME<br>Cert. Basis - TC A7SO | _____ | 10.6 | 31.9 | 338 |
| 204 | King KN-62A DME | _____ | 3.3 | 63.3 | 209 |
| 205 | King KN 65A DME<br>Cert. Basis - TSO C66a | _____ | 10.8 | 34.3 | 370 |
| 206 | King KR 85 Digital ADF with KA-42B Loop and Sense Antenna | _____ | 9.9 | 99.3 | 983 |
| | a. Audio Amplifier<br>Cert. Basis - TSO C41b | _____ | 0.8 | 52.5 | 42 |
| 207 | King KR 85 Digital ADF | _____ | 9.0 | 99.3 | 894 |
| | a. Audio Amplifier<br>Cert. Basis - TSO C41b | _____ | 0.8 | 52.5 | 42 |
| 208 | King KR 86 ADF with KA-42B Loop and Sense Antenna | | | | |
| | a. Single | _____ | 7.6 | 104.3 | 793 |
| | b. Dual | _____ | 10.6 | 108.9 | 1154 |
| | c. Audio Amplifier<br>Cert. Basis - TC A7SO | _____ | 0.8 | 52.5 | 42 |

*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.) |
|---|---|---|---|---|---|
| 209 | King KR 86 ADF | | | | |
| | a. Single | _____ | 6.7 | 104.3 | 699 |
| | b. Dual | _____ | **16.4 | 107.3 | 1760 |
| | c. Audio Amplifier | _____ | 0.8 | 52.5 | 42 |
| | Cert. Basis - TC A7SO | | | | |
| 210 | King KR-87 Digital ADF with KA44 Antenna | | | | |
| | a. Single | _____ | *7.7 | 75.1 | 578 |
| | b. Dual | _____ | **13.9 | 74.9 | 1041 |
| | c. Audio Amplifier | _____ | 0.8 | 54.1 | 43 |
| 211 | King KI-225 Slaved Card ADF | _____ | 1.5 | 66.3 | 99 |
| 212 | King KMA 20 ( ) Audio Panel | | | | |
| | Cert. Basis - TSO C35c, C50b | _____ | *3.7 | 74.9 | 277 |
| 213 | King KMA-24 Audio Control Panel | _____ | 1.7 | 65.3 | 111 |
| 214 | King KT 76 ( )/78 ( ) Transponder | | | | |
| | Cert. Basis - TSO C746 | _____ | *3.1 | 63.1 | 196 |
| 215 | Narco Comm 11A VHF Transceiver | | | | |
| | a. Single | _____ | 3.6 | 62.4 | 225 |
| | b. Dual | _____ | 7.1 | 62.4 | 443 |
| | Cert. Basis - TC A7SO | | | | |
| 217 | Narco Comm 11B VHF Transceiver | | | | |
| | a. Single | _____ | 3.9 | 62.4 | 243 |
| | b. Dual | _____ | 7.7 | 62.4 | 480 |
| | Cert. Basis - TC A7SO | | | | |

*Weight includes antenna and cable.

**Weight includes dual antenna and cable.

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

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 219 | Narco Comm 111 VHF Transceiver | | | | |
| | a. Single | _____ | 3.0 | 62.4 | 187 |
| | b. Dual | _____ | 6.0 | 62.4 | 374 |
| | Cert. Basis - TSO C37b, C38b | | | | |
| 221 | Narco Comm 111B VHF Transceiver | | | | |
| | a. Single | _____ | 3.9 | 62.4 | 243 |
| | b. Dual | _____ | 7.8 | 62.4 | 487 |
| | Cert. Basis - TSO C37b, C38b | | | | |
| 223 | Narco Comm 120 VHF Transceiver | | | | |
| | a. Single | _____ | 4.8 | 61.9 | 297 |
| | b. Dual | _____ | 8.6 | 62.4 | 537 |
| | Cert. Basis - TSO C37b, C38b | | | | |
| 225 | Narco Nav 11 VHF Receiver | | | | |
| | Cert. Basis - TC A7SO | _____ | 2.8 | 63.6 | 178 |
| 227 | Narco Nav 12 VHF Receiver | | | | |
| | Cert. Basis - TC A7SO | _____ | 3.4 | 63.6 | 216 |
| 229 | Narco Nav 14 VHF Receiver | | | | |
| | Cert. Basis - TC A7SO | _____ | 2.5 | 63.6 | 159 |
| 231 | Narco Nav 111 | | | | |
| | Cert. Basis - TSO C36c, C40a, C66a | _____ | 2.5 | 63.6 | 159 |
| 233 | Narco Nav 112 Receiver | | | | |
| | Cert. Basis - TSO C36c, C40a, C66c, C34c | _____ | 3.3 | 58.6 | 193 |
| 235 | Narco Nav 114 VHF Receiver | | | | |
| | Cert. Basis - TSO C38b, C40a, C36c, C34c, C66a | _____ | 2.5 | 63.6 | 159 |
| 237 | Narco Nav 121 VHF Receiver | | | | |
| | a. Single | _____ | 3.1 | 63.5 | 197 |
| | b. Dual | _____ | 6.2 | 63.4 | 393 |
| | Cert. Basis - TSO C36c, C40c, C66a | | | | |

