

# Cera Simaircraft

*Pilot's operating handbook*

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*Cessna* 188 AG

## Cessna 188 AG Wagon/AG Truck (available for FS2004)

Light and very manoeuvrable agricultural airplane (produced between 1966 and 1983). In the 60s Cessna decided to expand their line of light aircraft by entering the agricultural aircraft market. The resulting aircraft was a conventional single-seat, piston-powered, strut-braced low-winged agricultural airplane.

### Powerplant

Continental IO-520-D 225kW (300hp) fuel injected flat six piston engine driving a two blade fixed pitch or three blade constant speed propeller.

### Performance

Max speed 182 MPH ,  
Max cruising speed 146 MPH  
Initial rate of climb 465ft/min. Service ceiling 7800ft/min. Range with max fuel and reserves at 75% power 465km (252nm).

### Weights

#### Ag Wagon:

Basic Empty weight.....	2117 lbs
Usable fuel( 52 Gal).....	312 lbs
Pilot.....	170 lbs
Hopper Load.....	1670 lbs
Total weight .....	4269 lbs

#### Ag Truck:

Basic Empty weight.....	2226 lbs
Usable fuel( 52 Gal).....	312 lbs
Pilot.....	170 lbs
Hopper Load.....	1800 lbs
Total weight .....	4508 lbs

## Dimensions

Wing span 12.70m (41ft 8in)  
Length 7.90m (25ft 11in)  
Leight 2.49m (8ft 2in)  
Wing area 19.1m<sup>2</sup> (205sq ft).

## Capacity :

Pilot only in all models.

## Hopper capacity

Agwagon 757 litres (166Imp gal/200US gal)  
AgTruck 1059 litre (233Imp gal/280US gal)

