NOS – super fuel for super engine

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Nitrous oxide allows the engine to burn more fuel and air, resulting in a more powerful combustion. The gas itself is not flammable, but it delivers more oxygen than atmospheric air by breaking down at elevated temperatures, which is extremely important in racing competitions.

The purpose of a gasoline car engine is to convert gasoline into motion so that your car can move. Currently the easiest way to create motion from gasoline is to burn the gasoline inside an engine. Therefore, a car engine is an internal combustion engine -- combustion takes place internally. Internal combustion gasoline engines run on a mixture of gasoline and air. The ideal mixture is 14.7 parts of air to one part of gasoline (by weight.) Since gas weighs much more than air, we are talking about a large amount of air and a tiny bit of gas. One part of gas that is completely vaporized into 14.7 parts of air can produce tremendous power when ignited inside an engine. Almost all cars currently use what is called a four-stroke combustion cycle to convert gasoline power into motion. The four-stroke approach is also known as the Otto cycle, in honor of Nikolaus Otto, who invented it in 1867. It comprises: Intake, Compression, Power and Exhaust [1].

Nitrous oxide has another effect that improves performance even more. When it vaporizes, nitrous oxide provides a significant **cooling effect on the intake air**. When you reduce the intake air temperature, you increase the air's density, and this provides more oxygen inside the cylinder.

A 5-liter engine running at 4,000 rotations per minute (rpm) consumes about 10,000 liters of air every minute (compared to about 0.2 liters of gasoline), so it would take a tremendous amount of nitrous oxide to run a car continuously. Therefore, a car normally carries only a few minutes of nitrous oxide, and the driver uses it very selectively by pushing a button [2].

Nitrous oxide has this effect because it has a higher percentage of oxygen content than does the air in the atmosphere. Nitrous has 36% oxygen by weight and the atmosphere has 23%. Additionally, nitrous oxide is 50% denser than air at the same pressure. Thus, a cubic foot of nitrous oxide contains 2.3 times as much oxygen as a cubic foot of air. Just do a bit of math and you can realize the advantage: when substituting some nitrous oxide for some of the air going into an engine instead of filling up the appropriate amount of additional fuel, the engine is going to put out more power [3]. Very large power increases are possible, and if the mechanical structure of the engine is not properly reinforced, the engine may be severely damaged or destroyed during this kind of operation. It is very important with nitrous oxide augmentation of internal combustion engines to maintain proper operating temperatures and fuel levels to prevent "pre-ignition", or "detonation". Most problems that are associated with nitrous do not come from mechanical failure due to the power increases. Since nitrous allows a much denser charge into the cylinder it dramatically increases cylinder pressures. The increased pressure results in heat which will cause many problems from melting the piston, cylinder head or valves, to pre-detonation. It must be taken into consideration at the stage of the engine design for racing competition cars.

Bibliography:

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