

C.A.A.  
APPROVED OPERATING LIMITATIONS  
for the  
STINSON VOYAGER 150  
(Model 108-1)

Serial Number

108-869

**1947**

Registration Number

N 97869

This airplane is certificated under the Civil Aeronautics Regulations, Part 03, in the Normal and Utility Categories. Limitations contained herein are mandatory for each category as noted. Other data pertains to Recommended Operating Practice and is not considered mandatory.

Part I, pages 1 to 18, inclusive, comprises the Approved Operating Manual. Part II, weight and balance data, forms a part of this manual.

Approved By: \_\_\_\_\_

*Charles F. Dyson*

Director

Aircraft and Components Service

Date \_\_\_\_\_

*June 4, 1947*

PART I  
APPROVED OPERATING MANUAL

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LOG OF REVISIONS

Revision Number	Page Number	Date	CAA Inspector
1.	7, 8, & 9	8-1-47	<i>H. W. Foraker</i> Acting Supt. Aircraft & Components Branch Third Region

For Conversion of % MAC to Inches Wing Chord, See Page 15.

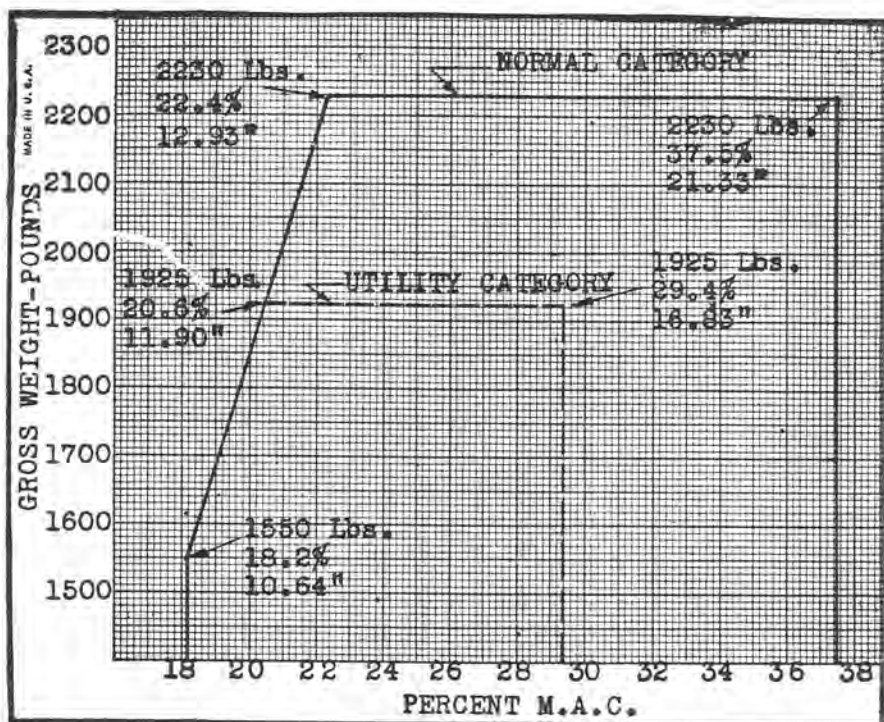


Figure 1 - Center of Gravity & Gross Weight Limitations

A  
AIRPLANE OPERATING LIMITATIONS

1. WEIGHT AND CENTER OF GRAVITY.

The center of gravity location for any given gross weight must be within the limits shown on Figure 1. The maximum gross weight for each category is as follows:

Normal Category ----- 2230 Pounds  
Utility Category ----- 1925 Pounds

2. AIRSPEED.

	<u>Normal Category</u>	<u>Utility Category</u>
Never Exceed Speed	148 mph TIAS	158 mph TIAS
Design Cruising Speed	117 mph TIAS	117 mph TIAS
Maneuvering Speed	113.5 mph TIAS	116.5 mph TIAS
Flaps Down Speed	88 mph TIAS	88 mph TIAS

3. MANEUVERS.

- Normal Category - No acrobatic maneuvers including spins approved.
- Utility Category - No acrobatic maneuvers approved except those listed below:

Chandelle  
Lazy Eight  
Stall (Except Whip Stall)  
Steep Turn  
Spin (Intentional Spins Prohibited  
With Flaps Down)  
No Inverted or Snap Maneuvers Approved.