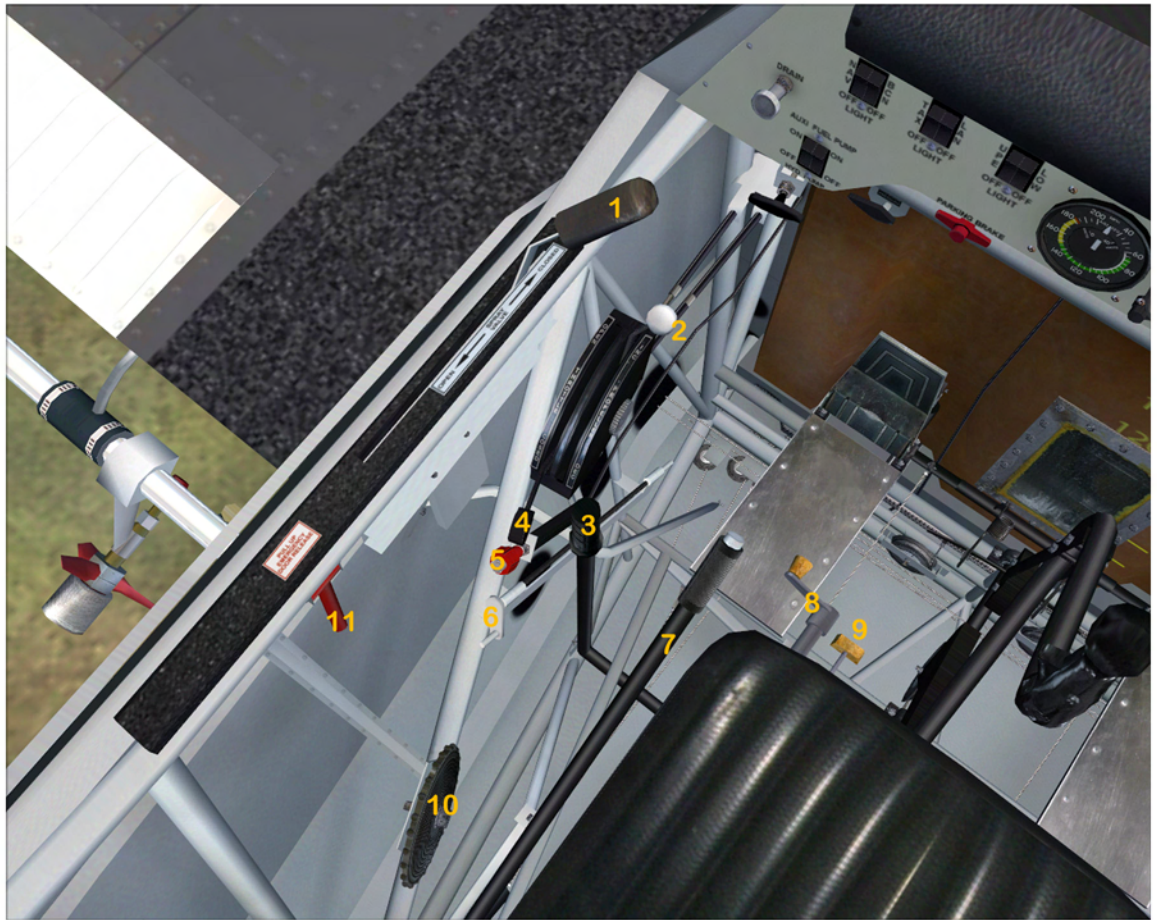
## Fuel

Usable 52 Gal. Maximum at 6Lbs./ Gal

## PANEL



- |                                     |                                  |
|-------------------------------------|----------------------------------|
| 1. Spray pressure gage              | 16. Circuit breakers             |
| 2. Ammeter                          | 17. Drain valve control          |
| 3. Manifold pressure/ Fuel flow     | 18. Auxiliar fuel pump switches  |
| 4. Tachometer                       | 19. Hydraulic pump system        |
| 5. Oil pressure gage                | 20. Boom presure control         |
| 6. Oil temperature gage             | 21. Parking Brake                |
| 7. Nav and BCN Lights switches      | 22. Radio comm                   |
| 8. Taxi and landing Lights switches | 23. Cabin heat control           |
| 9. Instruments Lights switches      | 24. Cabin air outlet             |
| 10. Airspeed indicator              | 25. Engine alternate air control |
| 11. Altimeter                       | 26. Primer                       |
| 12. Turn and Bank indicator         | 27. Fuel shutoff valve           |
| 13. Cylinder head temperature gage  | 28. Master switches              |
| 14. Left fuel Quantity              | 29. Magnetos switches            |
| 15. Right fuel Quantity             | 30. Starter switche              |

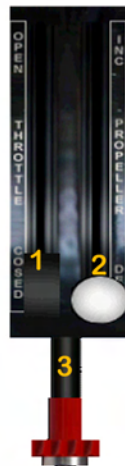


1. Boom control lever
2. Propeller control lever
3. Hopper control lever
4. Throttle lever
5. Mixture lever
6. Tail wheel lock
7. Wing flap handle
8. Seat up or down
9. Seat forward or backward
10. Elevator trim tab
11. Emergency door realese lever (Left/ Right)



1. Panel light switches
2. Door handle
3. Compass
4. window handle

Engine controls(shift + 2)



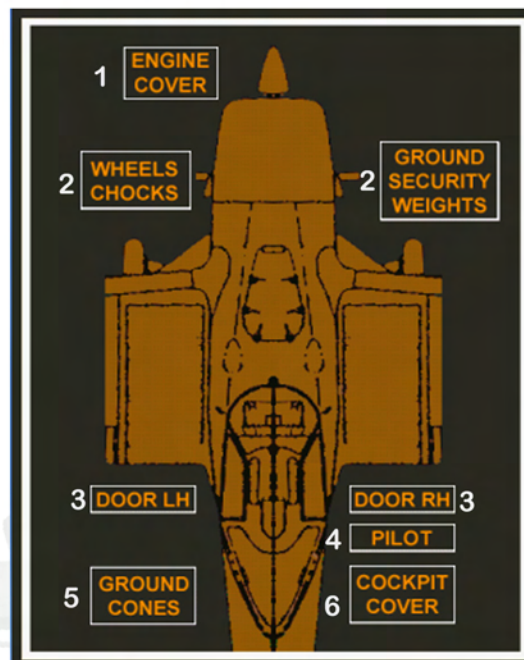
1. Throttle lever
2. Propeller lever
3. Mixture Lever

Radio (shift + 3)



1. Active/Stanby frequency
2. On/ off switche
3. Knob frequency

Animation control panel (shift + 4)



## 1. Engine cover

This animation is visible only when the aircraft is on the ground, not moving and engine is not running. If the animation is activated and the engine is started, the engine cover will disappear. An extra wind effect has been added for more realism.