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

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 239 | Narco Nav 122 VHF Receiver | | | | |
| | a. Single | _____ | *5.3 | 105.7 | 560 |
| | b. Dual | _____ | *8.8 | 87.5 | 770 |
| | Cert. Basis - TSO C35d, C36c, C40c, C66a | | | | |
| 241 | Narco Nav 122A VHF Receiver | | | | |
| | a. Single | _____ | *5.4 | 104.6 | 565 |
| | b. Dual | _____ | *9.0 | 86.8 | 781 |
| | Cert. Basis - TSO C34c, C35d, C36c, C40c, C66a | | | | |
| 243 | Narco Nav 124A VHF Receiver | | | | |
| | a. Single | _____ | *6.4 | 100.3 | 642 |
| | b. Dual | _____ | *11.1 | 84.2 | 935 |
| | Cert. Basis - TSO C35d, C36c, C40a, C66a | | | | |
| 245 | Narco Nav 124R VHF Receiver | | | | |
| | Cert. Basis - TSO C36c, C40a, C66a | _____ | 4.4 | 62.4 | 275 |
| 247 | Narco ID 124 VOR/LOC/GS Indicator | | | | |
| | a. Single | _____ | 1.2 | 65.5 | 79 |
| | b. Dual | _____ | 2.4 | 65.5 | 157 |
| | Cert. Basis - TSO C34c, C35d, C36c, C40c | | | | |
| 249 | Narco OC-110 Converter and Mount | | | | |
| | Cert. Basis - TSO C36c, C40a | _____ | 2.1 | 231.5 | 486 |
| 251 | Narco UGR-2A Glide Slope | | | | |
| | a. First | _____ | 3.0 | 40.0 | 120 |
| | b. Second | _____ | 3.0 | 40.0 | 120 |
| | c. Second | _____ | 3.0 | 231.5 | 695 |
| | Cert. Basis - TSO C34b | | | | |
| 253 | Narco UGR-3 Glide Slope | | | | |
| | Cert. Basis - TC A7SO | _____ | 2.9 | 40.0 | 116 |

*Weight includes marker antenna and cable.

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

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 255 | Narco MBT-12-R, Marker Beacon<br>Cert. Basis - TC A7SO | _____ | 4.2 | 77.4 | 325 |
| 257 | Narco CP-125 Audio Selector Panel<br>Cert. Basis - TC A7SO | _____ | 2.2 | 76.2 | 168 |
| 259 | Narco CP135 Audio Selector Panel<br>Cert. Basis - TSO 650b | _____ | 2.2 | 76.2 | 168 |
| 261 | Narco CP135M Audio Selector Panel<br>Cert. Basis - TSO C50b, C35d | _____ | *3.9 | 132.6 | 517 |
| 263 | Narco CLC-60A R-Nav | _____ | 11.5 | 142.0 | 1633 |
| | a. Narco SA-11 Adapter<br>Cert. Basis - TC A7SO | _____ | 0.8 | 13.0 | 10 |
| 265 | Narco DME-190<br>Cert. Basis - TC A7SO | _____ | **5.9 | 65.9 | 389 |
| 267 | Narco DME-190 TSO<br>Cert. Basis - TSO C66a | _____ | **5.9 | 65.9 | 389 |
| 269 | Narco DME-195 Receiver and Indicator<br>Cert. Basis - TSO C66a | _____ | **10.9 | 29.0 | 316 |
| 1 | Narco ADF-140 | | | | |
| | a. Single | _____ | 6.0 | 104.7 | 628 |
| | b. Dual<br>Cert. Basis - TSO C41c | _____ | *17.9 | 96.3 | 1724 |
| 273 | Narco ADF 141 | | | | |
| | a. Single | _____ | 6.0 | 104.7 | 628 |
| | b. Dual<br>Cert. Basis - TSO C41c | _____ | *17.9 | 96.3 | 1724 |

