Tech Bulletin

World Leader in Race Fuel Technology™

Tech Bulletin prepared by Steve Burns, Director-Research & Development

Methanol Fuels for Racing

VP offers several types of methanol racing fuels, each of which offers top quality for applications ranging from drag racing, circle track and road racing to off road and powerboats. Among the most important features of VP's methanol products is consistency in production and packaging. Much of the cheaper methanol on the market is reclaimed from industrial processes and far more likely to contain contaminants. VP doesn't cut corners or 'reclaim' methanol. While that leads to slightly higher prices, our customers can trust our product and have much greater assurance they won't have to deal with "bad fuel" issues.

Why offer three types of methanol?
VP has always emphasized giving our customers options. We try to make sure we always have the absolute best performing option available, making the most power possible given an application's parameters. But there are other considerations—budget, fuel rules, or environment for example—that sometimes dictate the selection of a fuel other than one that makes the most power.

M1™ - M1 is the best straight methanol on the market. No frills, but consistently **99.85+% pure and always packaged in lined drums**, as are all VP fuels. That means no contaminants and peace of mind from knowing you don't have to deal with fuel issues. When fuel rules require the use of straight methanol with no additives, M1 is the best option.

M3™ - M3 contains combustion and lubrication additives that improve vaporization and increase burning speed. These factors, combined with a better seal of the rings due to the lubrication additive, **make substantially more power than straight methanol**—up to a 50 Hp gain in a 1030 Hp engine. The improvement in throttle response is also significant—**up to a 5% increase in torque across a wider rpm range.** On-track results indicate a .02-.03 improvement in ET in the 1/8 mile. The improved combustion also helps the thermal efficiency of the air/fuel mixture. This expands the range of ignition, contributes to better 'startability' and more consistency run to run, while lowering the exhaust temperature 40-100°. Not only will M3's improved combustion make more power and offer better protection against detonation, it also **inhibits the noxious fumes you typically get with standard methanol, so it's much easier on your eyes and nose.** A somewhat unexpected benefit of M3 is a *30% decrease in fuel consumption*. That means if you typically use 40 gallons over a race weekend, you'll only need about 25-30 gallons of M3. M3 also includes an anticorrosion package, so there's no need to add anything else to address lubrication or corrosion issues.

To maintain the original properties and comply with Health and Safety regulations, this fuel should be handled and stored in a cool place and always maintained in tightly sealed drums.

Property/ Typical Values	M1	M3	M5	Test Methods
Specific Gravity @ 60F°	.795	.784	.816	ASTM D 4052
Reid Vapor Pressure	4.60	8.57	7.66	ASTM D 323
Color	Clear	Clear	Clear	

Since M3 is not pure methanol, it won't pass a water test. But where permitted, it will substantially improve performance in 60-70% of all applications, requiring **no jetting or timing changes—just pour it in and get up to 5% more Hp.** However, not every vehicle will run quicker with M3. For example, in applications that typically run very rich, M3's improved vaporization will lead to less volumetric efficiency, such that the car will run faster MPH, but stumble at the launch. In most of these instances, jetting changes will reverse that effect. In carbureted systems, smaller squirters and less aggressive pump cams will be required, while injection systems will require leaning out the idle system (not the main system). For customers who want more power but prefer not to deal with these adjustments, M5 will be the best option.

M5™ – M5 is simply the best performing methanol on the market. With its upgraded combustion additives, **M5 will make more power than M3, while offering the same or better protection against detonation**. Like M3, M5 offers a wider range for tuning, as reflected by the fact that the bracket racers who have helped us in testing have experienced no problems with tuning or tuning consistency. M5 also reduces noxious methanol fumes, although not as well as M3. That means that while M5 is the best choice for making the most power in unrestricted applications, M3 will still be the best option for some venues, notably enclosed stadiums. M5 is not pure methanol and won't pass a water test.

M2™ Upper Lube – Designed for use in methanol-powered engines, M2 protects valves, guides, cylinder walls, fuel pumps and aluminum fuel systems, and extends pump life. Using electrochemical plating technology—a big improvement over just using oil—M2 leaves a thin film of lubrication to protect against corrosion between races. Recommended for use with M1 or any other standard methanol, while it's not required with M3 or M5 due to their lubrication additives.

