FAA APPROVED
PILOT'S OPERATING HANDBOOK and
AIRPLANE FLIGHT MANUAL SUPPLEMENT
FOR
CESSNA 172R
AIRPLANES 17280001 AND ON

REGISTRATION NO.: 9562P

SERIAL NO.: 17280499

This Supplement must be attached to the "Pilot's Operating Handbook and FAA Approved Airplane Flight Manual" dated December 2, 1996 (or later FAA approved revision) when the Textron Lycoming IO-360-L2A engine rated at 180 HP and McCauley 1A170E/JHA7660 propeller are installed in accordance with Supplemental Type Certificate **SA10406SC**

The information contained herein supplements or supercedes the information in the basic manual only in those areas listed. For limitations, procedures, performance and loading information not contained in this supplement, consult the basic "Pilot's Operating Handbook and FAA Approved Airplane Flight Manual".

FAA APPROVED Fred Stellar

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LOG OF REVISIONS

Revision Number	Change Description	Pages Affected	FAA Approval and Date
IR	Initial Release.	All	See Cover Page May 6, 2005

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DATE: May 6, 2005

SECTION 1
GENERAL

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DESCRIPTIVE DATA

ENGINE

Engine Manufacturer: Textron Lycoming
Engine Model Number: IO-360-L2A
Engine Type: Normally aspirated, direct drive, air-cooled, horizontally opposed, fuel injected, four cylinder engine with 360 cu. In. displacement
Horsepower Rating and Engine Speed: 180 rated BHP at 2700 RPM

PROPELLER

Propeller Manufacturer: McCauley Propeller Systems
Propeller Model Number: 1A170E/JHA7660
Number of Blades: 2
Propeller Diameter: 76 inches
Propeller Type: Fixed pitch

MAXIMUM CERTIFICATED WEIGHTS

Ramp Weight	Normal Category:	2558 lbs.
	Utility Category:	2208 lbs.
Takeoff Weight	Normal Category:	2550 lbs.
	Utility Category:	2200 lbs.
Landing Weight	Normal Category:	2550 lbs.
	Utility Category:	2200 lbs.

SECTION 2
LIMITATIONS

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AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in Figure 1. Maneuvering speeds shown apply to normal category operations. The utility category maneuvering speed is 98 KIAS at 2200 lbs.

Symbol	Speed	KCAS	KIAS	Remarks
V_{NE}	Never Exceed Speed	160	163	Do not exceed this speed in any operation
V_{NO}	Maximum Structural Cruising Speed	126	129	Do not exceed this speed except in smooth air, and then only with caution
V_A	Maneuvering Speed: 2550 lbs. 2200 lbs. 1900 lbs.	 102 95 88	 105 98 90	Do not make full or abrupt control movements above this speed
V_{FE}	Maximum Flap Extended Speed: 10° Flaps 10° to 30° Flaps	 107 85	 110 85	Do not exceed this speed with flaps down.
-----	Maximum Window Open Speed	160	163	Do not exceed this speed with windows open

Figure 1
Airspeed Limitations

AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their color code significance are shown in Figure 2.

MARKING	KIAS VALUE OR RANGE	SIGNIFICANCE
White Arc	40-85	Full Flap Operating Range. Lower limit is maximum weight V_{SO} in landing configuration. Upper limit is maximum speed permissible with flaps extended.
Green Arc	48-129	Normal Operating Range. Lower limit is maximum weight V_S at most forward C.G. with flaps retracted. Upper limit is maximum structural cruising speed.
Yellow Arc	129-163	Operations must be conducted with caution and only in smooth air
Red Line	163	Maximum speed for all operations

Figure 2
Airspeed Indicator Markings

POWERPLANT LIMITATIONS

Engine Manufacturer: Textron Lycoming
Engine Model Number: IO-360-L2A
Maximum Power: 180 BHP rating
Engine Operating Limits for
Takeoff and Continuous Operations: Maximum Engine Speed: 2700 RPM

Note

The static RPM range at full throttle is 2300 – 2400 RPM

Propeller Manufacturer: McCauley Propeller Systems
Propeller Model Number: 1A170E/JHA7660
Propeller Diameter: Maximum 76 inches
Minimum 75 inch minimum

POWERPLANT INSTRUMENT MARKINGS

INSTRUMENT	RED LINE (MINIMUM)	GREEN ARC (NORMAL OPERATING)	RED LINE (MAX)
Tachometer: Sea-Level 5000 Feet 10,000 Feet	-----	2100 to 2500 RPM 2100 to 2600 RPM 2100 to 2700 RPM	2700 RPM
Oil Temperature	-----	100 to 245°F	245°F
Oil Pressure	20 PSI	50 to 90 PSI	115 PSI
Fuel Quantity	0 (1.5 Gal. Unusable Each Tank)		
Fuel Flow	-----	0 to 12 GPH	-----
Vacuum Gauge	-----	4.5 – 5.5 in. Hg.	-----

Figure 3
Powerplant Instrument Markings

WEIGHT LIMITS

Normal Category

Maximum Ramp Weight: 2558 lbs.
Maximum Takeoff Weight: 2550 lbs.
Maximum Landing Weight: 2550 lbs.
Maximum Weight in Baggage Compartment:
Baggage Area 1 – Station 82 to 108: 120 lbs.
Baggage Area 2 – Station 108 to 142: 50 lbs.

