

## Racing Gasoline Verses Aviation Gasoline

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I am going to attempt to address the controversy of aviation gasoline verses racing gasoline for use in race cars. Some racers use aviation gasoline, which is fine for some applications but does have shortcomings. There are several grades of aviation gasoline (avgas) that we must identify before going any farther.

### **Avgas 80/87**

This product is used in low compression ratio aircraft engines, contains little or no lead, is red in color, and should not be used in any automotive engine due to a low motor octane number of about 80.

### **Avgas1000/130**

This product can be used in some automotive engines. It has both research and motor octane numbers slightly over 100. Avgas 100/ 130 is green in color, contains four grams of lead per gallon, and is becoming harder to find.

### **Avgas 100 LL**

The LL stands for "low-lead" which means two grams per gallon, low compared to the avgas 100/130 that it was designed to replace. It has research and motor octane numbers very similar to the 100/130 product previously discussed. The color is blue. This product sometimes has a high level of aromatics, which can contribute to lazy throttle response, and dissatisfaction of the consumer.

### **Avgas II 5/145**

This product was developed for high performance piston aircraft engines used in World War II and in the Korean War. It is very hard to find anymore due to lack of demand although it is of very high-octane quality. The color is purple.

The remainder of this discussion will assume that our basis for comparison with racing gasoline is avgas 100/130 and/or 100 LL since they are both available and have acceptable octane quality for limited applications. When the word "avgas" is used, it will refer to avgas 100/130 or 100 LL.

Avgas is less dense than most racing gasoline. Instead of weighing about 6.1 to 6.3 pounds per gallon like racing gasoline, it weighs 5.8 to 5.9 pounds per gallon. The racer must compensate for this by changing to richer (larger) jets in the carburetor when changing from racing gasoline to avgas.

The other major difference is octane quality. Avgas is short on octane compared to most racing gasoline. Many racing engines with "quick" spark advance curves or with no centrifugal advance have more spark advance at low rpm than avgas and some

racing gasoline can handle. The result is detonation, especially during caution periods in circle track racing because the entire spark advance is "in", rpm is low, and part throttle air fuel ratios are too lean for the operating conditions. If the driver does not "work" the throttle back and forth, pistons can be "burned" which melts away part of the aluminum piston material. Inadequate octane quality is one of the quickest ways to destroy an engine. Pistons can be severely damaged during one acceleration where detonation is present and the racer may not know what is happening until it is too late.

For maximum performance and power from a racing engine, racing gasoline will normally provide better performance than avgas. Avgas can be a good gasoline for some applications, but since most racers do not know the octane requirement of their engines, they would be better off with a "real" racing gasoline that will give them the overall resistance to detonation that they need to protect their investment. If someone has spent from \$15,000 to \$50,000 or more on his or her racing engine, it is foolish to cut corners on gasoline be sure you have a gasoline with adequate octane quality.