## LIMITATIONS

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4. POSITIVE FLIGHT LOAD ACCELERATIONS.

Normal Category - 3.8

Utility Category - 4.4

5. OPERATING PLACARDS.

The following placards must prominently be displayed in the cabin:

(a) Normal Category - (2230 Pounds G.W.) No Acrobatic Maneuvers Including Spins Approved.

(b) Utility Category - (1925 Pounds G.W.) No Acrobatic Maneuvers Approved Except Those Listed Below:

<u>Maneuver</u>	<u>Entry Speed</u>
Chandelle	120 mph
Lazy Eight	115 mph
Stall (Except Whip)	-----
Spin*	-----
Steep Turn	-----

No Inverted or Snap Maneuvers Approved.

\*Intentional Spins Prohibited With Flaps Down.

(c) This airplane must be operated in compliance with the Approved Operating Limitations.

(d) The rear seat is not to be occupied when airplane is operated in the Utility Category.

## LIMITATIONS

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- (e) Standard Model - Do not exceed 100 pounds on floor of cabin under rear seat. Do not exceed 350 pounds on floor in rear of cabin with seats removed. See Operating Limitations Manual for detail loading instructions.
  - (f) Baggage Compartment Model - Do not place baggage under rear seat. Do not exceed 350 pounds on floor in rear of cabin with seats removed. See Operating Limitations Manual for detail loading instructions.
  - (g) Baggage Compartment - Do not exceed 100 pounds. See Operating Limitations Manual for detail loading instructions.
6. FLAP SETTINGS.
- (a) Take-Off - Flaps Up
  - (b) Landing - Flaps Down (33°)

## LIMITATIONS

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### 7. INSTRUMENT MARKINGS.

The airspeed indicator must be marked at the speeds listed under "2. AIRSPEED" of this section and at the following additional speeds.

Stalling Speed - Flaps Up      67 MPH TIAS  
Stalling Speed - Flaps Down    57 MPH TIAS

The explanation of these markings follows:

The never-exceed speed is the maximum safe airspeed for airplane operation and is marked on the airspeed indicator by a radial red line.

A yellow arc extends from the never-exceed speed to the design cruising speed; and a green arc from the cruising speed to the stalling speed with the wing flaps up (minimum speed at which flight is possible with flaps up).

The flap operating range is marked by a white arc extending from the design flap speed (maximum speed at which the flaps can be lowered) to the stalling speed with the flaps down.

The maneuvering speed is the minimum speed at which it is possible to obtain a load factor of 3.8 for the Normal Category and 4.4 for the Utility Category.

B  
POWER PLANT OPERATING LIMITATIONS

1. ENGINE.

Engine Make - Aircooled Motors, Inc.

Engine Model - Franklin 6A4-150-B3 or 6A4-150-B31

Rated Power - 150 BHP at 2600 RPM

Temperature Limits:

Cylinder Head - 520°F. (Spark Plug Gasket Type Thermo-  
couple)

Cylinder Barrel - 310°F.

Oil Inlet - 230°F.

Fuel Octane Rating - 80 Minimum

PROPELLER.

(a) Wood (Fixed or Adjustable)

Diameter - Not more than 76 inches

- Not less than 74 inches

Static RPM limits with maximum permissible throttle  
setting - Not more than 2300

- Not less than 2150

(b) Koppers Aeromatic - Hub #F-200, Blade #00-76B

Static RPM 2590



## LIMITATIONS

### 2. INSTRUMENT MARKINGS

- Fuel Quantity Indicator - The fuel gauge pointer stops at "E" when the fuel tank contains only the unusable fuel (2 gallons). The fuel remaining in tank when the pointer is at "E" cannot safely be used in flight.
- Oil Temperature Gauge - A red radial line is marked on the oil temperature gauge at 230°F which is the maximum permissible oil inlet temperature.
- Tachometer - A red radial line is marked on the tachometer at 2600 RPM which is the rated engine speed.

## C

### OPERATING PROCEDURES

#### 1. NORMAL.

##### (a) Starting Engine

- Set parking brake.
- Turn fuel selector valve to fullest tank.
- Carburetor heat off.
- Mixture full rich.

Throttle  $1/4$  inch open.  
Prime 2 to 5 strokes - do not prime hot engine.  
Turn master switch on.  
Turn ignition switch to start.  
When engine fires, release ignition switch and allow it to return to both.