Note
The maximum combined weight capacity for baggage areas 1 and 2 is 120 lbs.

Utility Category

Maximum Ramp Weight: 2208 lbs.
Maximum Takeoff Weight: 2200 lbs.
Maximum Landing Weight: 2200 lbs.
Maximum Weight in Baggage Compartment: In the utility category, the baggage compartment must be empty and rear seat must not be occupied.

CENTER OF GRAVITY LIMITS

Normal Category

Center of Gravity Range:

Forward: 35.0 inches aft of datum at 1950 lbs. or less, with straight line variation to 41.0 inches aft of datum at 2550 lbs.

Aft: 47.3 inches aft of datum at all weights.

Reference Datum: Lower portion of front face of firewall.

Utility Category

Center of Gravity Range:

Forward: 35.0 inches aft of datum at 1950 lbs. or less, with straight line variation to 37.5 inches aft of datum at 2200 lbs.

Aft: 40.5 inches aft of datum at all weights.

Reference Datum: Lower portion of front face of firewall

FLIGHT LOAD FACTOR LIMITS

Normal Category

Flight Load Factors (Maximum Takeoff Weight – 2550 lbs.):

Flaps Up.....+3.8g, -1.52g
Flaps Down.....+3.0g

Utility Category

Flight Load Factors (Maximum Takeoff Weight – 2200 lbs.):

Flaps Up.....+4.4g, -1.76g
Flaps Down.....+3.0g

PLACARDS

Near Airspeed Indicator:

MANEUVERING SPEED – 105 KIAS

SECTION 3
EMERGENCY PROCEDURES

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INTRODUCTION

AIRSPEEDS

AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure After Takeoff:
- Wing Flaps Up..... 70 KIAS
- Wing Flaps Down..... 65 KIAS

Maneuvering Speed:
- 2550 lbs..... 105 KIAS
- 2200 lbs..... 98 KIAS
- 1900 lbs..... 90 KIAS

Maximum Glide..... 68 KIAS
Precautionary Landing With Engine Power.....65 KIAS
Landing Without Engine Power:
- Wing Flaps Up..... 70 KIAS
- Wing Flaps Down..... 65 KIAS

EMERGENCY PROCEDURES CHECKLIST

Note: The airspeeds shown below are the only changes to the emergency procedures for the modified aircraft. Refer to the basic Flight Manual for the remainder of the procedures for those sections shown below.

ENGINE FAILURES

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. **Airspeed – 70 KIAS (flaps Up).**
   65 KIAS (flaps Down)

ENGINE FAILURE DURING FLIGHT (Restart Procedures)

1. **Airspeed – 68 KIAS**

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

3. Airspeed – 70 KIAS (flaps Up)
   65 KIAS (flaps Down)

PRECAUTIONARY LANDING WITH ENGINE POWER

3. Airspeed – 65 KIAS
8. Airspeed – 65 KIAS

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DITCHING
6. Power – Establish 300 Ft/Min Descent at 55 KIAS

NOTE

If no power is available, approach at 70 KIAS with flaps up or at 65 KIAS with 10° flaps.

AMPLIFIED EMERGENCY PROCEDURES

ENGINE FAILURE

After an engine failure in flight, the most important course of action is to continue flying the airplane. Best glide speed (68 KIAS) should be established as quickly as possible. While gliding toward a suitable landing area, an effort should be made to identify the cause of the failure. If time permits, an engine restart should be attempted as shown in the checklist. If the engine cannot be restated, a forced landing without power must be completed.

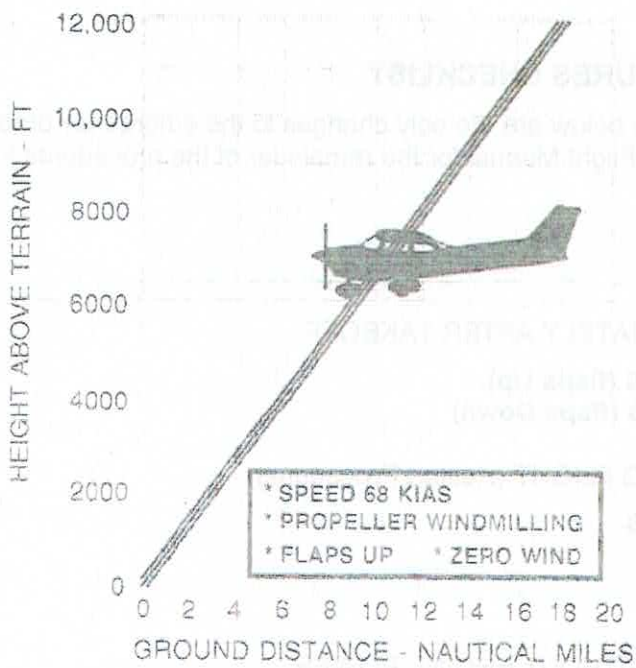

Figure 4
Maximum Glide

SECTION 4
NORMAL PROCEDURES

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AIRSPEEDS

AIRSPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 2550 pounds and may be used for any lesser weight.

