

Serial No. 108-4859

CAA Identification No. NC 6859M

L A N D P L A N E
A I R P L A N E - F L I G H T - M A N U A L

PREVIOUSLY ENTITLED
APPROVED OPERATING LIMITATIONS

A. LIMITATIONS SECTION.

The following limitations must be observed in the operation of this airplane:

1. ENGINE.

Make: Aircooled Motors, Inc.
Model: Franklin 6A4-165-B3
Rated RPM: 2800 rpm (165 H.P.)
Temp. Limits: Cylinder Head: 530°F (Spark plug type thermocouple)
Cylinder Head: 445°F (Bayonet type thermocouple)
Cylinder Barrel: 310°F
Oil Inlet: 230°F
Fuel Octane Rating: 80 Minimum

2. PROPELLER.

(a) Fixed Pitch Wood.

Diameter: 78 inches max.
74 inches min.
Static RPM limits with maximum permissible throttle setting: 2265 rpm.

(b) Fixed Pitch Metal.

Make: McCauley
Model: 1A17C
Diameter: 76 inches max; 74 inches min.
Static RPM limits with maximum permissible throttle setting: 2300 to 2450 r.p.m.

(c) Two Position Controllable Pitch. (Two Blade)

Make: Sensenich
Model: C-3FR4/PC-376B3
Diameter: 76 inches max.
74 inches min.
Pitch Settings: Low 13.0°
High 17.5°
Static RPM limits with maximum permissible throttle setting (Low Pitch): 2490 rpm.

(d) Automatic Variable Pitch. (Two Blade)

Make: Koppers Aeromatic
Model: F200/00-76P
Parts List Assembly No. 4320 or 4320-1
Diameter: 76 inches max; 74 inches min.
Installation and operation must be accomplished in accordance with Koppers' "Installation Procedure and Operating Limitations No. 11c".

3. POWER PLANT INSTRUMENT MARKINGS.

(a) Fuel Quantity Indicator: Fuel remaining in tank when indicator is in the region marked in RED cannot safely be used in flight.

(b) Oil Temperature Gauge: Unsafe if indicator exceeds RED line (230°F).

(c) Oil Pressure Gauge: Unsafe beyond limits of GREEN arc. Extremities marked by RED lines at 30 and 55 psi.

(d) Tachometer: Rated engine speed (2800 rpm) marked by RED line. GREEN arc shows normal operating range (2000 to 2800 rpm). With McCauley propeller installed, YELLOW arc replaces green arc over range in which continuous operation should be avoided (2150 to 2250 rpm).

4. AIR SPEED LIMITATIONS. (MPH - TIAS)

	Category	
	Normal	Utility
Never Exceed Speed	158	170
Maximum Structural Cruising Speed.	126	126
Maneuvering Speed.	120	120
Flaps Down Speed	88	88

5. FLIGHT LOAD FACTORS.

Normal Category Maximum Positive Load Factor: 3.8g
Utility Category Maximum Positive Load Factor: 4.4g

The maneuvering speed is the maximum speed at which it is not possible to exceed the flight load factors.

6. MAXIMUM GROSS WEIGHT.

Normal Category: 2400 Pounds
Utility Category: 2000 Pounds

7. CENTER OF GRAVITY LIMITS. (See Figure 1.)

Datum line is wing leading edge. For conversion of percent MAC to inches wing chord, multiply percent by 55.50 and add 0.52 inches to this product.