(b) Take-Off

Mixture full rich.

Carburetor air heat off unless icing conditions exist.  
Use of Wing Flaps for Take-Off -- Wing flap control is placarded "TAKE-OFF -- 1ST NOTCH". Take-off may be made with the flaps in this position at the discretion of the pilot. It should be noted, however, that performance information contained in this manual is realized only with the flaps in Full-Up position as stipulated under airplane operating limitations.

(c) Flight

Mixture full rich below 3000 feet - lean for smooth engine operation above 3000 feet.  
Use carburetor air heat to eliminate and prevent carburetor ice.  
Open throttle  $1/3$  to  $1/2$  after maneuver and every 20 seconds or 250 feet during power off descent to clear engine and spark plugs.

(d) Landing

Mixture full rich.

Carburetor heat full on if possible icing conditions exist.

Flaps full down - second notch.

Set trim tab at best trim.

Minimum recommended airspeed over obstacle on landing is 68 mph.

After landing, turn carburetor heat off.

(e) Stopping Engine

Idle at 600 rpm for minimum of one minute.

Slowly open throttle and simultaneously pull mixture control to full lean.

When engine stops firing, turn ignition switch off.

Leave mixture control at full lean as a precaution against accidental starting.

Turn master switch off.

Set parking brakes.

2. CIRCUIT BREAKERS.

Circuit breakers are located under left side of the dash. These breakers are completely automatic in their operation and require no attention.

3. EMERGENCY.

In case of balked landing, apply throttle. To obtain best rate of climb raise flaps.

D  
PERFORMANCE INFORMATION

Revised 8-1-47

Note: All speeds tested hereunder are true indicated airspeeds (TIAS).  
For indicated airspeeds (IAS), see Figure 5, page 13.

1. STALL SPEEDS.

	<u>Normal Category</u>	<u>Utility Category</u>
Stalling Speed Flaps Up	67	58 —
Stalling Speed Flaps Down	57	54 -

2. TAKE-OFF DISTANCE.

Take-off distances at altitudes from Sea Level to 7000 feet are shown on Figure 2, page 10. Included in the distance given by these curves is that required to climb to 50 feet above the field. The data from which these curves were derived was obtained under the following conditions: 2230 pounds gross weight, full throttle - wing flaps up, 73.5 mph - zero wind, and hard surface level runway.

3. LANDING DISTANCE.

Landing distances at altitudes from Sea Level to 7000 feet are shown on Figure 3, page 11. Included in the distance given by these curves is that required to contact the ground from an altitude of 50 feet above the field with a speed of 74 mph at that time. The data from which these curves were derived was obtained under the following conditions: 2230 pounds gross weight, wing flaps full down, zero wind, and hard surface level runway.