Takeoff:	
Normal Climb Out	75 – 85 KIAS
Short Field Takeoff, Flaps 10°, Speed at 50 Feet	56 KIAS
Enroute Climb, Flaps Up:	
Normal, Sea Level	75 – 85 KIAS
Normal, 10,000 Feet	70 – 80 KIAS
Best Rate-of-Climb, Sea Level	74 KIAS
Best Rate-of-Climb, 10,000 Feet	72 KIAS
Best Angle-of-Climb, Sea Level	62 KIAS
Best Angle-of-Climb, 10,000 Feet	67 KIAS
Landing Approach:	
Normal Approach, Flaps Up	65-75 KIAS
Normal Approach, Flaps 30°	60-70 KIAS
Short Field Approach, Flaps 30°	61 KIAS
Balked Landing:	
Maximum Power, Flaps 20°	60 KIAS
Maximum Recommended Turbulent Air Penetration Speed:	
2550 Lbs	105 KIAS
2200 Lbs	98 KIAS
1900 Lbs	90 KIAS
Maximum Demonstrated Crosswind Velocity:	
Takeoff or Landing	15 Knots

CHECKLIST PROCEDURES

Note: Only the procedures shown below have changed from the checklist procedures for the original aircraft. Refer to the basic Airplane Flight Manual for the remainder of the steps not listed in this supplement.

PREFLIGHT INSPECTION

(5) NOSE

2. Engine Oil Dipstick/Filler Cap – Check oil level, then check dipstick/filler cap SECURE. Do not operate with less than six quarts. Fill to eight quarts for extended flight.

TAKEOFF

NORMAL TAKEOFF

5. Climb Speed – 75 – 85 KIAS

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SHORT FIELD TAKEOFF

7. Climb Speed – 56 KIAS (until all obstacles are cleared)
8. Wing Flap – RETRACT slowly after reaching 75 KIAS

CRUISE

3. Power – 2100 – 2700 RPM (No more than 75% is recommended).

LANDING

SHORT FIELD LANDING

3. Airspeed – 61 KIAS

BALKED LANDING

2. Climb Speed – 60 KIAS
3. Wing Flaps - 10° (until obstacles are cleared).
   RETRACT (after reaching a safe altitude and 65 KIAS).

AMPLIFIED PROCEDURES

TAKEOFF

POWER CHECK

It is important to check full throttle engine operation early in the takeoff roll. Any sign of rough engine operation or sluggish engine acceleration is good cause for discontinuing the takeoff. If this occurs, you are justified in making a thorough full throttle static runup before another takeoff is attempted. The engine should run smoothly and turn approximately 2300 – 2400 RPM with mixture leaned to provide maximum RPM.

WING FLAP SETTINGS

Normal takeoffs are accomplished with wing flaps 0° - 10°. Using 10° wing flaps reduces the ground roll and total distance over an obstacle by approximately 10 percent. Flap deflections greater than 10° are not approved for takeoff. If 10° wing flaps are used for takeoff, they should be left down until all obstacles are cleared and a safe flap retraction speed of 75 KIAS is reached. On a short field, 10° wing flaps and a obstacle clearance speed of 56 KIAS should be used.

CRUISE

Normal cruise is performed between 45% and 75% rated power. The engine RPM and corresponding fuel consumption for various altitudes can be determined by using the data in Section 5.

ALTITUDE	75% POWER		65% POWER		55% POWER	
	KTAS	NMPG	KTAS	NMPG	KTAS	NMPG
Sea Level	114	11.2	108	12.0	101	12.8
4000 feet	119	11.7	112	12.4	104	13.2
8000 feet	124	12.2	117	12.9	107	13.6

Figure 5
Cruise Performance Table

LANDING

SHORT FIELD LANDING

For a short field landing in smooth air conditions, make an approach at 61 KIAS with 30° flaps using enough power to control the glide path. (Slightly higher approach speeds should be used under turbulent air conditions.) After all approach obstacles are cleared, progressively reduce power and maintain the approach speed by lowering the nose of the airplane. Touchdown should be made with power off and on the main wheels first. Immediately after touchdown, lower the nose wheel and apply heavy braking as required. For maximum brake effectiveness, retract the flaps, hold the control wheel full back, and apply maximum brake pressure without sliding the tires.

NOISE CHARACTERISTICS

The certificated noise level for the Model 172R at 180 HP at 2550 pounds maximum weight is 80.1 dB(A). No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

SECTION 5
PERFORMANCE

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AIRSPEED CALIBRATION

NORMAL STATIC SOURCE

CONDITION:

Power required for level flight or maximum power descent.

FLAPS UP												
KIAS	50	60	70	80	90	100	110	120	130	140	150	160
KCAS	56	62	70	78	87	97	107	117	127	137	147	157
FLAPS 10°												
KIAS	40	50	60	70	80	90	100	110	---	---	---	---
KCAS	51	57	63	71	80	89	99	109	---	---	---	---
FLAPS 30°												
KIAS	40	50	60	70	80	85	---	---	---	---	---	---
KCAS	50	56	63	72	81	86	---	---	---	---	---	---

Figure 6
Airspeed Calibration – Normal

AIRSPEED CALIBRATION

ALTERNATE STATIC SOURCE

CONDITION:

Power required for level flight or maximum power descent.