*Weight includes dual antenna and cable.
**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.) |
|---|---|---|---|---|---|
| 275 | Narco AT50A Transponder | | | | |
| | Cert. Basis - TSO C74b | _____ | **3.0 | 62.3 | 187 |
| | a. Narco AR-500 Altitude Encoder | | | | |
| | Cert. Basis - TSO C88 | _____ | 1.0 | 57.5 | 58 |
| 277 | Narco AT150 Transponder | | | | |
| | Cert. Basis - TSO C74c | _____ | **3.0 | 62.3 | 187 |
| | a. Narco AR-500 Altitude Encoder | | | | |
| | Cert. Basis - TSO C88 | _____ | 1.0 | 57.5 | 58 |
| 289 | Antenna and Cable | | | | |
| | a. Nav Receiving | _____ | 1.6 | 206.9 | 331 |
| | b. *1 VHF Comm | _____ | 0.8 | 147.5 | 118 |
| | C. *2 VHF Comm | _____ | 0.9 | 167.8 | 151 |
| | d. Glide Slope (Single) | _____ | 0.9 | 96.7 | 87 |
| | e. Glide Slope (Dual) | _____ | 2.8 | 180.0 | 504 |
| | f. Single ADF Sense | _____ | 0.4 | 160.0 | 64 |
| | Cert. Basis - TC A7SO | | | | |
| 291 | Anti Static Antenna and Cable | | | | |
| | a. *1 VHF Comm | _____ | 1.5 | 162.7 | 252 |
| | b. *2 VHF Comm | _____ | 1.6 | 192.5 | 308 |
| | c. Single ADF Sense | _____ | 0.6 | 160.0 | 96 |
| | Cert. Basis - TC A7SO | | | | |
| 293 | Emergency Locator Transmitter | | | | |
| | (C.C.C. Model C1R-11-2) | _____ | 1.7 | 267.2 | 454 |
| | a. Antenna and Coax | _____ | 0.2 | 255.4 | 51 |
| | b. Shelf and Access Hole | _____ | 0.5 | 266.4 | 133 |
| | Cert. Basis - TSO C91 | | | | |
| 294 | Emergency Locator Transmitter | | | | |
| | (Narco Model ELT-10) | _____ | 3.5 | 267.2 | 935 |
| | a. Antenna and Coax | _____ | 0.3 | 255.4 | 77 |
| | b. Shelf and Access Hole | _____ | 0.5 | 266.4 | 133 |
| | Cert. Basis - TSO C91 | | | | |

**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.) |
|---|---|---|---|---|---|
| 295 | Microphone | | | | |
| | a. Piper Dwg. 68856-10 | _____ | 0.3 | 70.8 | 21 |
| | b. Piper Dwg. 68856-11 | _____ | 0.6 | 69.9 | 42 |
| | c. Piper Dwg. 68856-12 (Single) | _____ | 0.3 | 70.8 | 21 |
| | Piper Dwg. 68856-12 (Dual) | _____ | 0.6 | 70.8 | 42 |
| | d. Piper Dwg. 79036-5 (Single) | _____ | 0.6 | 69.9 | 42 |
| | e. Piper Dwg. 79036-6 (Dual) | _____ | 1.2 | 69.9 | 84 |
| | Cert. Basis - TC A7SO | | | | |
| 297 | Boom Microphone - Headset Piper Dwg - 37021-4 | | | | |
| | a. Single | ____ | 0.3 | 85.5 | 26 |
| | b. Dual | ____ | 0.6 | 85.5 | 51 |
| | Cert. Basis - TC A7SO | | | | |
| 299 | Cabin Speaker, Piper Dwg. 99820 | | | | |
| | Cert. Basis - TC A7SO | _____ | 1.1 | 97.5 | 107 |
| 301 | Headset, Piper Dwg. 68856-10 | | | | |
| | Cert. Basis - TC A7SO | ____ | 0.5 | 65.0 | 33 |
| 303 | Bendix Radar Piper Dwg. 37916-2 | | | | |
| | Cert. Basis - TSO C63b | ____ | 19.5 | 12.4 | 242 |
| 304 | Bendix Radar Piper Dwg. 37916-4 | | | | |
| | Cert. Basis - TSO C63b | ____ | 23.5 | 21.2 | 498 |
| 305 | Radio Shelf Piper Dwg. 69977-2 | | | | |
| | Cert. Basis - TC A7SO | ____ | 0.9 | 229.0 | 206 |

