AVIATION GASOLINES

Aviation gasolines are designed to excellent performance in a wide variety of aircraft piston engines by giving clean combustion, freedom from knock and vapor lock, ready starting and good low temperature handling.

Aviation Gasolines 80/87 and 100/130 formerly were the primary gasolines manufactured for the aviation public. However, these aviation gasolines are being phased out of the market with a single-grade general aviation gasoline known as Aviation Gasoline 100LL (low-lead). This grade meets all requirements of 100/130 but has a lower maximum lead content of 2.0 ml/per gal. Engine manufacturers recommended the use of Aviation Gasoline 100LL in engines certified with the 91/98 or 100/130 grades. The 100LL grade product gives lower engine deposit levels and increased spark plug life in these higher-powered engines. Aircraft engines certified with Aviation Gasoline 80/87 can use the 100LL grade as a satisfactory recommended alternate fuel under the stipulation outlined in engine manufactures' bulletins. Owners of aircraft engines certified on the 80/87 grade product should refer to the engine manufacturers' bulletin for detailed grade recommendations for their specific engines. All aviation gasolines meet commercial ASTM specification D910.

Aviation gasolines are carefully manufactured, blended and inspected to combine optimum performance with the severe requirements of aircraft operation which include a wide range of temperatures, altitudes and power requirements. Avgas is also non-corrosive to aircraft and engine metals and is compatible with the elastomers used in the fuel systems.

Because of differences in volatility, vapor pressure, lead content, fuel additives and other factors, motor gasolines are not recommended for use in aircraft engines, nor are aviation gasolines suitable for use in automotive engines. Performance difficulties can easily arise if this rule is not observed. Jet fuels should never be mixed with aviation gasolines because jet fuels have very poor anti-knock quality and greatly differing volatility.

GENERAL NOTE

Because aviation gasoline 80/87 was phased out in many marketing areas, the Experimental Aircraft Association undertook a flight program to demonstrate suitability of using automotive gasoline in certain model aircraft. In the early 1980's, the Federal Aviation Administration issued Supplemental Type Certificates to EAA authorizing the use of "unleaded automotive gasoline, 87 minimum antiknock index, per ASTM Specification D439" in Cessna 150 aircraft equipped with Teledyne Continental Motors 0-200-A engines. EAA is selling this STC to any operator for a fee.

Neither Lycoming nor TCM support the FAA approval and specifically recommend against the use of the automotive fuel in aircraft.

This company will market only those products fully approved for flight use. Until automotive gasoline is fully approved for use in a significant portion of the aircraft population, this company does not plan to provide automotive fuel for retail sale as an aviation fuel.

This company makes no judgment of the technical merits of using automotive gasoline in aircraft. The aircraft airframe and engine manufactures are best positioned to identify the critical fuel characteristics which provide safe and reliable flight. Over many years, ASTM Standard D910 has evolved to provide a framework to control these characteristics. Aircraft are specifically flight certified on fuel conforming to D910. Some of the more critical characteristics include:

- Adequate supercharged octane rating
- Controlled vapor pressure and volatility
- Inert to fuel system components
- Long storage stability
- Special TEL scavenger
- Water separation

Automotive gasolines are generally manufactured to ASTM Standard D4814. This standard covers a wide variety of gasolines and oxygenate blends suitable for use in automotive engines. As broad as the specifications in this standard are, there is no general requirement that all automotive gasoline must conform to D4814. Some of the variations permitted in D4814 which may impact automotive fuel performance in aircraft include:

- Antiknock Index reduction permitted for altitude and weather
- Volatility permitted for seasonal temperature variations and geographical areas
- Wide variety of additives and oxygenated compounds permitted.

Should automotive fuels eventually become certified for aviation use, we will require that any aviation retailers who handle this product for aviation use must comply with generally accepted aviation fuel quality assurance standards. This will include dedicated systems with appropriate equipment and procedures to guarantee appropriate quality standards at the point of delivery to the consumer.

A/M/

	Grade 80 (80/87)	Grade 100 (100/130)	Gra 100L
Color	Red	Green	Blue
API Gravity, 60 °F	71.4	71.5	67.9
Specific Gravity, 60/60 °F	0.6974	0.6970	0.7096
Reid Vapor Pressure, psi	6.5	6.2	6.3
Distillation, °F			
Initial Boiling Point	105	104	95
10% Evaporated	144	152	154
40% Evaporated	195	200	205
50% Evaporated	208	210	215
90% Evaporated	240	240	236
Final Boiling Point	290	295	290
Residue, %	0.9	1.0	1.0
Loss, %	1.1	1.0	1.0
New Heat of Combustion, BTU/lb.	19,005	19,037	18,897
Sulfur, %	0.010	0.008	0.012
Tetraethyblead, ml/gal	0.25	3.03	1.80
Copper Strip Corrosion	No. 1	No. 1	No. 1
Potential Gum 5 hr,mg/100ml.	1.4	1.5	0.6
Freezing Point, °F	-100	-96	-88
Water Reaction Volume Change, ml	0.6	0.6	0.4
Knock Value			
Aviation (lean)	86	105	103
Supercharge (Rich)	91	132	133