FLAPS UP												
KIAS	50	60	70	80	90	100	110	120	130	140	150	160
KCAS	56	62	68	76	85	95	105	115	125	134	144	154
FLAPS 10°												
KIAS	40	50	60	70	80	90	100	110	---	---	---	---
KCAS	51	55	60	68	77	86	96	105	---	---	---	---
FLAPS 30°												
KIAS	40	50	60	70	80	85	---	---	---	---	---	---
KCAS	49	54	61	69	78	83	---	---	---	---	---	---

NOTE:

Windows closed, ventilators closed, cabin heater, cabin air, and defroster on maximum.

Figure 7
Airspeed Calibration – Alternate

STALL SPEEDS AT 2550 POUNDS

Conditions:
Power Off

MOST REARWARD CENTER OF GRAVITY

FLAP SETTING	ANGLE OF BANK							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	48	53	52	57	57	63	68	75
10°	42	50	45	54	50	59	59	71
30°	40	48	43	52	48	57	57	68

MOST FORWARD CENTER OF GRAVITY

FLAP SETTING	ANGLE OF BANK							
	0°		30°		45°		60°	
	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	48	53	52	57	57	63	68	75
10°	43	51	46	55	51	61	61	72
30°	40	48	43	52	48	57	57	68

NOTES:

1. Altitude loss during a stall recovery may be as much as 230 feet.
2. KIAS values are approximate.

Figure 8
Stall Speeds

SHORT FIELD TAKEOFF DISTANCE AT 2550 POUNDS

CONDITIONS:

Flaps 10°
Full Throttle Prior to Brake Release
Paved, level, dry runway
Zero Wind
Lift Off: 51 KIAS
Speed at 50 Ft: 56 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	860	1465	925	1575	995	1690	1070	1810	1150	1945
1000	940	1600	1010	1720	1090	1850	1170	1990	1260	2135
2000	1025	1755	1110	1890	1195	2035	1285	2190	1380	2355
3000	1125	1925	1215	2080	1310	2240	1410	2420	1515	2605
4000	1235	2120	1335	2295	1440	2480	1550	2685	1660	2880
5000	1355	2345	1465	2545	1585	2755	1705	2975	1825	3205
6000	1495	2605	1615	2830	1745	3075	1875	3320	2010	3585
7000	1645	2910	1785	3170	1920	3440	2065	3730	2215	4045
8000	1820	3265	1970	3575	2120	3880	2280	4225	2450	4615

NOTES:

1. Short field technique as specified in Section 4.
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.

Figure 9
Short Field Takeoff Distance – 2550 lbs.

SHORT FIELD TAKEOFF DISTANCE AT 2400 POUNDS

CONDITIONS:

Flaps 10°
Full Throttle Prior to Brake Release
Paved, level, dry runway
Zero Wind
Lift Off: 48 KIAS
Speed at 50 Ft: 54 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	745	1275	800	1370	860	1470	925	1570	995	1685
1000	810	1390	875	1495	940	1605	1010	1720	1085	1845
2000	885	1520	955	1635	1030	1760	1110	1890	1190	2030
3000	970	1665	1050	1795	1130	1930	1215	2080	1305	2230
4000	1065	1830	1150	1975	1240	2130	1335	2295	1430	2455
5000	1170	2015	1265	2180	1360	2355	1465	2530	1570	2715
6000	1285	2230	1390	2410	1500	2610	1610	2805	1725	3015
7000	1415	2470	1530	2685	1650	2900	1770	3125	1900	3370
8000	1560	2755	1690	3000	1815	3240	1950	3500	2095	3790

NOTES:

1. Short field technique as specified in Section 4.
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.

Figure 10
Short Field Takeoff Distance – 2400 lbs.

SHORT FIELD TAKEOFF DISTANCE AT 2200 POUNDS

CONDITIONS:

Flaps 10°
Full Throttle Prior to Brake Release
Paved, level, dry runway
Zero Wind
Lift Off: 44 KIAS
Speed at 50 Ft: 50 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	610	1055	655	1130	705	1205	760	1290	815	1380
1000	665	1145	720	1230	770	1315	830	1410	890	1505
2000	725	1250	785	1340	845	1435	905	1540	975	1650
3000	795	1365	860	1465	925	1570	995	1685	1065	1805
4000	870	1490	940	1605	1010	1725	1090	1855	1165	1975
5000	955	1635	1030	1765	1110	1900	1195	2035	1275	2175
6000	1050	1800	1130	1940	1220	2090	1310	2240	1400	2395
7000	1150	1985	1245	2145	1340	2305	1435	2475	1540	2650
8000	1270	2195	1370	2375	1475	2555	1580	2745	1695	2950

NOTES:

1. Short field technique as specified in Section 4.
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.

Figure 11
Short Field Takeoff Distance – 2200 lbs.