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

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 307 | RCA - Weather Scout II<br>Monochrome Radar<br>Piper Dwg. 37916-5<br>Cert. Basis - TSO C63b | _____ | 15.7 | 9.2 | 144 |
| 309 | RCA - Weather Scout II<br>Color Radar<br>Piper Dwg. 37916-7<br>Cert. Basis - TSO C63b | _____ | 25.0 | 24.3 | 607 |
| | King KX 155 NAV/COM | x | 5,5 | 64,2 | 353 |
| | King KX 155 NAV/COM | x | 5,5 | 64,2 | 353 |
| | Filser LX 500 R GPS | x | 2,9 | 65,0 | 188,5 |
| | A.S. USH Switching Unit | x | 0,5 | 30,7 | 15,4 |

aero electronic
LBA Nr. 11-A396

THIS PAGE INTENTIONALLY LEFT BLANK

(n) Miscellaneous
(Optional Equipment)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 351 | Zinc Chromate Finish<br>Cert. Basis - TC A7SO | X | 6.0 | 172.0 | 1032 |
| 353 | Stainless Steel Control Cables<br>Cert. Basis - TC A7SO | ____ | – | – | – |
| 355 | Ice Protection System Installation<br>Piper Dwg. 37700<br>Cert. Basis - TC A7SO | | | | |
| | a. Windshield Heating Unit<br>Piper Dwg. 78162-0 | X | 2.6 | 59.6 | 155 |
| | b. Heated Pitot Head and Lift Detectors | X | 0.4 | 100.0 | 40 |
| | c. Ice Light Kit<br>Piper Dwg. 37700-3 | X | 0.4 | 72.0 | 29 |
| | d. Electrothermal Hartzell Propeller Deicing System<br>Piper Dwg. 37700-3 | X | 11.6 | 39.2 | 455 |
| | e. Electrothermal McCauley Propeller Deicing System<br>Piper Dwg. 37700-8 | ____ | 10.2 | 28.0 | 286 |
| | f. Pneumatic Deicing System Including Vacuum Pumps<br>Piper Dwg. 37700-2 | X | 34.3 | 111.9 | 3839 |

(n) Miscellaneous
(Optional Equipment) (cont)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 357 | Fuel Cells, Piper Dwg. 37077-3 Cert. Basis - TSO C80 | X | 6.2 | 93.6 | 580 |
| 358 | Air Conditioning Installation Cert. Basis - TC A7SO | | 53.1 | 108.6 | 5767 |
| 359 | Ground Ventilating Blower, Piper Dwg. 79273-5 Cert. Basis - TC A7SO | X | 8.1 | 207.3 | 1679 |
| 361 | Super Cabin Sound Proofing, Piper Dwg. 78480 Cert. Basis - TC A7SO | X | 24.2 | 107.2 | 2594 |
| 363 | Adjustable Front Seat (Left), Piper Dwg. 79592-0/79592-2 Cert. Basis - TC A7SO | X | *4.6 | 84.7 | 390 |
| 365 | Adjustable Front Seat (Right), Piper Dwg. 79592-1/79592-3 Cert. Basis - TC A7SO | X | *4.6 | 84.1 | 387 |
| 367 | Jump Seat (with seat belts), Piper Dwg. 78108-9 Cert. Basis - TC A7SO | | 9.2 | 122.3 | 1125 |
| 369 | Club Seating<br>a. With Regular Headrests on Center Seats | X | *13.2 | 90.4 | 1193 |
| | b. With Oversize Headrests on Center Seats | | *14.2 | 90.4 | 1284 |
| | Piper Dwg. 37825-3 Cert. Basis - TC A7SO | | | | |
| 371 | Inboard Armrest - Aft Seats Cert. Basis - TC A7SO | | 2.6 | 152.0 | 395 |
| 373 | Headrests (2) Front, Piper Dwg. 79337-18 Cert. Basis - TC A7SO | X | 2.0 | 99.5 | 199 |

