





# ACCEPTABLE ALTERNATE ENGINE FUELS

■ Many pilots are being forced to make fuel decisions never before faced, as a result of shortages, misallocations, and restrictive distribution policies. The question then, becomes: What avgas do you use if your recommended fuel isn't available?

Also, in some parts of the country avgas suppliers are eliminating lower-octane fuel grades and replacing them with a low-lead 100-octane fuel (LL100) that has about half the lead content of standard 100/130 avgas.

Printed below are comprehensive listings of engines specified for use with fuels rated below 100/130. The lists show what fuels may be substituted and describe modifications that might be necessary for operation with other than specified fuels. The information in the charts comes from engine manufacturers, who will also supply specific details and part numbers concerning any suggested modifications.

## Avco Lycoming, Williamsport, Pa.

This company points out, as do other manufacturers, that in no case may a fuel of lower octane than specified be used. Avco Lycoming says LL100 fuel can be burned continuously in all its opposed-series aircraft engines without requiring the inspections described herein.

The company also points out that any 91/96-rated engine "may also be considered to be specified for 100/130," and can burn any higher leaded fuel. Thus, with one exception—the O-435—Avco Lycoming 91/96 specified engines are not included in the chart.

Engine	Specified Fuel	Acceptable Alternate Fuels
O-235-C, -E	80	Use of higher leaded fuel must be limited to 25% of operating time. If used more than 25%, inspection every 150 hours for valve stem erosion, or "necking," is recommended. O-235-C and O-290-D can be converted to use sodium-cooled exhaust valves.
O-290-D	80	
O-290-D2	80/87	
O-320-A, -C, -E	80/87	All higher lead fuel OK except with some early production engines with solid-stem exhaust valves. In this case, 25% limitation and inspection requirement above apply.
IO-320-A, -E	80/87	All higher octane fuels OK.
O-340-B	80/87	All higher octane fuels OK.
O-360-B, -D	80/87	All higher octane fuels OK.
O-435-A	80/87	LL100 only.
O-435-K1 (O-435-4), -A2	91/96	25% limitation and 150-hour inspection requirement apply when used with higher leaded fuels.
GO-435	80/87	All OK, except when used with early production engines with solid-stem exhaust valves. 25% limitation and 150-hour inspection requirement then apply.
VO-435-A	80/87	
GO-480-B, -D, -F	80/87	
O-540-B	80/87	All higher octane fuels OK.
VO-540-A, -B	80/87	All higher octane fuels OK.

## Franklin Engine Company, Syracuse, N.Y.

A Franklin spokesman stresses that low-lead 100-octane fuel is the preferred fuel for all engines the company produces. Their lower-octane-rated engines may experience lead fouling of spark plugs when used with higher octane fuels. In addition, several older engines are likely to show valve and valve seat problems with extended use of higher lead fuels. In some cases replacement exhaust valves are available to overcome this problem.

Engine	Specified Fuel	Acceptable Alternate Fuels
6V4-200, C32, C33	91/96	All higher octane fuels OK.
6V-335-A, -B	91/96	All higher octane fuels OK.
6V-335-A1A, -A1B	80/87	All higher octane fuels OK.
6A-335-B, -B1	80/87	Valve replacement required for continued use with higher leaded fuels.
6A-335-A	91/96	All higher octane fuels OK.
6A-350-D1	80/87	All higher octane fuels OK.
6A-4-165-B3, -B4	80/87	Valve replacement required for continued use of higher leaded fuels.
6A4-150-B3, -B4	80/87	LL100 only. No replacement valves available.

## Teledyne Continental Motors, Mobile, Ala.

For lower-octane-rated engines, "use low-lead 100 whenever you can" if the specified fuel isn't available, says a company service official. Higher leaded fuels should be used only when others are not available. LL100 avgas will "lessen" chances of damage to those engines without improved valves. Problems caused by higher lead content fuels "are critical with respect to TCM smaller engines such as the O-200-A," unless improved valves are installed, says the company.

Engine	Specified Fuel	Acceptable Alternate Fuels
C75	80/87	Low-lead 100 only, unless improved valves, both intake and exhaust, are installed to better withstand valve stem erosion and burning associated with the higher lead fuels. Continuous use of high-octane fuel without improved valves requires inspection every 150 hours.
C85	80/87	
C90	80/87	
C125	80/87	
C145	80/87	
O-200-A	80/87	Engines produced since 1964 OK for all higher-rated fuels. Note above applies to earlier models.
O-200-B	80/87	
O-300-A, -B, -C	80/87	Valve replacement required for continued use with higher leaded fuels. See note above.
O-300-D, -E	80/87	
GO-300	80/87	All higher octane fuels OK. TCM recommends more frequent spark plug inspection for possible plug gap erosion or plug fouling.
IO-346	91/96	
IO-360-B	80/87	
O-470-J, -R	80/87	
O-470-4, 11, 13, 15	91/96	
IO-470-J, -K	80/87	