RACE FUEL-GENERAL INFORMATION

Following are some guidelines to help determine the proper fuel for your hi performance ATV engine

We recommend using:
VP Racing Fuel www.vpracingfuels.com
C12-Best All Around Race/Recreation (non-oxygenated)
U4.2 Maximum Performance for 4-Stroke in an AMA legal fuel. Up to 6% gain over pump gas

Sonoco Race Fuels www.racegas.com
"The" Standard-All Around Race/Recreation (non-oxygenated)

**Consult VP Fuels and Sonoco Race Fuels website's for additional fuel blend options and information*

Following is some basic technical information regarding race fuel:

OCTANE: This number rates a fuel's ability to resist detonation and/or preignition. Octane is rated in Research Octane Numbers (RON), Motor Octane Numbers (MON) and Pump Octane Numbers (R+M/2). A pump octane number is the number you see on the pump at gas stations. It represents the average of the fuel's RON and MON. Most race fuel manufactures prefer MON testing for its accuracy.

FUEL DENSITY: The weight of gasoline in relation to the weight of water. Gasoline floats in water which proves it is lighter. It is important to always run a fuel with the same density. Changing fuel density can richen or lean the air-fuel ratio.
Fuel density is a kin to oil viscosity, heavier weights flow less through a given opening.

BURNING SPEED: Is the speed in which fuel releases its energy. Different engines require fuels with various burn rates.

ENERGY VALUE: Is an expression of the potential energy in various fuels. Energy value in fuel is measured in BTU's per pound (not per gallon). Generally higher energy values have a greater impact on horsepower.

COOLING EFFECT OF FUEL: Is directly related the fuel's heat of vaporization. The higher a fuels heat of vaporization the better its ability to cool. Better cooling by the fuel will generate horsepower gains in both 2 & 4 stroke engines.

DETONATION: Detonation, also known as pinging, occurs when the air/fuel mixture in the cylinder that has been ignited by the spark plug, causes another flame front that interrupts smooth burning. The violent collision of these two flame fronts causes the characteristic metallic "pinging" sound. Detonation dramatically increases combustion chamber pressure, generates tremendous amounts of heat and engine wear, and can range in severity from hardly noticeable to total destruction of the engine.

PRE-IGNITION: Premature ignition of the air/fuel mixture as the piston is traveling upward during the compression cycle and prior to firing of the spark plug. It is usually caused by red hot deposits in the combustion chamber, and overheated spark plug, or incorrect tuning parameters, insufficient fuel quality, too little octane, and/or heat from compression or engine temperatures. If severe enough, pre-ignition can cause major mechanical damage. Although not the same as detonation, the resulting damages can be very similar.

STORAGE: For optimum storage for race fuel in sealed metal drums. Keep fuel in cool dry environment. Do not store directly on concrete, store on pallet or wood blocks. Do not store fuel outside in direct sunlight or in plastic container. Use plastic containers for short term storage fuel only. Stored properly race fuel can last for months.
NOTE: When race fuel begins to smell like turpentine it is bad. The use of bad race fuel will cause severe engine damage.

Basic definition for some Fuels and Supplements

AVIATION FUEL: Av Gas is a common alternative to pump gas in performance applications. Because street pump gas is primarily designed to address emissions considerations rather than performance AV gas sometimes used by those looking for a cheaper alternative to race fuel. When choosing a fuel for performance applications, **here are some important things to consider**.

Av Gas is designed for low RPM engines. A typical aircraft engine does not rev much beyond 2,200 RPM. Av Gas therefore has a very slow burn speed and is typically not well-suited to high RPM engines with their much higher exhaust and cylinder temperatures. Since Av Gas is used in engines that typically operate at a steady RPM, acceleration and throttle response qualities are less crucial than with most racing fuels.

Av Gas octane ratings (e.g. "100/130") are derived through different methods than octane numbers for racing and street gasolines. As an example, 100/130 octane Av Gas is generally similar in performance to a racing gasoline in the mid to high 90's octane range. Av Gas can work better than street gas in some performance applications because the quality of pump gas is often poor. However, in almost every case, the correct racing gasoline will provide more horsepower and torque, crisper acceleration, and cooler operation, as opposed to AV Gas. Racing gasolines are also usually less prone to vapor lock, more efficient at the atmospheric pressures and temperatures at ground level. For the ultimate performance, reliability, and maximum engine life, race gas is usually a much better choice.

OXEGENATED FUEL: Oxygenated fuel is nothing more than fuel that has a chemical compound containing oxygen. Oxygenated fuel works by allowing the gasoline in vehicles to burn more completely. Because more of the fuel is burning, there are fewer harmful chemicals released into the atmosphere. In addition to being cleaner burning, oxygenated fuel also increase the engines performance. In some case power can be increased from 6%-10%.

NITRO METHANE: Nitro methane is a very powerful fuel, and it can be used to increase power output in racing applications. Nitro does not mix well with gasoline so therefore it is better for alcohol

applications. Nitro creates tremendous amounts of heat when it is ignited, and without spending obscene amounts of money, it is hard to use nitro in gas applications.

PROPYLENE OXIDE: Is a horsepower additive for gasoline. Oxygen-rich, easily vaporized. Power gain can be substantial.
NOT LEGAL FOR USE IN MOST ATV RACING EVENTS

NITROUS OXIDE: Nitrous oxide allows the engine to burn more fuel and air; resulting in a more powerful combustion with increase the engines power output. The gas itself is not flammable, but it delivers more oxygen than atmospheric air by breaking down at elevated temperatures. Nitrous oxide is stored as a compressed liquid; the evaporation and expansion of liquid nitrous oxide in the intake manifold causes a large drop in intake charge temperature, resulting in a denser charge, further allowing more air/fuel mixture to enter the cylinder. Nitrous oxide is generally injected into the intake manifold on an ATV application

Factors influence your fuel requirements

Temperature - Generally, the hotter the ambient air and engine coolant the greater the octane requirement.

Altitude - The higher the altitude above sea level, the lower the octane requirement. Modern computer-controlled engines adjust spark timing and air-fuel ratio to compensate for changes in barometric pressure, and thus the effect of altitude on octane requirement is smaller in these vehicles.

Humidity - The drier the air, the greater the octane requirement.

Spark Timing - The octane requirement increases as the spark timing is advanced. Both the basic setting of the spark timing and the operation of the automatic spark advance mechanisms are important in controlling knock. In some computer controlled engines, the spark timing can only be changed by replacing modules in the computer. If they are equipped with knock sensors, these computer controlled engines have the ability to retard the ignition temporarily when a sensor detects knock. This temporarily reduces the octane requirement and may also temporarily reduce vehicle performance. This is a common characteristic of automotive engines, but not used on ATV's.