*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.) |
|---|---|---|---|---|---|
| 375 | Headrests (2) Center, Piper Dwg. 79337-18 Cert. Basis - TC A7SO | X | 2.0 | 132.1 | 264 |
| 379 | Headrests (2) Rear, Piper Dwg. 79337-18 Cert. Basis - TC A7SO | ____ | 2.0 | 171.5 | 343 |
| 381 | Oversize Headrests - Front (2) Cert. Basis - TC A7SO | ____ | 3.2 | 99.5 | 318 |
| 385 | Oversize Headrests - Center (2) (Fwd. facing seats only) Cert. Basis - TC A7SO | ____ | 3.2 | 132.1 | 423 |
| 387 | Oversize Headrests - Aft (2) Cert. Basis - TC A7SO | ____ | 3.2 | 171.5 | 549 |
| 389 | Inertia Safety Belts (Center) (2) .75 lbs. each, Piper PS50039-4-15 Cert. Basis - TC A7SO | ____ | 1.5 | 133.9 | 201 |
| 391 | Inertia Safety Belts (Rear) (2) 0.8 lbs. each, Piper PS50039-4-14 Cert. Basis - TC A7SO | X | 1.6 | 181.5 | 290 |
| 392 | Shoulder Harness - Inertia (Front) (2) Piper PS50039-4-21 | ____ | 1.3 | 120.1 | 156 |
| 393 | Shoulder Harness - Fixed (Center) (2) Piper PS50039-4-22 | ____ | 1.1 | 133.9 | 147 |
| 394 | Shoulder Harness - Inertia (Center) (2) Piper PS50039-4-19 | ____ | 1.3 | 133.9 | 174 |
| 395 | Shoulder Harness - Fixed (Rear) (2) Piper PS50039-4-22 | ____ | 1.1 | 181.5 | 200 |

(n) Miscellaneous
(Optional Equipment) (cont)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 396 | Shoulder Harness - Inertia (Rear) (2)<br>Piper PS50039-4-19 | _____ | 1.3 | 181.5 | 236 |
| 397 | Assist Straps, Piper Dwg. 79455<br>Cert. Basis - TC A7SO | _____ | .3 | 120.0 | 36 |
| 398 | Curtain and Rod Installation<br>Piper Dwg. 79721-2<br>Cert. Basis - TC A7SO | _____ | 1.9 | 143.6 | 273 |
| 399 | Curtain and Rod Installation<br>Piper Dwg. 67955-3<br>Cert. Basis - TC A7SO | X | 5.2 | 143.6 | 747 |
| 400 | Refreshment Console<br>Cert. Basis - TC A7SO | _____ | 7.0 | 118.5 | 830 |
| 401 | Executive Writing Table<br>Piper Dwg. 36800-2<br>Cert. Basis - TC A7SO | _____ | 3.9 | **185.6 | 724 |
| 402 | Deluxe Carpeting<br>Cert. Basis - TC A7SO | _____ | *-3.4 | 120.0 | -408 |
| 03 | Luxurious Interior<br>Piper Dwg. 67954-2<br>Cert. Basis - TC A7SO | _____ | 25.0 | 120.0 | 3000 |
| 405 | Fire Extinguisher<br>a. Piper Dwg. 78621-2 Scott 42211-00<br>b. Piper Dwg. 35680-2 Graviner HA1014-01<br>Cert. Basis - TC A750 | _____<br><br>_____ | 5.0<br><br>5.6 | 56.0<br><br>62.8 | 280<br><br>352 |

*Weight and moment difference between standard and optional equipment.
**Stowed Position