INFORMATION

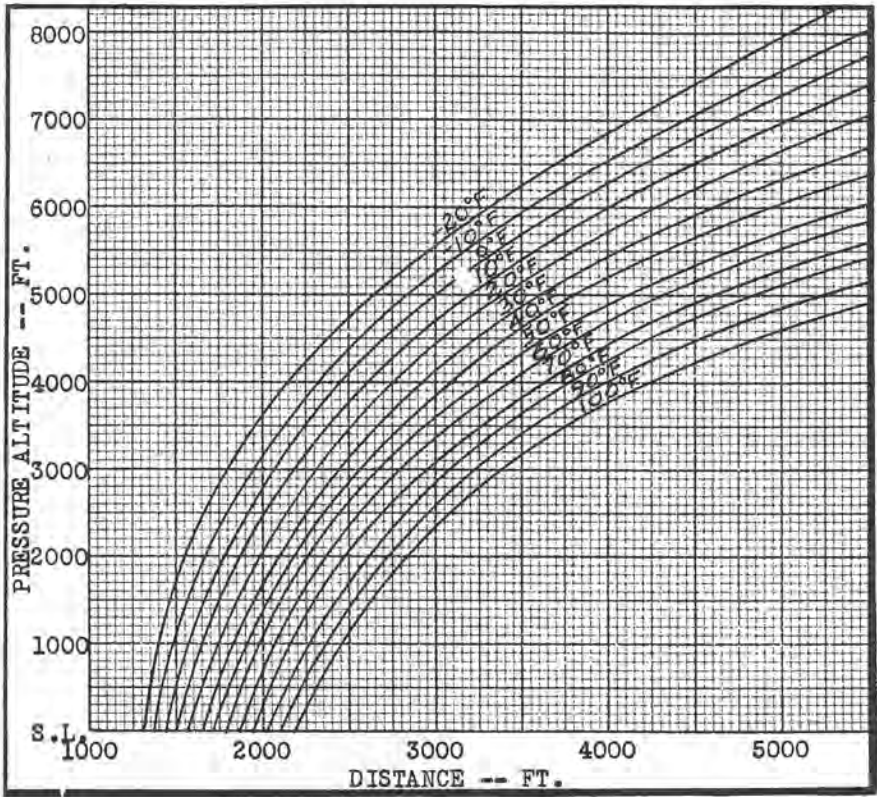


Figure 2 - Distance Required to Take-Off and Climb to 50 Feet  
 - 10 -

INFORMATION

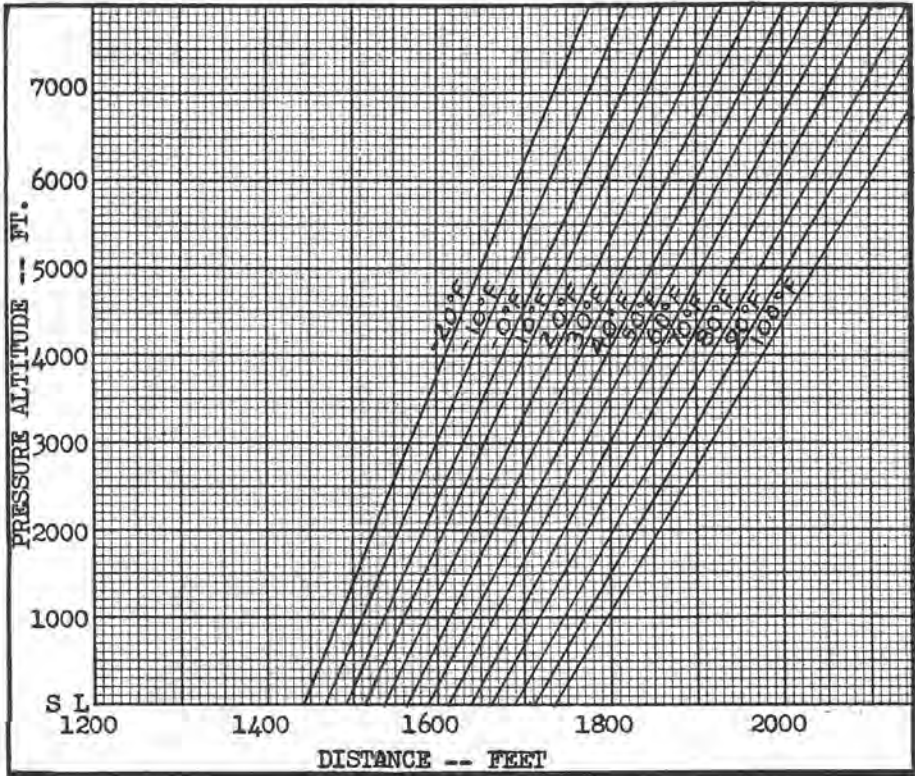


Figure 3 - Distance Required to Land Over A 50 Foot Obstacle

INFORMATION