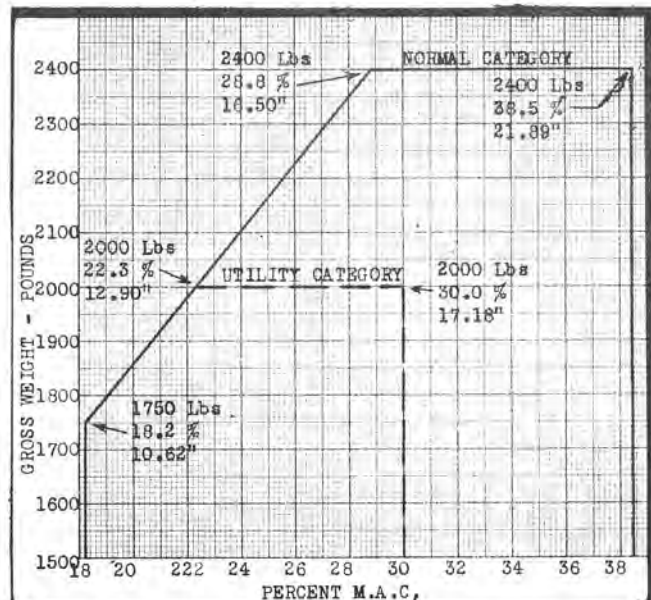


Figure 1 - Center of Gravity & Gross Weight Limitations

TABLE I
PERFORMANCE WITH FIXED-PITCH WOOD PROPELLER (Sensenich 76JR53)
AIRPLANE EQUIPPED WITH WHEELS

ITEM	ALTITUDE	OUTSIDE AIR TEMPERATURES				
		0°F	25°F	50°F	75°F	100°F
Take-Off Distance (feet)	Sea Level	1913	2108	2313	2545	2750
Distance required to take-off and climb to 50 ft.	2000 ft.	2352	2573	2867	3113	3414
	4000 ft.	2894	3210	3552	3930	4363
Full Throttle -- 80 mph TIAS -- Flaps UP	6000 ft.	3639	4058	4500	5020	5558
Normal Rate of Climb (ft./min.)	Sea Level	640	615	590	565	545
Full Throttle -- 82 mph TIAS -- Flaps UP	2000 ft.	556	532	507	484	464
	4000 ft.	473	449	424	402	380
	6000 ft.	389	364	341	320	300
Landing Distance (feet)	Sea Level	1734	1803	1880	1955	2035
Distance required to land over a 50 foot obstacle and stop.	2000 ft.	1845	1925	2010	2096	2176
	4000 ft.	1955	2045	2138	2236	2320
Approach at 80 mph TIAS -- Flaps Full DOWN	6000 ft.	2066	2165	2265	2375	2465

TABLE II
PERFORMANCE WITH FIXED-PITCH WOOD PROPELLER (Sensenich 76JR53)
AIRPLANE EQUIPPED WITH SKIS

ITEM	ALTITUDE	OUTSIDE AIR TEMPERATURES				
		-50°F	-25°F	0°F	25°F	50°F
Take-Off Distance (feet)	Sea Level	*	**1899	2100	2318	2564
Distance required to take-off and climb to 50 ft.	2000 ft.	*	**2330	2598	2871	3231
	4000 ft.	*	*	**3265	3645	4085
Full Throttle -- 80 mph TIAS -- Flaps UP	6000 ft.	*	*	**4199	4736	5405
Normal Rate of Climb (ft./min.)	Sea Level	695	668	640	615	590
Full Throttle -- 82 mph TIAS -- Flaps UP	2000 ft.	610	584	556	532	507
	4000 ft.	525	500	473	449	424
	6000 ft.	440	415	389	364	341
Landing Distance (feet)	Sea Level	2507	2612	2719	2830	2952
Distance required to land over a 50 foot obstacle and stop.	2000 ft.	2658	2776	2896	3022	3158
	4000 ft.	2810	2940	3073	3214	3364
Approach at 80 mph TIAS -- Flaps Full DOWN	6000 ft.	2962	3104	3251	3407	3570

NOTES:

- * At these low temperatures, take-off may be impossible because of very high ski drag.
- ** At these low temperatures, the take-off distance may become excessive due to increased ski drag.

B. MANEUVERS AND OPERATING PLACARDS.

The following placards must be prominently displayed in the cabin:

- (a) "Normal Category - (2400 Pounds G.W.) No Acrobatic Maneuvers Including Spins Approved.
*Utility Category - (2000 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)	-----
Steep Turn	-----
Spin (Intentional Spins Prohibited with Flaps Down).	