(n) Miscellaneous
(Optional Equipment) (cont)

| Item No. | Item | Mark if Instl. | Weight (Pounds) | Arm (In.) Aft Datum | Moment (Lb-In.) |
|---|---|---|---|---|---|
| 407 | Tow Bar<br>Piper Dwg. 96331-0<br>Cert. Basis - TC A7SO | X | 4.4 | 8.0 | 35 |
| 409 | Oxygen System - Scott Aviation MKIII (Incl. (1) Mike Mask)<br>a. Piper Dwg. 37684 (Forward Facing Seating Arrangement) Scott 802180-00 | | 41.0 | 112.9 | 4629 |
| | b. Piper Dwg. 37825-4 (Club Seating Arrangement) Scott 802180-01<br>Cert. Basis - TC A7SO | X | 41.6 | 112.9 | 4697 |
| 410 | Fixed Oxygen System - Scott Aviation, Ambassador MK III System, Piper Dwg. 36960-3<br>a. Charged | | 45.5 | 201.3 | 9159 |
| | b. Uncharged<br>Cert. Basis - TC A7SO | | 40.2 | 200.1 | 8044 |
| | TOTAL OPTIONAL EQUIPMENT | | | | |

EXTERIOR FINISH

Base Color Juneau White

Trim Color Baja Yellow

Accent Color Ocala Orange
Hickory Brown

Registration No. Color

Type Finish

THIS PAGE INTENTIONALLY LEFT BLANK

(o) Maximum Zero Fuel Weight Increase

Certain items of optional equipment are either partially or wholly installed in the wing of the Seneca II, and hence need not be counted against the centerline loading restriction. The following is a list of these items:

| Item | Mark if Instl. | Amount By Which Max. Zero Fuel Weight May Be Increased (Pounds) |
|---|---|---|
| Optional Engine Primer System<br>Piper Dwg. 37865-2<br>Cert. Basis - TC A7SO | _____ | 1.4 |
| Two Propellers<br>McCauley Model 3AF34C502/80HA-4<br>(Left Wing)<br>McCauley Model 3AF34C503/L80HA-4<br>(Right Wing)<br>Cert. Basis - P57GL | _____ | 17.8 |
| Synchrophasers<br>Piper Dwg. 36890<br>Cert. Basis - TC A7SO | _____ | 1.4 |
| Heavy Duty Group No. 1<br>a. Cleveland Aircraft Products<br>40-120 Wheel Assy. (2)<br>30-83 Brake Assy. (2)<br>Cert. Basis - TSO C26a<br>Goodrich 6.00 x 6 Ribbed<br>Type III 8 Ply Rating Tire<br>With Tube (2)<br>Cert. Basis - TSO C62 | _____ | 0.3 |
| Strobe Lights<br>(Wing Tip) (Whelen)<br>Piper Dwg. 95267<br>Cert. Basis - TC A7SO | _____ | 2.5 |
| Vacuum System Installation<br>a. Two Vacuum Pumps,<br>Piper Dwg. 79399-0 & -2*<br>Cert. Basis - TC A7SO | _____ | 2.2* |
| Heated Pitot Head<br>Piper Dwg. 37700<br>Cert. Basis - TC A7SO | _____ | 0.5 |

*Not installed with pneumatic deicing system.

(o) Maximum Zero Fuel Weight Increase (cont)

| Item | Mark if Instl. | Amount By Which Max. Zero Fuel Weight May Be Increased (Pounds) |
|---|---|---|
| Electrothermal Hartzell Propeller Deicing System<br>Piper Dwg. 37700<br>Cert. Basis - TC A7SO | _____ | 4.9 |
| Electrothermal McCauley Propeller Deicing System<br>Piper Dwg. 37700<br>Cert. Basis - TC A7SO | _____ | 4.2 |
| Pneumatic Deicing System Including Vacuum Pumps<br>Piper Dwg. 37700<br>Cert. Basis - TC A7SO | _____ | 22.4 |
| Fuel Cells<br>Piper Dwg. 37077-3<br>Cert. Basis - TSO C80 | _____ | 7.9 |
| Air Conditioning Installation<br>Piper Dwg. 36809<br>Cert. Basis - TC A7SO | _____ | 19.3 |

Total of Installed Items = lbs.

Therefore, the new maximum zero fuel wt. of the airplane is:

Standard
(Max. Zero Fuel Wt.) + (Wing Options) = New Max. Zero Fuel Wt.

(4000 lbs.) + ( lbs.) = lbs.