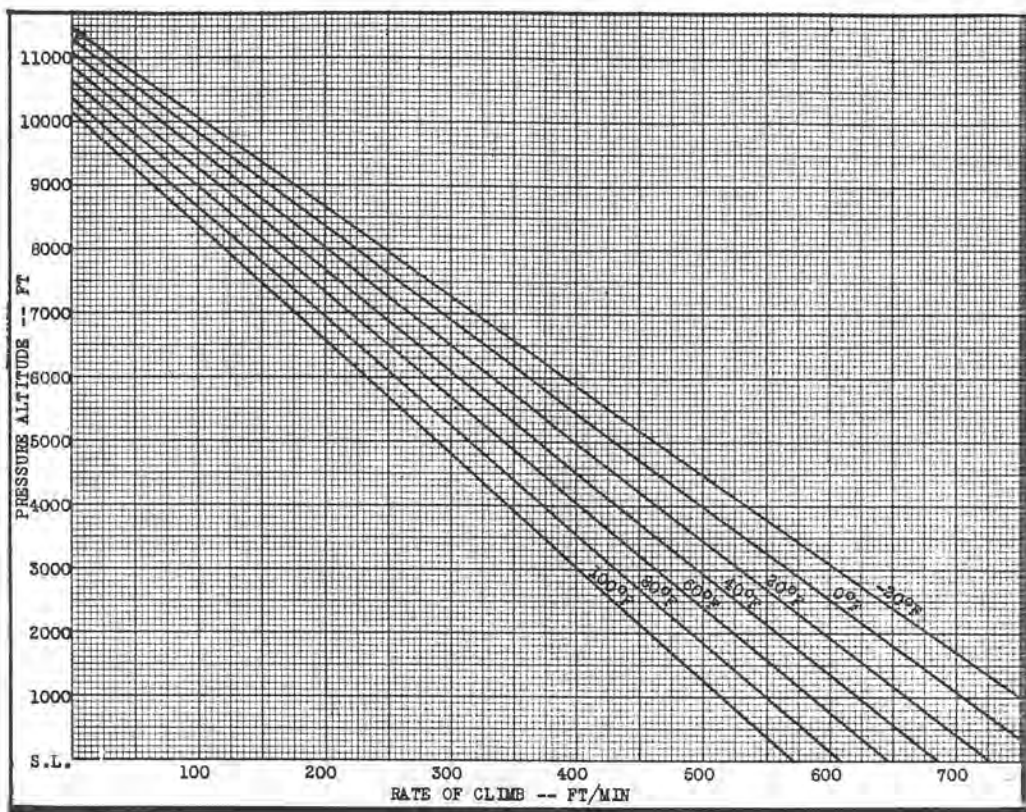


Figure 4 - Take-Off and Balked Landing Climb

INFORMATION

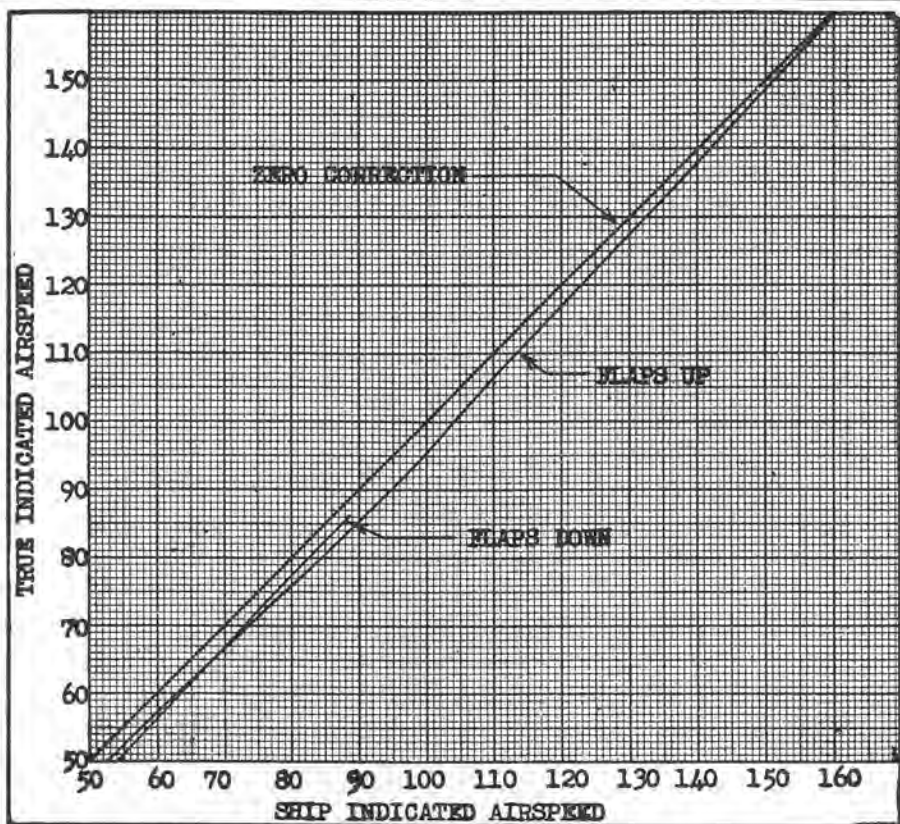


Figure 5 - Airspeed Calibration



## INFORMATION

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### 4. CLIMB DATA.