MAXIMUM RATE-OF-CLIMB AT 2550 POUNDS

CONDITIONS:

Flaps Up
Full Throttle

PRESS ALT FT	CLIMB SPEED KIAS	RATE OF CLIMB - FPM			
		-20°C	0°C	20°C	40°C
S.L.	74	855	785	710	645
2000	73	760	695	625	560
4000	73	685	620	555	495
6000	73	575	515	450	390
8000	72	465	405	345	285
10,000	72	360	300	240	180
12,000	72	255	195	135	- - -

NOTE:

1. Mixture leaned above 3,000 feet for maximum RPM.

Figure 12
Maximum Rate of Climb

TIME, FUEL AND DISTANCE TO CLIMB AT 2550 POUNDS

CONDITIONS:

Flaps Up
Full Throttle
Standard Temperature

PRESS ALT FT	CLIMB SPEED KIAS	RATE OF CLIMB FPM	FROM SEA LEVEL		
			TIME IN MIN	FUEL USED GAL	DIST NM
S.L.	74	730	0	0.0	0
1000	73	695	1	0.4	2
2000	73	655	3	0.8	4
3000	73	620	4	1.2	6
4000	73	600	6	1.5	8
5000	73	550	8	1.9	10
6000	73	505	10	2.2	13
7000	73	455	12	2.6	16
8000	72	410	14	3.0	19
9000	72	360	17	3.4	22
10,000	72	315	20	3.9	27
11,000	72	265	24	4.4	32
12,000	72	220	28	5.0	38

NOTES:

1. Add 1.4 gallons of fuel for engine start, taxi and takeoff allowance.
2. Mixture leaned above 3,000 feet for maximum RPM.
3. Increase time, fuel and distance by 10% for each 10°C above standard temperature.
4. Distances shown are based on zero wind.

Figure 13
Time, Fuel and Distance to Climb

CRUISE PERFORMANCE

CONDITIONS:
2550 Pounds
Recommended Lean Mixture At All Altitudes (Refer to Section 4, Cruise)

PRESS ALT FT	RPM	20°C BELOW STANDARD TEMP			STANDARD TEMPERATURE			20°C ABOVE STANDARD TEMP		
		% BHP	KTAS	GPH	% BHP	KTAS	GPH	% BHP	KTAS	GPH
2000	2550	83	117	11.1	77	118	10.5	72	117	9.9
	2500	78	115	10.6	73	115	9.9	68	115	9.4
	2400	69	111	9.6	64	110	9.0	60	109	8.5
	2300	61	105	8.6	57	104	8.1	53	102	7.7
	2200	53	99	7.7	50	97	7.3	47	95	6.9
	2100	47	92	6.9	44	90	6.6	42	89	6.3
4000	2600	83	120	11.1	77	120	10.4	72	119	9.8
	2550	79	118	10.6	73	117	9.9	68	117	9.4
	2500	74	115	10.1	69	115	9.5	64	114	8.9
	2400	65	110	9.1	61	109	8.5	57	107	8.1
	2300	58	104	8.2	54	102	7.7	51	101	7.3
	2200	51	98	7.4	48	96	7.0	45	94	6.7
	2100	45	91	6.6	42	89	6.4	40	87	6.1
6000	2650	83	122	11.1	77	122	10.4	72	121	9.8
	2600	78	120	10.6	73	119	9.9	68	118	9.4
	2500	70	115	9.6	65	114	9.0	60	112	8.5
	2400	62	109	8.6	57	108	8.2	54	106	7.7
	2300	54	103	7.8	51	101	7.4	48	99	7.0
	2200	48	96	7.1	45	94	6.7	43	92	6.4

NOTE:

1. Cruise speeds are shown for an airplane equipped with speed fairings. Without speed fairings, decrease speeds shown by 2 knots.

Figure 14
Cruise Performance

CRUISE PERFORMANCE

CONDITIONS:
2550 Pounds
Recommended Lean Mixture At All Altitudes (Refer to Section 4, Cruise)

PRESS ALT FT	RPM	20°C BELOW STANDARD TEMP			STANDARD TEMPERATURE			20°C ABOVE STANDARD TEMP		
		% BHP	KTAS	GPH	% BHP	KTAS	GPH	% BHP	KTAS	GPH
8000	2700	83	125	11.1	77	124	10.4	71	123	9.7
	2650	78	122	10.5	72	122	9.9	67	120	9.3
	2600	74	120	10.0	68	119	9.4	64	117	8.9
	2500	65	114	9.1	61	112	8.6	57	111	8.1
	2400	58	108	8.2	54	106	7.8	51	104	7.4
	2300	52	101	7.5	48	99	7.1	46	97	6.8
	2200	46	94	6.8	43	92	6.5	41	90	6.2
10,000	2700	78	124	10.5	72	123	9.8	67	122	9.3
	2650	73	122	10.0	68	120	9.4	63	119	8.9
	2600	69	119	9.5	64	117	9.0	60	115	8.5
	2500	62	113	8.7	57	111	8.2	54	109	7.8
	2400	55	106	7.9	51	104	7.5	49	102	7.1
	2300	49	100	7.2	46	97	6.8	44	95	6.5
12,000	2650	69	121	9.5	64	119	8.9	60	117	8.5
	2600	65	118	9.1	61	116	8.5	57	114	8.1
	2500	58	111	8.3	54	109	7.8	51	107	7.4
	2400	52	105	7.5	49	102	7.1	46	100	6.8
	2300	47	98	6.9	44	95	6.6	41	92	6.3