No inverted or Snap Maneuvers Approved.

This airplane must be operated in compliance with the Airplane Flight Manual."

*These maneuvers are not listed on the placards of some of the Model 108-3 airplanes.

(b) Voyager Cabin: "Do not place baggage under rear seat. Do not exceed 350 pounds on floor in rear of cabin with seats removed."

(c) Station Wagon Cabin: "Do not place baggage under rear seat. Do not exceed 90 pounds per square foot, or a total of 600 pounds, on floor of cabin."

(d) Baggage Compartment: "Do not exceed 100 pounds."

(e) Use when Two-Position propeller is installed: "Push for High RPM."

9. FLIGHT INSTRUMENT MARKINGS.

The airspeed indicator is marked at the speeds listed under Paragraph 4, AIRSPEED LIMITATIONS, and at the stalling speeds, 64.5 mph flaps up and 61.5 mph flaps down. The explanation of these markings follows:

(a) Red lines mark the never exceed speed for each category (marked "N" for Normal and "U" for Utility) which is the maximum safe airspeed.

(b) Yellow arc denotes range of speeds in which airplane should be operated with caution and extends from the never exceed speed to the maximum structural cruising speed.

(c) Green arc denotes normal operating speed range and extends from cruising speed to stalling speed with flaps up.

(d) White arc denotes speed range in which flaps may safely be lowered.

B. PROCEDURES SECTION.

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

2. Do not operate engine continuously at speeds between 2150 and 2250 rpm when McCauley propeller is installed.

3. In case of Balked Landing, apply throttle and readjust trim tab settings. To obtain best rate of climb, raise flaps.

C. PERFORMANCE INFORMATION SECTION.

1. TAKE-OFF, CLIMB, AND LANDING.

(a) Performance figures for the airplane equipped with wheels are given in Table I. These figures were obtained during the CAA type tests using the Sensenich fixed-pitch wood propeller, and may be realized under conditions indicated with the airplane and engine in good condition and with average piloting technique.

All landplane performance is given for 2400 pounds gross weight, with no wind, and on level, paved runways. In using this data, allowance must be made for actual conditions.

(b) Performance figures for the airplane equipped with skis are given in Table II. These figures are based on CAA test data obtained at approximately 32°F temperature, using the Sensenich fixed-pitch wood propeller, and may be realized under the conditions indicated with the airplane and engine in good condition and with average piloting technique. It should be noted however, that ski drag on snow will increase with a decrease in temperature and will therefore tend to increase take-off distances.

All Skiplane performance is given for 2400 pounds gross weight, with no wind, and on level, crusted snow and ice surfaces. In using this data, allowance for actual conditions must be made.

(c) Performance with McCauley and Sensenich two-position propeller installation is equal to or exceeds that presented in Tables I and II herein.

With Koppers Aeromatic propeller Model F200/00-76B installation, the airplane performance is equal to or exceeds that presented in Tables I and II herein, and at altitudes this performance may be improved by increasing the flight rpm in accordance with paragraph D(3) of the CAA approved Koppers' "Installation Procedure and Operating Limitations No. 11C".

2. STALLING SPEED.

(a) The following table gives the stalling speeds of the airplane at various angles of bank. The approaching stall is indicated by general tail buffeting.

TABLE III

STALLING SPEEDS

<u>Angle of Bank (Deg.)</u>	<u>0</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>
<u>Flaps UP</u>	64.5	65.0	66.4	69.3	73.7	80.4	91.1
<u>Flaps Full-DOWN</u>	61.4	62.0	63.3	66.0	70.2	76.6	86.8

(b) At full forward C.G. loading (1750 lbs. @ 18.2%) with flaps extended and power on, the stall characteristics indicate a pitch of 45° and requires approximately 200 feet altitude for recovery. In a normal unaccelerated stall, at more rearward C.G. loadings, not more than an 100 foot loss of altitude, nor a pitch greater than 30°, will be encountered.