Climbing characteristics of the airplane at altitudes are shown on Figure 4, page 12. The data from which these curves were derived was obtained under the following conditions: 2230 pounds gross weight, wing flaps up, and full throttle - 80 MPH.

### 5. STALLING SPEED.

Stalling speed characteristics are shown in the following table. Values are given for 2230 pounds gross weight and power off flight.

Angle of Bank (Deg.)	0	10	20	30	40	50	60
Flaps Up	67	68	69	72	77	84	95
Flaps Full Down	57	58	59	61	65	71	81

### 6. AIRSPEED CALIBRATION.

Calibration of the airspeed indicator with True Indicated Airspeed is shown on Figure 5, page 13.

E  
WEIGHT AND BALANCE DATA

1. WEIGHT AND CENTER OF GRAVITY LIMITATIONS.

Weight and balance data is shown on Figure 1. To convert figures for percent MAC into inches wing chord, multiply percent by 55.50 and add .52 inches to this product. Wing leading edge is Reference line.

2. EMPTY WEIGHT.

The empty weight and its corresponding center of gravity are given on the Actual Weight and Balance sheets included in Part II. These sheets also contain a list of standard equipment included in the weight of the airplane.

3. LOADING.

Any combination of baggage, passengers, and fuel may be carried that does not exceed any one of the following limitations:

(a) Do not exceed 2230 pounds gross weight. See Actual Weight and Balance sheets for airplane weight empty.

(b) Do not exceed most rearward Center of Gravity positions and authorized weights shown in Figure 1. See paragraph 4, page 17, for checking balance when carrying load.

(c) Do not exceed 100 pounds in the baggage compartment. This is the maximum load for which this compartment is approved.

## WEIGHT AND BALANCE DATA

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- (d) Do not exceed 350 pounds on floor in rear of cabin with seats removed. This is the maximum load for which the floor structure is approved. Maximum loads must be uniformly distributed.
- (e) Do not exceed 100 pounds on floor of cabin under rear seat on standard airplane.
- (f) On baggage compartment models, do not carry baggage under rear seat.

Securely fasten all loads. The drape extending from the front of the seat to the floor has been proven strong enough to retain 100 pounds of baggage beneath the seat. With the rear seat removed, the safety belts and their lugs on the floor may be used to secure baggage or cargo.

#### 4. BALANCE CHECK.

The following computation sheet is furnished to provide a quick means of checking the airplane loading to assure that the most rearward Center of Gravity Position is not exceeded. Insert the airplane empty weight from page 20, and obtain the arm therefor by subtracting the arm given on page 20 from 21.32.

WEIGHT AND BALANCE DATA

	<u>Weight</u>	x	<u>Arm</u>	=	<u>Moment</u>
Airplane Empty				x	=
Front Seat Occupants			5.32	x	=
Oil (8 Quarts)	15		70.32	x	=
			Total		(1)
					<u>1055</u>
Rear Seat Occupants			26.88	x	=
Cabin Baggage			20.68	x	=
Baggage Compartment Baggage			54.18	x	=
			Total		(2)

Total (1) must be equal to, or larger than, Total (2). Gross weight must not exceed 2230 pounds.