## 2. Wheels chocks and ground security weights

These effects are visible only when the aircraft is on the ground and not moving. If the effects are activated, engines will not start since parking brakes will be automatically activated. When effects are deactivated, parking brakes will remain active and (.) has to be pressed on the keyboard in order to deactivate it.

## 3. Left and right doors

Doors can only be operated from the animation panel or using the doors handles in the virtual cockpit. Windows can only be operated using the handles in the virtual cockpit.

**Please note that doors cannot be operated with the (Shift + E) command.**

#### 4. Pilot

If the aircraft is on the ground, not moving, the engine is not running and one of the doors is opened, it is possible to hide the pilot.

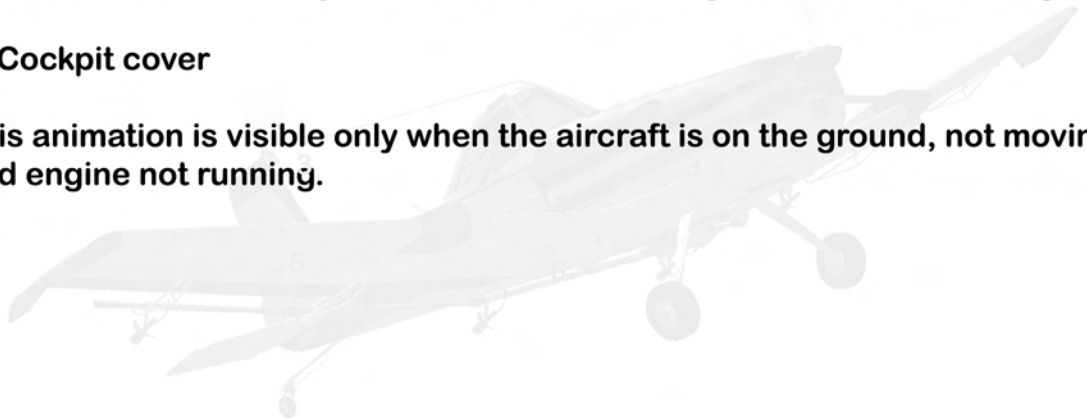
Please note that if the pilot is not visible it is not possible to run the engine.

#### 5. Ground cones

This effect is visible only with the aircraft on the ground and not moving.

#### 6. Cockpit cover

This animation is visible only when the aircraft is on the ground, not moving and engine not running.



Dispersal system (Shift+ 5) 

Hopper system (only models wiht Hopper sistem)



Hopper control Open/closed

Dispersal effects

1.Dumping from the aircraft tank (chemicals or water);



## 2. Dumping from the aircraft tank (Wildfire Retardant ).



Dispersal sistem 2 (Shift+5) 

Boom system (only models wiht Boom system)



