

<u>LIMITING OPERATIONAL CONDITIONS</u>	<u>R.P.M.</u>	<u>BOOST LBS</u> <u>sq. in.</u>
Maximum take-off and climb to 1,000 feet.	3,000	plus 12
Maximum climbing.	2,850	plus 9
Maximum all-out level (5 minutes limit)	3,000	plus 9
Maximum diving conditions		
(a) At less than 1/3rd throttle ...	3,000	...
(b) Throttle more than 1/3rd open ...	3,600	plus 9

Maximum power altitude ... 21500 feet
 FUEL 100 octane
 OIL Specification ... 100M. Alternative; Intava IAA.745
 Pressures: Normal. ... 80 lbs. sq. in.
 Emergency minimum ... 60 lbs. sq. in.

When starting up from cold the pressure may rise above the normal reading until the oil has reached working temperature.

Limiting Inlet Temperatures:-

Minimum for opening up and take-off. ... 15 deg. C.
 Maximum for normal flight ... 90 deg. C.
 Emergency maximum (5 mins. limit). ... 95 deg. C.

COOLING - Pressure water.

The engine operates pressure water cooled, with coolant being 70% water and 30% ethylene glycol to D.T.D. 344.

The cooling system is closed to atmosphere, except for a relief valve built into the header tank. This valve allows the pressure in the system to build up to prevent boiling until the maximum coolant outlet temperature of 120% C. is reached.

When the system cools off, air is drawn through the relief valve. During the warming up period this air expands and is driven off from the vent pipe, frequently carrying with it a certain amount of coolant. This is quite normal, and provided liquid is not driven off in normal flight it should cause no alarm.

OUTLET TEMPERATURE:-

The engine should not be opened up until the coolant outlet temperature exceeds 60% C.

Maximum permissible outlet temperatures are as follows:-

Cruising. ... 100% C.
 Take-off, climbing and all-out level 120% C.
 Recommended cruising outlet temperature 85-95 deg. C.

Throttle Control:

The pilot's throttle is connected to the engine through a boost control, the primary function of which is to prevent rated boost from being exceeded.

The operation is progressive and the unit will control at rated boost or any lower boost depending on the position of the pilot's throttle lever. Owing to mechanical limitation, however, unit will not maintain low boost pressures up to full open throttle on the climb without adjustment of the pilot's lever.

A gate in the control quadrant is set to limit the boost pressure for normal operation to plus 9 lbs sq. in. but for take-off the control is moved through the gate to obtain plus 12 lbs sq. in.

MIXTURE CONTROL.

The carburettor provides automatic adjustment of mixture strength for variation in altitude and boost pressure by aneroid operated needle valves. The aneroids are in communication with the air intake and supercharger respectively.

AIRSCREWS.

The constant speed airscrew affords the pilot a wide choice of engine r.p.m. without changing the boost pressure. Each setting of the constant r.p.m. control will maintain a definite engine r.p.m. Thus adjustment of the throttle and constant speed unit provides any desired combination of boost pressure and engine r.p.m.

Take-Off. Move the control lever to the forward position to give approximately 3,000 r.p.m. at plus 12 lbs sq. in. boost.

Climbing. When 1000 feet has been reached under take-off condition the engine should be throttled back to the gate throttle position (Plus 9 lbs sq. in. boost) and the constant speed control lever set to control at 2,850 r.p.m.

Maximum all out level. Move the control lever to the forward position (3000 r.p.m.) and set the throttle up to the gate to give plus 9 lbs sq. in. boost. This condition is limited to 5 minutes duration.

Diving. When going into a dive always throttle back first, then open up gradually to the required boost pressure (not exceeding plus 9 lbs q. in.). This will safeguard the engine from over-revving in the event of a cut-out occurring when entering a steep dive.

Approximately 2600 r.p.m. will give the maximum speed in the dive.

Cruising. For economical cruising the r.p.m. should be reduced first and if this does not give as low as A.S.I. as is required, the boost pressure should be subsequently reduced as well.

Landing. When gliding in to land, with the engine throttled, move the constant speed control lever to the high r.p.m. position in order to prepare for an emergency take-off.

General Remarks. For dog-fighting, the best position of the constant speed control lever is that which gives approximately 2,850 r.p.m. For stretching a glide, in the event of a forced landing, the lever should be returned to the low r.p.m. position.

STARTING.

Cold starting. Turn on fuel and priming cocks. Give 4 or 5 strokes of the priming pump. Open throttles slightly off the slow running stop. Press the starter button and switch on the ignition. Switch off the starter magneto as soon as the engine starts.

It may be necessary to continue priming if the engine fails to start, but over-priming should be avoided. Under winter conditions heavier priming may be necessary.

Starting attempts should not exceed 10 seconds, with an interval of 10 seconds between each attempt.

Hot Starting. Attempt to start without priming, but if priming is found necessary, 1 or 2 strokes of the pump should be sufficient. In the event of over priming, or failure to start due to over richness, the engine should be cleared by giving a few turns with the throttles wide open and the ignition switches off.

WARMING UP AND GROUND CHECKS.

After starting, when the oil pressure is steady, open up and run at 1,200 r.p.m. until working temperatures have been reached (oil inlet temperature 15°C, coolant outlet temperature 60°C)

With the constant speed control in the high r.p.m. position the engine should be opened up to take off boost and the ground r.p.m. and ignition systems checked. The r.p.m. drop when running on single ignition should not exceed 8%.

Avoid long periods of idling. Open up periodically to assist the volute drain which clears the supercharger of surplus fuel.

SHUTTING DOWN.

Allow the engine to idle at approximately 800 r.p.m. for a few seconds, pull the slow-running cut-out lever, and switch off the ignition.