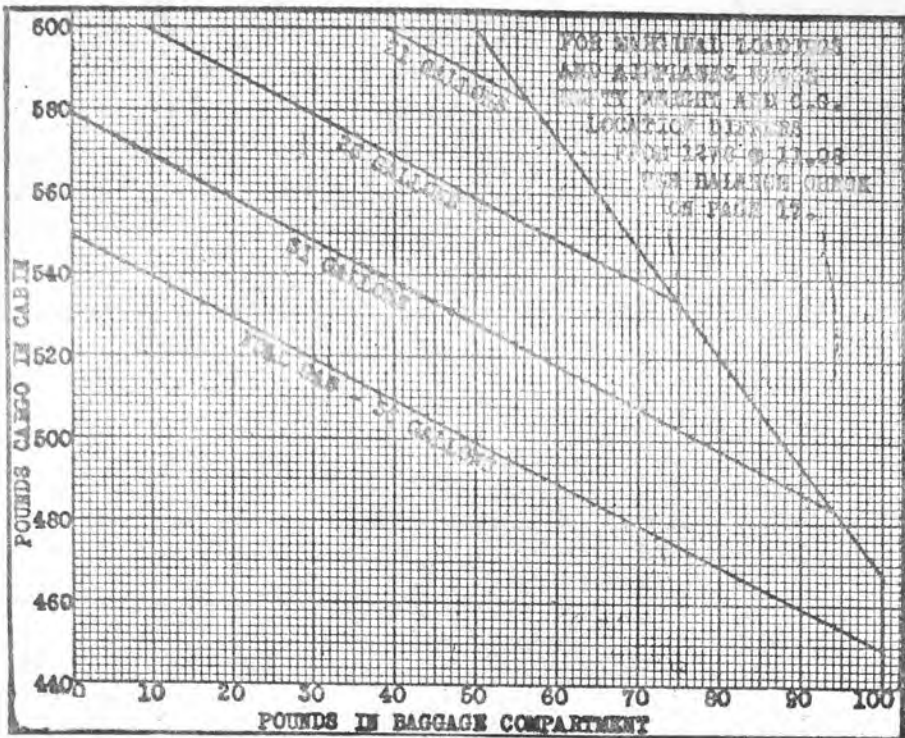


Figure 6 - Station Wagon Loading Chart

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Page 18 only of this "Approved Operating Limitations for the Stinson Voyager (Model 108-1)" is from the Preliminary Model 108-2 "Approved Operating Limitations for the Stinson Voyager (Model 108-2)" dated March 7, 1947. Gross weight of both the model 108-1 and 108-2 is 2230 pounds.

PART II

WEIGHT AND BALANCE DATA

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Standard Equipment List . . . . .	21
Aircraft Maintenance Record - Section I . . . . .	22
Aircraft Maintenance Record - Section II . . . . .	25

Insert Actual Weight  
and Balance Computation  
Sheet Here.

## STANDARD EQUIPMENT LIST

(Cross out equipment not installed)

<u>No.</u>		<u>Weight</u>	<u>Arm</u>
1	Propeller - Fixed Pitch Wood	14.0	-65.5
2	Spinner - Propeller	2.0	-66.5
101	Starter - Delco-Remy	16.0	-32.0
102	Carburetor Air Heater and Control	5.0	-41.0
103	Carburetor Air Filter - Air-Maze C-13197	1.0	-40.0
104	Cabin Heater and Control	6.0	-15.0
203	Parking Brake	.5	-16.2
301	Generator - Delco-Remy	12.0	-31.5
302	Battery Electric Storage Co. 6TS-9F	29.0	13.5
303	Landing Light and Wiring	1.0	4.0
304	Radio Transmitter - Receiver Hallicrafter	9.0	- 9.0
206	Edo Floats - Model 44-2425 With Water Rudder	303	21.2
207	Seaplane Fin - 108-3901002	4.6	218.0



AIRCRAFT MAINTENANCE RECORD  
SECTION I  
WEIGHT AND EQUIPMENT CHANGES

Note: Record in this section only those repairs and alterations (Form 337) that involve a change in the weight or the empty center of gravity.

Stinson Aircraft	Serial No:	Identification Mark:
Repair and Alteration Form dated:		
By (Agency name and number):		
Location and brief description of change or equipment:		
<u>        </u> New E.W.	<u>        </u> New Useful Load	<u>        </u> New Empty C.G.

Stinson Aircraft	Serial No:	Identification Mark:
Repair and Alteration Form dated:		
By (Agency name and number):		
Location and brief description of change or equipment:		
<u>        </u> New E.W.	<u>        </u> New Useful Load	<u>        </u> New Empty C.G.

Stinson Aircraft	Serial No:	Identification Mark:
Repair and Alteration Form dated:		
By (Agency name and number):		
Location and brief description of change or equipment:		
<u>                    </u> New E.W.	<u>                    </u> New Useful Load	<u>                    </u> New Empty C.G.

Stinson Aircraft	Serial No:	Identification Mark:
Repair and Alteration Form dated:		
By (Agency name and number):		
Location and brief description of change or equipment:		
<u>                    </u> New E.W.	<u>                    </u> New Useful Load	<u>                    </u> New Empty C.G.

Stinson Aircraft	Serial No:	Identification Mark:
Repair and Alteration Form dated:		
By (Agency name and number):		
Location and brief description of change or equipment:		
<u>                    </u> New E.W.	<u>                    </u> New Useful Load	<u>                    </u> New Empty C.G.