Technical questions on applications and tuning can be referred to VP's Technical Department at 812-878-2025 or tech@vpracingfuels.com. VP's methanol products can be ordered via any of VP's regional distribution centers, contact information for which is available on VP's website at *vpracingfuels.com*. VP's methanol products are available in 5-, 15-, 30- and 54 gallon drums, as well as bulk.

The four most important properties of racing fuel

You can't make a racing fuel that has the best of everything, but you can produce one that will give your engine the most power. This is why we produce different fuels for different applications. The key to getting the best racing gasoline is not necessarily buying the fuel with the highest octane, but getting one that is best suited for your engine.

1. **OCTANE -** The rating of fuels' 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). Pump Octane Numbers are what you see on the yellow decal at the gas stations and represents an average of RON and MON. VP uses MON because this test method is more prevalent in racing. Most other companies use RON because it is higher, easier to come by, and sounds better in marketing messages. Don't be fooled by high RON numbers or an average -- MON is the most important for a racing application. However, the ability of the fuel to resist preignition is more that just a function of octane.
2. **BURNING SPEED -** The speed at which fuel releases its energy. In a high-speed internal combustion engine, there is very little time (real time - not crank rotation) for the fuel to release its energy. Peak cylinder pressure should occur around 20° ATDC. If the fuel is still burning after this, it is not contributing to peak cylinder pressure, which is what the rear wheels see.
3. **ENERGY VALUE -** An expression of the potential in the fuel. The energy value is measured in BTUs per pound, not per gallon. The difference is important. The air fuel ratio is in weight, not volume. Remember, this is the potential energy value of the fuel. This difference will show up at any compression ratio or engine speed.
4. **COOLING EFFECT:** The cooling effect on fuel is related to the heat of vaporization. The higher the heat of vaporization, the better its effect on cooling the intake mixture. This is of some benefit in a low rpm engine, but can be a big gain in high rpm engines.

The VP Racing Story

For more than 30 years, VP's passionate dedication to technological development through R&D has set it apart from every other race fuel company. We started with the philosophy that the only thing that counts is winning, and that continues to this day.

VP works directly with racers at the track and on their dynos. It's how we started and continues to be our M.O., with most of our R&D accomplished in this manner. True champions leave no stone unturned in their drive to win. That's why more champions in more forms of motorsports choose to work with VP than any fuel company in the world.

Claiming world leadership in technology might seem like a stretch until you look at the range of applications for which VP has developed top performing fuels and now sells in more than 30 countries around the world. Take NHRA Pro Stock, where VP has dominated for three decades and was ultimately chosen as the spec fuel for the world's most advanced engines in a stock application. Or take VP's Late Model Plus, which in just three years has become a dominant fuel in dirt track racing and which no competitor has been able to match. Or take motorcycles—for the last three years, 100% of AMA's championships across all Pro classes have been won on VP-powered machines. Much of VP's technology in motorcycle fuels has been transferred to automotive applications and with many of the best young minds involved with the technological developments in motorcycle racing, our work in this area keeps us ahead of most competitors on the learning curve.

VP's commitment to R&D goes far beyond making a profit. It's about being the best—and knowing that with delivery of the best quality, performance and consistency, profits will follow. That's why R&D and Quality Control are two of VP's biggest expenditures. And why those budgets will never be cut. After all, racing is built on technology. And technology in racing fuels drives our company.

There's a reason VP offers more than 60 blends of racing fuel today—each of them came out of R&D with specific teams. The good news we've likely already developed the best available fuel for your application. But rest assured, if your application is so unique it requires creating a new fuel, that's exactly what we'll do.

For questions regarding fuel recommendations or tuning, contact VP's Technology Director at 812-878-2025 or *tech@vpracingfuels.com*. VP's unsurpassed quality, performance and consistency were built on world leading race fuel technology -technology available to you. Put VP to work for your team today.

Advancing the Science of Motorsports™

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