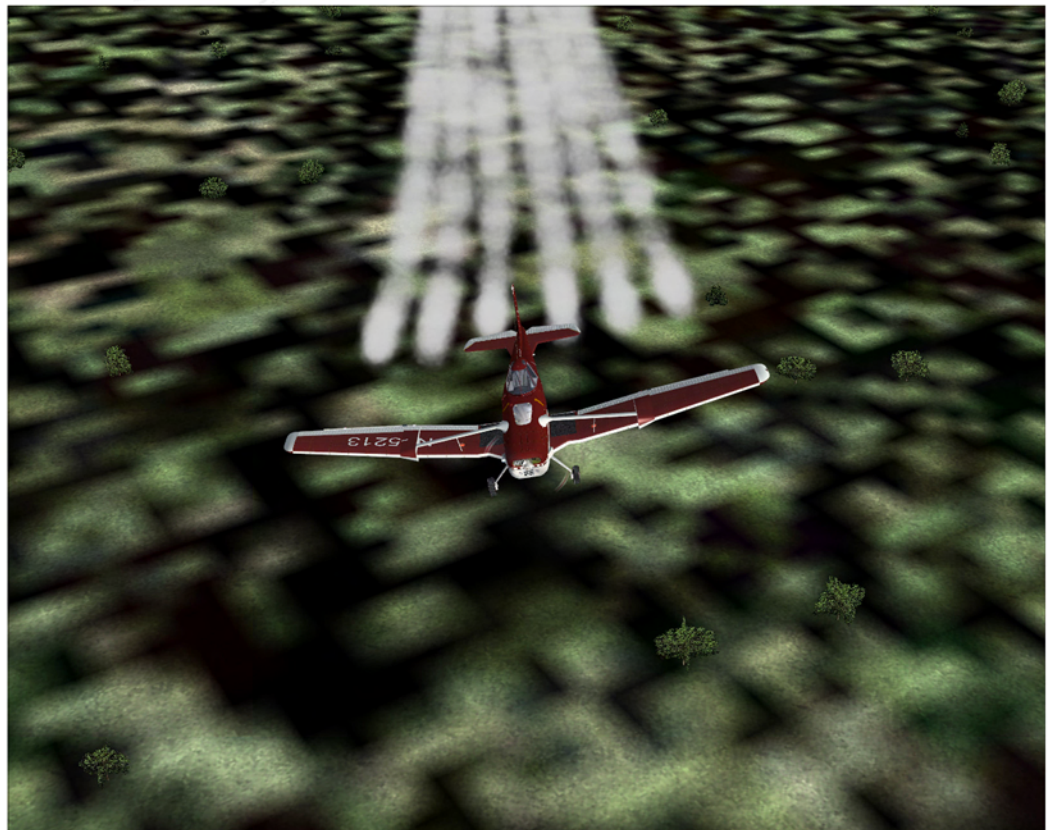
Boom control Open/closed

## 1. Spray from wings valves (chemicals);



In order to operate the dispersal system engine has to be running, hydraulic pump (1) has to be on and increase boom pressure lever (2) has to be above 7 PSI (3).

Dispersal system can be operated either from the 2D cabin (Shift + 4) or in the 3D cabin (operating the lever).



## OPERATING DETAILS

### Starting the engine

Proper fuel management and throttle adjustments are needed to obtain an easy start from the continuous -flow fuel-injection engine. The procedure outlined in section I should be followed closely as it is effective under nearly all operating conditions, including hot and cold weather conditions. Slight variations from this procedure may be necessary at times to compensate for extreme conditions.

Conventional full rich mixture and high RPM propeller settings are used for starting. The throttle, however, should be fully closed initially. When ready to start, place the right half of the auxiliary fuel pump switch in the ON position and advance the throttle to obtain 8 to 10 gal/hr fuel flow. Then promptly turn off the fuel pump and return the throttle to idle. With both magneto switches on, depress the starter button. While cranking, slowly advance the throttle until the engine starts. Slow throttle advancement is essential, since the engine will start readily when the correct fuel/air ratio is obtained.

### NOTE

During cold weather conditions, it may be necessary to place the auxiliary fuel pump switch in the HI position to prime the engine prior start. Care should be taken to prevent flooding due to the danger of fire. If a fire should develop, attempt to complete the engine start. Starting the engine will suck the flames back into the engine, and will usually put out the fire.

### Taxiing

The tail wheel lock should be unlocked for steering while taxiing. Since alternate air intake is unfiltered, the alternate air control should be pushed full in (closed) during all ground operations.

Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips and the horizontal stabilizer.

### Takeoff

Takeoff should be conducted with the tail wheel lock engaged. Tail wheel travel will be limited to 2.5° each side of center, and weather vaning and shimmy tendencies will be minimized.

## Enroute climb

If maximum rate-of-climb performance is desired, climb speed will vary from 91 MPH at sea level, decreasing to 88 MPH at 10,000 feet.

At cruising climb at 25 inches of manifold pressure, 2550 RPM (approximately 75% power) and 90 to 100 MPH is normally recommended. This type of climb provides better engine cooling, less engine wear, and improved visibility ahead. Cruising climbs should be conducted at 18 GPH up to 4,000 feet with a fuel flow reduction of one GPH for each 2,000 feet above 4,000.

To climb steeply over an obstacle with wing flaps retracted, use an obstacle clearance speed of 75 MPH.

## Cruising

Normal cruising is performed between 55% and 75% power.

