

OPERATING DETAILS

on the inside wheel.

Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller. Full throttle run-ups on loose gravel are especially harmful to propeller tips.

NOTE

Caution should be used when taxiing over rough fields to avoid excessive loads on the nosewheel. Rough use of brakes and power also add to the nose-wheel load. A good rule of thumb; "On rough fields, use minimum speed, power, and brakes".

TAKE-OFF.

1. *Normal Take-Off* — Normal take-offs are accomplished with wing flaps up, full throttle, and 2600 RPM. Reduce power to 23 inches manifold pressure and 2450 RPM as soon as practical to minimize engine wear.

2. *Use of Wing Flaps for Take-Off* —

The take-off ground run with wing flaps 10 degrees is approximately 25% less than the take-off run with the wing flaps retracted. The use of 10 degrees wing flaps reduces the total distance over a 50-foot obstacle by approximately 20%. This is a result of slower forward speeds even though the use of wing flaps lessens the rate of climb. Therefore, for increased take-off performance, the recommended technique is to lower wing flaps 10 degrees (first notch).

It is recommended that the take-off charts, (figures 16 and 17), be consulted to determine the distance required for take-off. 30 and 40 degree wing flaps are not recommended at any time for take-off.

REMEMBER

Don't under marginal conditions, leave wing flaps on long enough that you are losing both climb and air-speed.

Don't raise wing flaps with airspeed below "off-flaps" stalling speed. (See stalling speed chart, figure 11.)

Do slowly release the wing flaps as soon as you reasonably can after take-off, preferably 50 feet or more over terrain or obstacles.

CLIMB.

Normal climbs are conducted at 100-120 MPH with wing flaps up, 23 inches manifold pressure and 2450 RPM. For maximum climb performance use full throttle and 2600 RPM. The sea level best rate of climb speed is 89 MPH, IAS at sea level, and is reduced ½ MPH for every 1,000 feet of altitude above sea level.

If an obstruction dictates using a steep climb angle, the best angle-of-climb speed should be used with wing flaps up, full throttle and 2600 RPM.

This best angle-of-climb speed is 70 MPH, IAS.

NOTE

Steep climbs at these low speeds should be of short duration due to reduced engine cooling.

If ten (10) degrees wing flaps are used for take-off, they should be left on until all obstacles are cleared. To clear an obstacle with wing flaps 10 degrees, the best angle-of-climb speed (60 MPH, IAS) should be used. If no obstructions are ahead, a best rate-of-climb speed (89 MPH, IAS) would be most efficient. These speeds vary slightly with altitude, but they are close enough for average field elevations.

Upon reaching a safe altitude and airspeed, the wing flaps should be retracted slowly, and power adjusted for climb.

In normal cross-country flying, "cruising climb" procedure is generally the most efficient in respect to overall trip speed and fuel consumption. This type of climb (100-120 MPH) provides good engine cooling, better visibility, and less engine wear than maximum performance operation.

For detailed climb performance, see the climb performance charts in Section V.

CRUISE.

Cruising charts are presented in Figure 18, Section V. It can be seen that the speeds for maximum range are much lower than normal cruise speed. Since the main advantage of the airplane over ground transportation is speed, one should utilize the high cruising speeds obtainable. However, if a destination is slightly out of

reach in one hop at normal cruising speed, it would save time and money to make the trip non-stop at some lower speed. An inspection of these cruising charts shows the long ranges obtainable at lower cruising speeds.

These charts are based on flight tests with "best power" mixture and 55 gallons of fuel for cruising. Allowances for fuel reserve, headwinds, take-offs, and climb or variations in mixture leaning technique should be made and are in addition to those shown in the charts.

Normal cruising is done at 60% to 70% power. A maximum cruising power of approximately 75% is allowable with 23 inches (mercury) manifold pressure and 2450 RPM. Various percent powers can be obtained with an infinite number of combinations of manifold pressures, engine speeds, altitudes, and outside air temperatures. However, at full throttle and a constant engine speed and a standard air temperature, a specific power may be obtained at only one altitude. For example at full throttle and 2450 RPM the following speeds are obtainable at various % powers and altitudes:

% BHP	Altitude	True Airspeed
75	6600	162
70	8400	161
65	10,200	159

This table shows that cruising can be done most efficiently at higher altitudes because very nearly the same cruising speed can be maintained at much less power. This means savings in fuel consumption and engine wear.