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SERVICE INSTRUCTION

DATE: October 12, 2007

Service Instruction No. 1148C
(Supersedes Service Instruction No. 1148B)
Engineering Aspects are
FAA Approved

SUBJECT: Use of Carburetor Heat Control

MODELS AFFECTED: All Lycoming engines using float type carburetors.

TIME OF COMPLIANCE: During engine operation.

WARNING

REFER TO THE PILOT'S OPERATING HANDBOOK OR AIRFRAME MANUFACTURER'S MANUAL FOR ADDITIONAL INSTRUCTIONS ON THE USE OF CARBURETOR HEAT CONTROL. INSTRUCTIONS FOUND IN EITHER PUBLICATION SUPERSEDE THE FOLLOWING INFORMATION.

Under certain moist atmospheric conditions (generally at a relative humidity of 50% or greater) and at temperatures of 20° to 90°F it is possible for ice to form in the induction system. Even in summer weather ice may form. This is due to the high air velocity through the carburetor venturi and the absorption of heat from this air by vaporization of the fuel. The temperature in the mixture chamber may drop as much as 70°F below the temperature of the incoming air. If this air contains a large amount of moisture, the cooling process can cause precipitation in the form of ice. Ice formation generally begins in the vicinity of the butterfly and may build up to such an extent that a drop in power output could result. In installations equipped with fixed pitch propellers, a loss of power is reflected by a drop in manifold pressure and RPM. In installations equipped with constant speed propellers, a loss of power is reflected by a drop in manifold pressure. If not corrected, this condition may cause complete engine stoppage.

To avoid this, all installations are equipped with a system for preheating the incoming air supply to the carburetor. In this way sufficient heat is added to replace the heat loss of vaporization of fuel, and the mixing chamber temperature cannot drop to the freezing point of water (32°F). The air preheater is a tube or jacket through which the exhaust pipe from one or more cylinders is passed, and the air flowing over these surfaces is raised to the required temperature before entering the carburetor. Consistently high temperatures are to be avoided because of a loss of power and a decided variation of mixture. High charge temperatures also favor detonation and preignition, both of which are to be avoided if normal service life is to be expected from the engine. The following outline is the proper method of utilizing the carburetor heat control.

Ground Operation – Use of the carburetor air heat on the ground must be held to an absolute minimum. On some installations the air does not pass through the air filter, and dirt and foreign substances can be taken into the engine with the resultant cylinder and piston ring wear. Only use carburetor air heat on the ground to make certain it is functioning properly.

Take-Off – Set the carburetor heat in full cold position. For take-off and full throttle operation the possibility of expansion or throttle icing at wide throttle openings is very remote.

Climbing – When climbing at part throttle power settings of 80% or above, set the carburetor heat control in the full cold position; however, if it is necessary to use carburetor heat to prevent icing it is possible for engine roughness to occur due to the over-rich fuel/air mixture produced by the additional carburetor heat. When this happens, lean the mixture with the mixture control only enough to produce smooth engine operation. Do not continue to use carburetor heat after flight is out of icing conditions, and return mixture to full rich when carburetor heat is removed.

Flight Operation – During normal flight, leave the carburetor air heat control in the full cold position. On damp, cloudy, foggy or hazy days, regardless of the outside air temperature, be alert for loss of power. This will be evidenced by an unaccountable loss in manifold pressure or RPM or both, depending on whether a constant speed or fixed pitch propeller is installed on the aircraft. If this happens, apply full carburetor air heat and open the throttle to limiting manifold pressure and RPM. This will result in a slight additional drop in manifold pressure, which is normal, and this drop will be regained as the ice is melted out of the induction system. When ice has been melted from the induction system, return the carburetor heat control to the full cold position. In those aircraft equipped with a carburetor air temperature gauge, partial heat may be used to keep the mixture temperature above the freezing point of water (32°F).

WARNING

CAUTION MUST BE EXERCISED WHEN OPERATING WITH PARTIAL HEAT ON AIRCRAFT THAT DO NOT HAVE A CARBURETOR AIR TEMPERATURE GAUGE. USE EITHER FULL HEAT OR NO HEAT IN AIRCRAFT THAT ARE NOT EQUIPPED WITH A CARBURETOR AIR TEMPERATURE GAUGE.

Landing Approach – In making a landing approach, the carburetor heat is generally in the “Full Cold” position. However, if icing conditions are suspected, apply “Full Heat”. In the case that full power needs to be applied under these conditions, as for an aborted landing, return the carburetor heat to “Full Cold” after full power application.

NOTE: Revision “C” revises text.