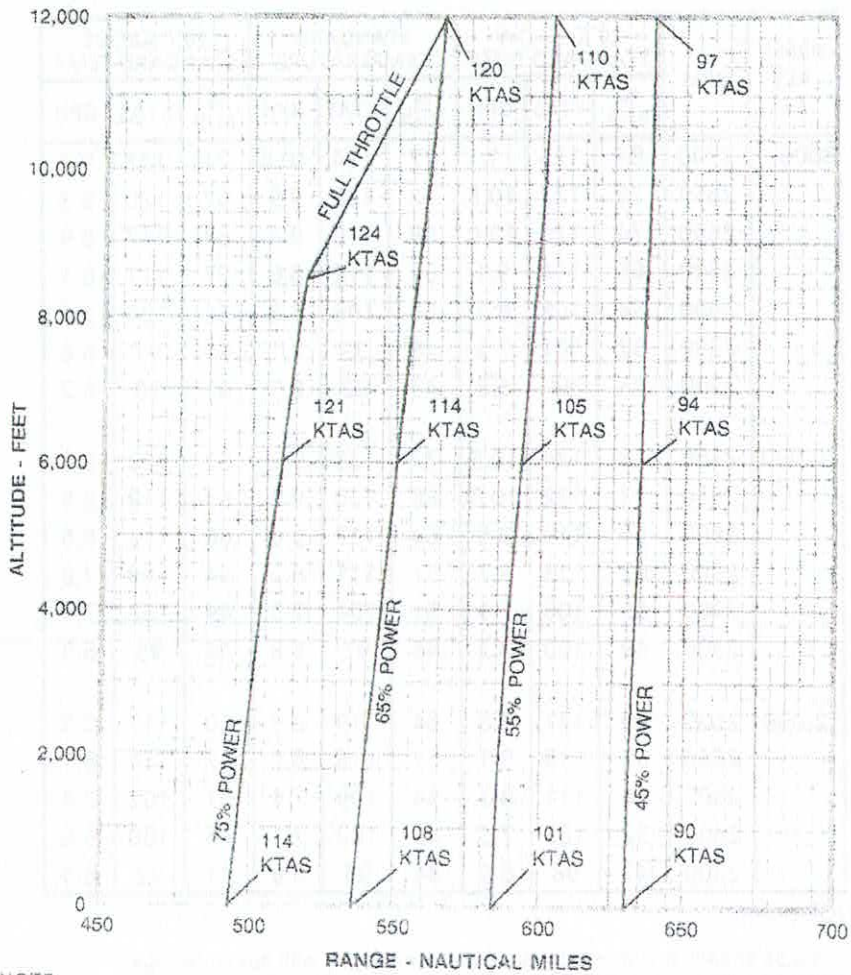
NOTE:

1. Cruise speeds are shown for an airplane equipped with speed fairings. Without speed fairings, decrease speeds shown by 2 knots.

Figure 15
Cruise Performance

RANGE PROFILE
45 MINUTES RESERVE
53 GALLONS USABLE FUEL

CONDITIONS:
2550 Pounds
Recommended Lean Mixture for Cruise At All Altitudes
Standard Temperature
Zero Wind

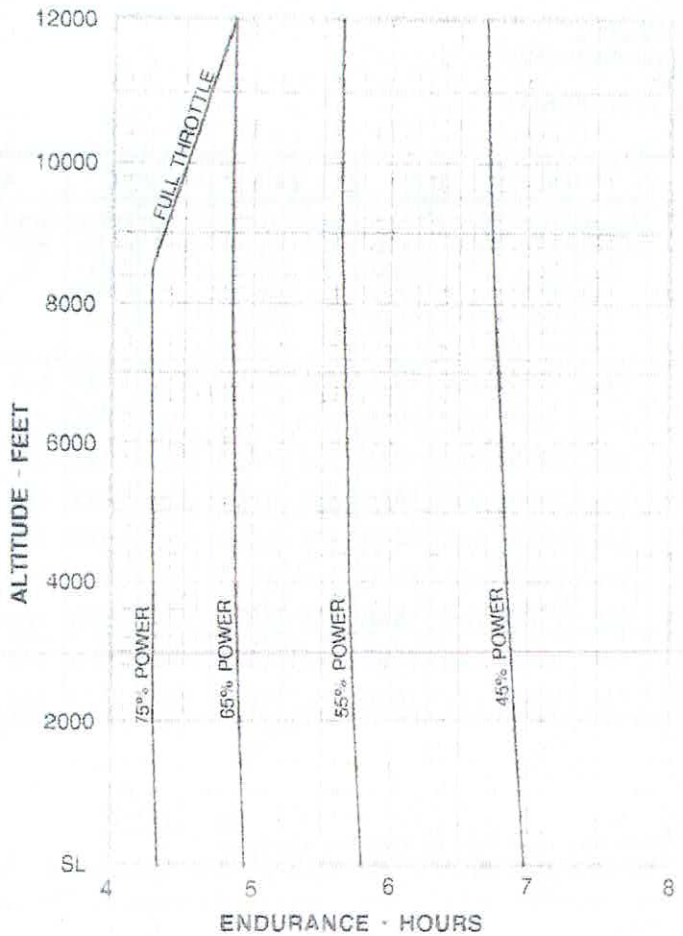


NOTE:
1. This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the distance during climb.
2. Performance is shown for an airplane equipped with speed fairings, which increase the cruise speeds by approximately 2 knots.