## NOTE

Cruising should be performed at 65% to 75% power until a total of 50 hours has accumulated or oil consumption has stabilized. This is to ensure proper seating of the rings and is applicable to new engines, and engines in service following cylinder replacement or top overhaul of one or more cylinders.

## Stalls

The stall characteristics are conventional, and aural warning is provided by a stall warning horn which sounds between 5 and 10 MPH above the stall in all configurations. All controls remain effective throughout the stall.

## EMERGENCY PROCEDURES

Emergencies caused by aircraft or engine malfunctions are extremely rare if proper pre-flight inspections and maintenance are practiced. However, should an emergency arise, the basic guidelines described in this section should be considered and applied as necessary to correct the problem.

### Emergency hopper dump

If, in the event of an emergency, it becomes necessary to dump the hopper contents, the following procedure is suggested:

1. Move the hopper dump handle full forward
2. Apply forward pressure to the control stick as required to maintain a steady climb attitude

3. When altitude gain is satisfactory or when hopper load is exhausted, close hopper dump door.

## Forced landings

### Emergency landing without engine power

If an engine stoppage occurs, establish a flaps-up glide at 85 MPH. If time permits, attempt to restart engine by checking for the following: proper fuel shutoff control position, adequate fuel flow, and improved operation on a single magneto.

If all attempts to restart the engine fail and a forced landing is imminent, select a suitable area and prepare for the landing as follows:

1. Jettison hopper load
2. Check shoulder harness and seat belt for snug fit
3. Pull mixture control to idle cut-off position
4. Fuel shut-off valve control knob – OFF
5. Turn off all switches
6. Approach at 85 MPH
7. Extend wing flaps as necessary within gliding distance or field
8. Land in a three-point attitude
9. Apply heavy braking in initial part of landing roll

### NOTE

Increase the above listed airspeed by 5 MPH if landing must be made at maximum restricted category weight.

### Precautionary landing with engine power

Some advance preparations prior to making a precautionary landing at an unfamiliar “off airport” site should be made as follows:

1. Jettison hopper load
2. Check shoulder harness and seat belt for snug fit
3. Drag over selected field with flaps 10° and 90 MPH, noting preferred area for touchdown on next landing approach. Upon reaching a safe altitude and airspeed, retract flaps
4. On downwind leg, turn off all switches except magneto switches
5. Approach with flaps 20° at 80 MPH
6. Before touchdown, turn magneto switches OFF
7. Land in a three-point attitude
8. Apply heavy braking in initial part of landing roll

## Emergency door release

If an emergency arises which requires rapid evacuation of the aircraft during ground operations or after an emergency landing, proceed as follows:

1. Release canopy door latch, if possible
2. Rotate emergency door release handle upward
3. Push door away from aircraft
4. Release seat belt and evacuate the aircraft

Periodic inspection of the emergency door release mechanism on each canopy door is recommended to maintain familiarity with its function and assure its operation if needed.

## Fire

### Engine fire in flight

Although engine fires are extremely rare in flight, the following steps should be taken if one is encountered:

1. Fuel shutoff valve knob – OFF
2. Pull mixture control to idle cut-off
3. Turn master and magneto switches off
4. Establish a 120 MPH glide
5. Close cabin heat control
6. Select a field suitable for a forced landing
7. If fire is not extinguished, increase glide speed in an attempt to find an airspeed that will provide an incombustible mixture
8. Execute a forced landing as described under Emergency landing without engine power. Do not attempt to restart the engine

### Electrical fires in flight

The initial indication of an electrical fire is usually the odor of burning insulation. The following procedure should be then used:

1. Master switch – OFF
2. All radio/electrical switches – OFF
3. Vents/cabin air/heat – CLOSED
4. Fire extinguisher – ACTIVATE

If fire appears out and electrical power is necessary for continuance of flight:

1. Master switch – ON

2. Circuit breakers – CHECK for faulty circuit, do not reset
3. Radio/electrical switches – ON one at a time, with delay after each until short circuit is localized
4. Vents/cabin air/heat – OPEN when it is ascertained that fire is completely extinguished

## Spin

Intentional spins are prohibited in this aircraft. Should an inadvertent spin occur, the following recovery technique should be used:

