



OCTANE NUMBERS AND WHAT THEY REPRESENT

One of the most frequently asked technical questions we get at VP is about the difference between Motor, Research and R+M/2 Octane Numbers. The next question often asked is why do some fuel companies represent their fuels with Motor Octane Numbers and other companies use Research or R+M/2 Octane Numbers.

Realize first that octane is a measurement of a fuel's ability to resist detonation—nothing more. The two types of machines used for testing octane—a Motor Octane machine and a Research Octane machine—were designed in the 1930s. They were designed to test for octane numbers from the 0-100 range, therefore, any number above 100 is an extrapolation.

Both of these machines are dinosaurs and are not adequate for today's high tech fuels or engines, but they're the only means available for testing fuels. These machines are one-cylinder engines with an adjustable head that can move up or down to increase or lower the compression ratio while the engine is running. The Motor and Research machines are the same in this respect, but they differ in several other characteristics.

The following is a comparison of the two machines used for testing octane numbers:

	Motor Machine	Research Machine
RPM	900	600
INTAKE TEMP.	300 DEGREES F	120 DEGREES F
TIMING	VARIABLE BASIC Setting 26 degrees	FIXED AT 13 DEGREES (DOES NOT CHANGE)

As you can see, the Motor Octane machine runs at a higher RPM, higher temperature and more timing. This machine puts more stress on the fuel than a Research machine and more accurately simulates a racing engine. VP Racing Fuels always includes Motor Octane Numbers when promoting its fuels because our fuels are used exclusively for racing applications.

The Research Octane machine will always produce a higher number for the obvious reason that it does not put the same amount of stress on the fuel. This number is used by some fuel companies to trick the racer into thinking the fuel is rated higher, i.e., higher quality, than it really is. The "R+M/2" Octane Number is the average of the Research and Motor Octane numbers for a fuel and is the number displayed with yellow labels on retail level gas pumps.

When comparing fuels for racing purposes make sure to compare Motor Octane Numbers because these are the ones that count in your racing application. Focusing on the MON of each fuel will help ensure you're comparing apples to apples with regard to octane.

But bear in mind, a fuel's ability to prevent detonation is a function of more than just octane. For example, VP's fuels—oxygenated or nonoxygenated—vaporize much better than competitive fuels with comparable octane ratings. This means VP fuels cool the intake charge, burn faster and yield more efficient combustion. As a result, the "effective" octane rating of VP's fuels is even higher than the rating generated by the octane test. As a result, VP fuels will prevent detonation more effectively than competitive fuels with comparable MONs.