Figure 16
Range Profile

ENDURANCE PROFILE
45 MINUTES RESERVE
53 GALLONS USABLE FUEL

CONDITIONS:
2550 Pounds
Recommended Lean Mixture for Cruise At All Altitudes
Standard Temperature



NOTE:
1. This chart allows for the fuel used for engine start, taxi, takeoff and climb, and the time during climb.

Figure 17
Endurance Profile

SHORT FIELD LANDING DISTANCE AT 2550 POUNDS

CONDITIONS:

Flaps 30°
Power Off
Maximum Braking
Paved, level, dry runway
Zero Wind
Speed at 50 Ft: 61 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	545	1290	565	1320	585	1350	605	1380	625	1415
1000	565	1320	585	1350	605	1385	625	1420	650	1450
2000	585	1355	610	1385	630	1420	650	1455	670	1490
3000	610	1385	630	1425	655	1460	675	1495	695	1530
4000	630	1425	655	1460	675	1495	700	1535	725	1570
5000	655	1460	680	1500	705	1535	725	1575	750	1615
6000	680	1500	705	1540	730	1580	755	1620	780	1660
7000	705	1545	730	1585	760	1625	785	1665	810	1705
8000	735	1585	760	1630	790	1670	815	1715	840	1755

NOTES:

1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on dry, grass runway, increase distances by 45% of the "ground roll" figure.
4. If landing with flaps up, increase the approach speed by 9 KIAS and allow for 35% longer distances.

Figure 18
Short Field Landing Distance

SECTION 6
WEIGHT & BALANCE/EQUIPMENT LIST

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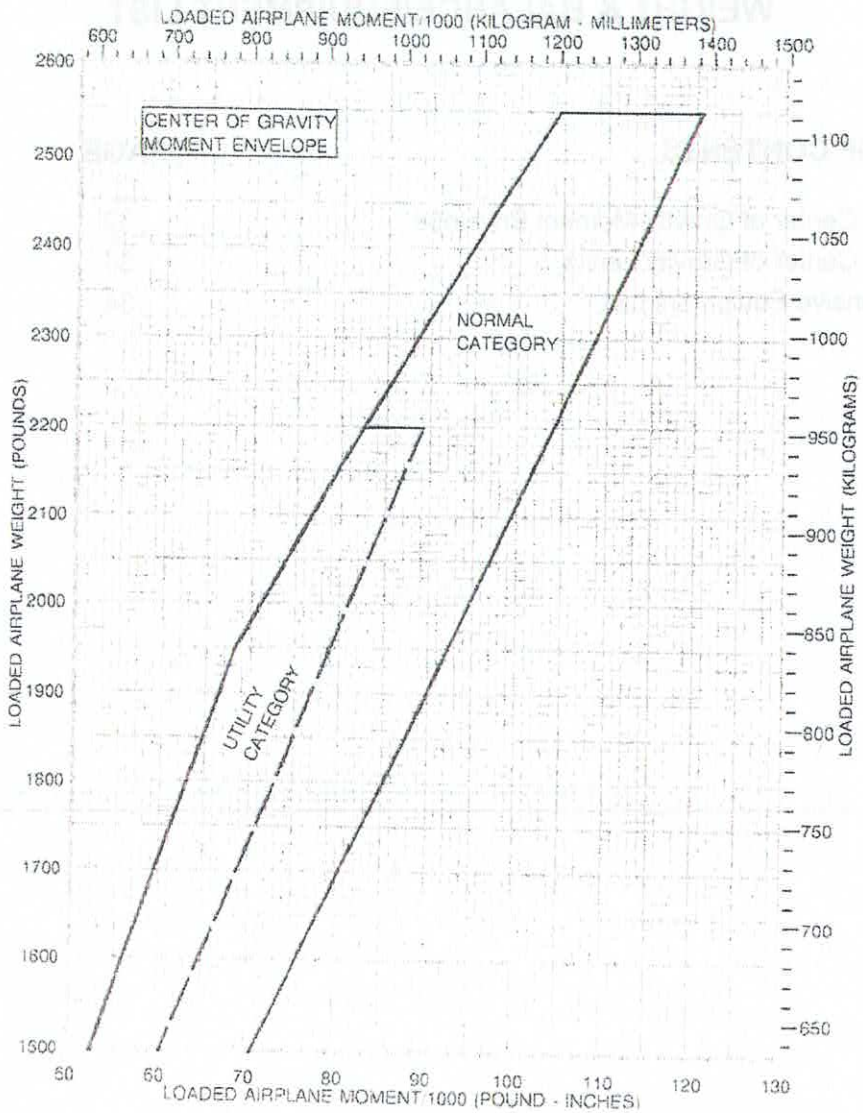