1. Retard throttle to idle position
2. Place ailerons in neutral position
3. Apply and hold full rudder opposite to the direction of rotation
4. As the rudder reaches the opposite stop (approximately  $\frac{1}{4}$  turn), move the control stick briskly forward
5. Hold these control inputs rotation stops
6. As rotation stops, neutralize rudder and make a smooth recovery from the resulting dive

## OPERATING LIMITATIONS

Maneuvers – Normal category

Gross weight – 3300 lbs

Flight load factor

Flaps up - +3.8 – 1.52

Flaps down 5° - +2.5

Flaps down 10° - 20° - +2.0

Airspeed limitations (without dispersal system)

Never exceed speed (glide or dive, smooth air) – 182 MPH

Maximum structural cruising speed – 146 MPH

Maximum speed, flaps extended

Flaps 5° - 121 MPH

Flaps 10° - 20° - 109 MPH

Maneuvering speed

3300 lbs – 118 MPH

2800 lbs – 107 MPH

2300 lbs – 98 MPH

With dispersal equipment – 121 MPH

## Airspeed indicator markings

Never exceed (glide or dive, smooth air) – 182 MPH

Caution range – 146 to 182 MPH

Normal operating range – 67 to 146 MPH

Flap operating range – 62 to 109 MPH

## Engine operation limitations

Power and speed – 300 BHP at 2850 RPM

(5 minutes takeoff)

285 BHP at 2700 RPM

(maximum continuous)

## Engine instruments markings

### Oil temperature gauge

Normal operating range – green arc

Do not exceed – 240° F (red line)

### Oil pressure gauge

Idling pressure – 10 psi (red line)

Normal operating range – 30 – 60 psi (green arc)

Maximum pressure – 100 psi (red line)

### Manifold pressure gauge

Normal operating range – 15 – 25 in. Hg (green arc)

### Tachometer

Normal operating range – 2200 – 2550 RPM (green arc)

Caution range – 2700 – 2850 RPM (yellow arc)

Do not exceed (engine rated speed) – 2850 RPM (red line)

### Fuel flow indicator

Normal operating range – 7.0 – 17.0 gal/hr (green arc)

Minimum and maximum – 3.5 and 19.5 psi (25.2 gal/hr)(red line)

### Fuel flow at full throttle

Sea level – 24 gal/hr (2850 RPM) – 23 gal/hr (2700 RPM)

4000 feet – 22 gal/hr (2850 RPM) – 21 gal/hr (2700 RPM)

8000 feet – 20 gal/hr (2850 RPM) – 19 gal/hr (2700 RPM)

### Cylinder head temperature gauge

Normal operating range – 300° - 460° F (green arc)

Do not exceed – 460° F (red line)

### Fuel quantity indicators

Empty – E (red line)

(2.0 gallons total unusable)

## OPERATIONAL DATA

The operational data charts in this section are presented so that you may know what kind of performance to expect from your aircraft under standard day conditions in both normal and restricted categories.

### Normal category performance

AIRSPEED CORRECTION TABLE												
	IAS	60	70	80	90	100	110	120	130	140	150	160
Flaps up	CAS	56	66	77	87	97	108	118	128	138	148	159
Flaps down	CAS	56	66	77	87	97	107	-	-	-	-	-

STALL SPEEDS – MPH, CAS			
CONFIGURATION	ANGLE OF BANK		
POWER OFF – AFT C.G.	0°	30°	60°

GROSS WEIGHT 3300 LBS.	Flaps up	61	66	86
	Flaps 10°	59	63	83
	Flaps 20°	57	61	81
	Flaps 30°	55	59	79

TAKEOFF DATA								
Gross weight pounds	IAS @ 50 ft. MPH	Head wind knots	@ sea level & 59° F		@ 2500 ft. & 50° F		@ 5000 ft. & 41° F	
			Ground run	Total to clear 50 ft. OBS	Ground run	Total to clear 50 ft. OBS	Ground run	Total to clear 50 ft. OBS
3300	70	0	610	970	730	1125	880	1325
		10	425	720	515	845	630	1005
		20	270	505	335	600	420	720
2800	64	0	420	735	500	835	600	960
		10	285	335	345	615	420	715
		20	170	365	210	425	265	495
2300	58	0	270	550	325	615	385	690
		10	175	395	210	445	255	500
		20	95	260	120	295	150	340
NOTES:								
1. Increase distance 10% for each 25° F above standard temperature								
2. For operation on a dry, grass runway, increase distance (both "ground run" and "total to clear 50 ft. obstacle") by 6% of the "total to clear 50 ft. obstacle" figure								

MAXIMUM RATE OF CLIMB								
Gross weight pounds	@ sea level & 59° F		@ 5000 ft. & 41° F		@ 10000 ft. & 23° F		@ 15000 ft. & 5° F	
	IAS MPH	Rate of climb FT/MIN	IAS MPH	Rate of climb FT/MIN	IAS MPH	Rate of climb FT/MIN	IAS MPH	Rate of climb FT/MIN
3300	91	940	90	670	88	400	86	135
2800	88	1205	87	900	85	590	83	290
2300	84	1570	83	1230	81	840	79	485

NOTES:

1. Full throttle, 2700 RPM, mixture at recommended leaning schedule, and flaps up
2. For hot weather, decrease rate of climb 30ft./min for each 10° F above standard day temperature for particular altitude

TIME, FUEL & DISTANCE TO CLIMB						
Normal climb 95 IAS/MPH						
Flaps up - 2550 RPM - 25 inches MP or full throttle						
Altitude ft.	Temp ° F	Gross weight pounds	Rate of climb FT/MIN	From sea level		
				Time minutes	Fuel used gallons	Distance miles
Sea level	59	3300	630	0	0	0
		2800	840	0	0	0
		2300	1125	0	0	0
2500	50	3300	630	4	1.2	5
		2800	845	3	0.9	4

		2300	1130	2	0.7	3
5000	41	3300	580	8	2.4	11
		2800	790	6	1.8	8
		2300	1070	4	1.3	6
7500	32	3300	455	13	3.8	18
		2800	645	10	2.8	13
		2300	900	7	2.0	10
10000	23	3300	330	19	5.5	28
		2800	505	14	3.9	10
		2300	730	10	2.9	15

NOTES:

1. Mixture setting:

- S.L. to 4000 ft. - 18 GPH
- 6000 ft. - 17 GPH
- 8000 ft. - 16 GPH
- 10000 ft. - 15 GPH

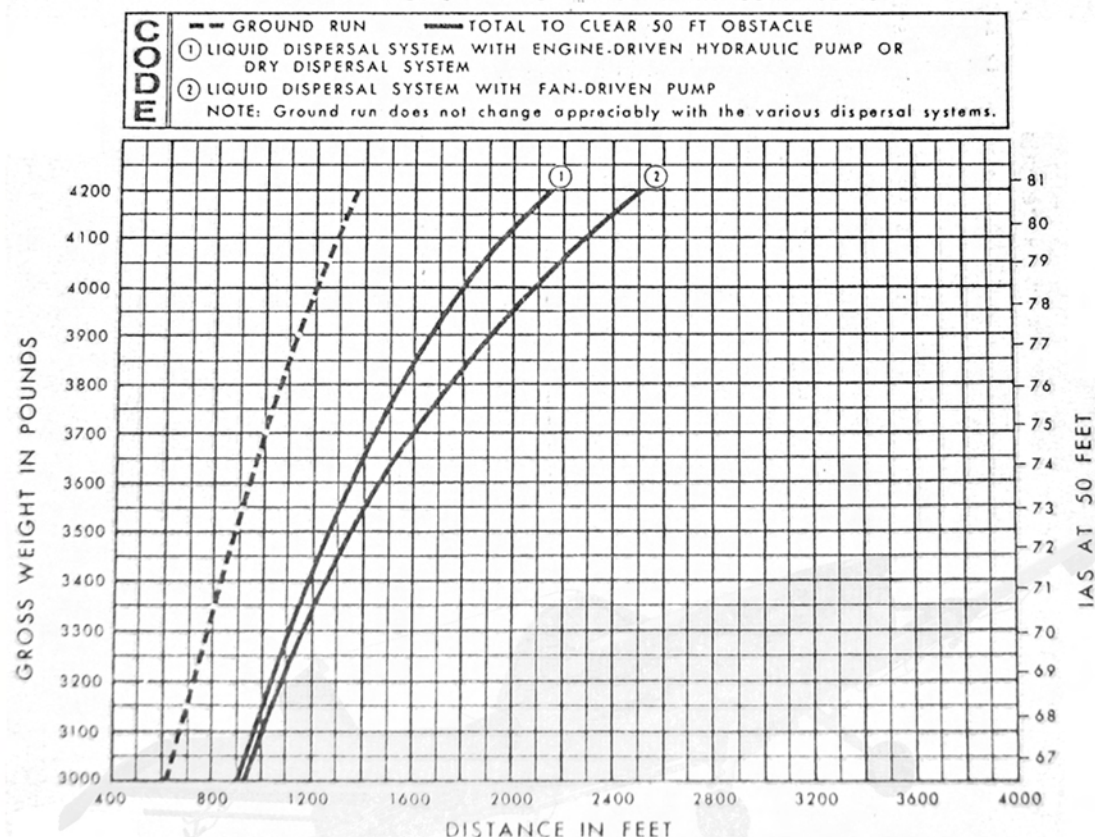
2. Add 2.0 gallons of fuel for engine start, taxi and takeoff allowance