Figure 19
Center of Gravity Moment Envelope

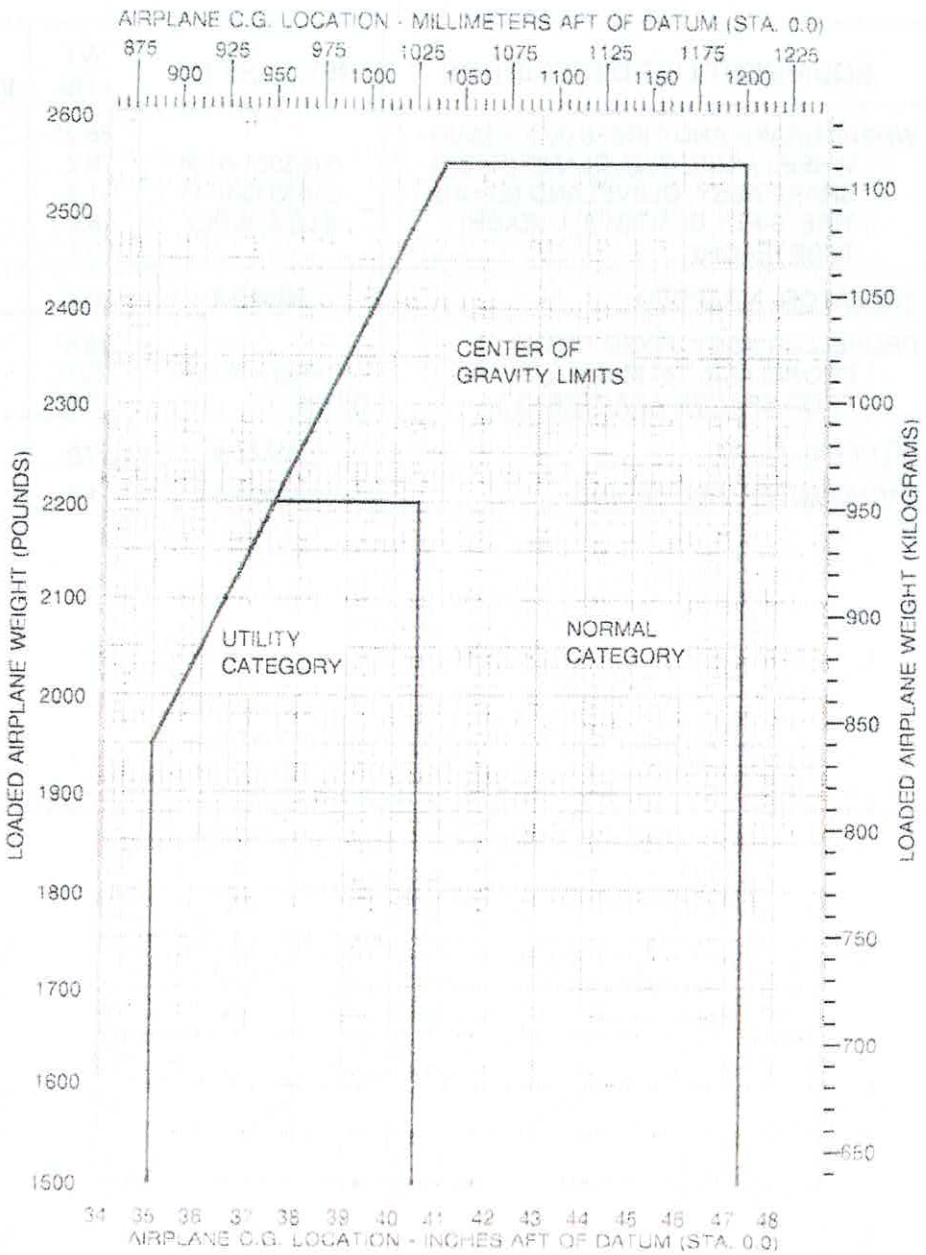

Figure 20
Center of Gravity Limits

COMPREHENSIVE EQUIPMENT LIST

ITEM No.	EQUIPMENT LIST DESCRIPTION	REF PART NO.	WT LBS	ARM INCHES
32-01-R	WHEEL BRAKE AND TIRE, 6.00 X 6 MAIN		36.2*	57.8*
	- WHEEL ASSY, CLEVELAND (EACH)	C163001-0104	6.2	58.2
	- BRAKE ASSY, CLEVELAND (EACH)	C163030-0111	1.8	54.5
	- TIRE, 6-PLY BLACKWALL (EACH)	6.00-6, 6-PLY	8.0	58.2
	- TUBE (EACH)		2.1	58.2
34-01-R	INDICATOR, AIRSPEED	S3325-6	0.6	16.2
61-01-R	PROPELLER ASSY, FIXED-PITCH		38.8*	-38.2*
	- PROPELLER, 76" McCAULEY	1A170E/JHA7660	35.0	-38.4
	- PROP SPACER ADAPTER, 3.5"	C7726	3.6	-36.0
73-01-S	EGT/FUEL FLOW	S3277-8	0.6	7.8
77-01-R	TACHOMETER, RECORDING	S3329-5	1.0	12.1

SECTION 7
AIRPLANE AND SYSTEMS DESCRIPTION

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ENGINE

ENGINE INSTRUMENTS

The engine driven mechanical tachometer is located on the instrument panel to the right of the pilot's control wheel. The instrument is calibrated in increments of 100 RPM and indicates both engine and propeller speed. An hour meter in the lower section of the dial records elapsed engine time in hours and tenths. Instrument markings include the normal operating range (multiple width green arc) of 2100 to 2700 RPM, and a maximum (red line) of 2700 RPM. The multiple width green arc has steps at 2500, 2600, and 2700 RPM which indicate the maximum recommended power settings for altitudes of sea level, 5,000 and 10,000 feet respectively.

PROPELLER

The airplane is equipped with a two-bladed, fixed-pitch, one-piece forged aluminum alloy propeller which is anodized to retard corrosion. The propeller is 76 inches in diameter.