3. Distance shown are based on zero wind

CRUISE PERFORMANCE							
Recommended lean mixture							
Standard conditions - zero wind - gross weight 3300 pounds							
Altitude	RPM	MP	%BHP	TAS MPH	GAL/HOUR	52 gal. (45 min reserve)	
						Endr. Hours	Range miles
2500	2550	25	79	140	16.4	2.6	355
		24	74	136	15.6	2.7	370
		23	70	133	14.7	2.9	380
	2400	25	71	134	14.9	2.8	375
		24	68	130	14.2	3.0	385
		23	64	127	13.4	3.2	400
	2300	24	63	126	13.3	3.2	400
		23	60	123	12.6	3.4	410
		22	56	119	11.9	3.5	420
	2200	22	52	114	11.1	3.8	430
		21	48	110	10.5	4.0	440
		20	45	105	9.8	4.3	445
5000	2550	24	77	141	16.1	2.6	365
		23	73	138	15.2	2.8	375
		22	69	134	14.4	2.9	390
	2400	25	73	138	15.3	2.8	375
		24	70	135	14.5	2.9	385
		23	66	131	13.8	3.0	395
	2300	24	65	131	13.7	3.1	395
		23	62	127	13.0	3.2	405
		22	58	123	12.3	3.4	415
	2200	22	54	118	11.5	3.6	430
		21	50	114	10.8	3.8	435
		20	47	109	10.2	4.1	445
7500	2550	22	71	139	14.9	2.8	385
		21	67	135	14.0	3.0	395
		20	63	131	13.2	3.2	405
	2400	22	64	132	13.5	3.1	400
		21	61	128	12.8	3.3	410
		20	57	124	12.0	3.4	420
	2300	21	57	124	12.0	3.4	420
		20	53	119	11.3	3.6	430
		19	49	114	10.6	3.9	435
	2200	20	49	114	10.6	3.9	435
		19	46	108	10.0	4.1	445
		18	42	102	9.3	4.4	450
NOTES:							
1. Range and endurance values included time and distance required during a normal climb at 95 MPH IAS and 2.0 gallons of fuel for engine start, taxi, and takeoff allowance							
2. Reserve fuel is based on 45 minutes @ 45% BHP and is 7.4 gallons							

## TAKEOFF DISTANCE WITH DISPERSAL EQUIPMENT

SEA LEVEL • STANDARD CONDITIONS • ZERO WIND • HARD SURFACE RUNWAY • FLAPS 10°



### PERFORMANCE DIFFERENTIAL TABLE

#### EFFECT OF OPTIONAL DISPERSAL EQUIPMENT

GROSS WEIGHT 3300 POUNDS

Dispersal equipment		Climb differential RPM	Cruise speed differential MPH
System	Type		
Liquid Dispersal	Engine-driven Hydraulic pump	-250	-27
	Fan-driven pump	-310	-33
Dry dispersal	High volume	-270	-27

#### EFFECT OF INCREASED GROSS WEIGHT

Weight increase	Climb differential - RPM	Cruise speed differential - MPH
For each 100 lbs above 3300 lbs	-45	-1.5

NOTE:  
For optimum climb performance with dispersal equipment installed, reduce speeds on "Maximum rate of climb" chart by 13 MPH

*Contact Us:*



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