



# Tech Bulletin

World Leader in Race Fuel Technology™

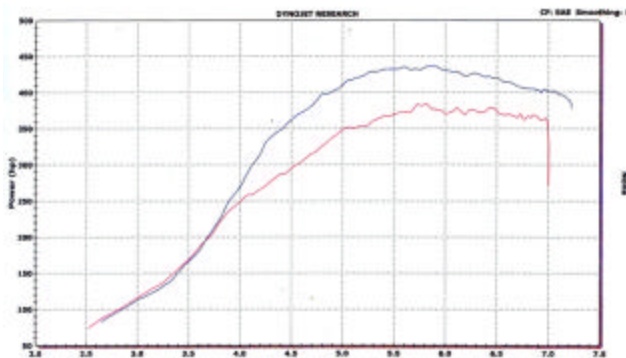
Tech Bulletin prepared by Steve Burns, Director-Research & Development

## Sport Compact Racing Fuels

VP Racing offers several fuel options for high-performance sport compact cars, including one that is street legal—StreetBlaze 100. While all these fuels will help generate optimum power and performance in any high performance automotive application, only StreetBlaze 100 is recommended for use in street cars that also will be used for street driving.

### Unleaded

**StreetBlaze™ 100** – This fuel is specifically engineered for high-performance street cars including sport compacts, muscle cars, street rods and more. Oxygenated with ethanol, it's street legal throughout the U.S. In applications with anything from 4- to 12-cylinders or engines equipped with a turbocharger, supercharger or nitrous oxide system (NOS), StreetBlaze 100 will generate optimum power and performance. In turbocharged or supercharged applications, it allows an increase in boost without fear of detonation. NOS users can also leverage its higher octane rating to step up to a more powerful nitrous oxide system. Dyno tests with a turbocharged application proved StreetBlaze 100 generates up to 14% more horsepower compared to premium grade 91 octane unleaded gasoline. Designed for use in cast-iron head engines with CRs up to 13:1 and aluminum head engines up to 14:1. Works well on the latest generation of electronically-controlled turbo engines. Contains no metal compounds and won't harm catalytic converters or oxygen sensors.



### Engine Speed (RPM X 1000)

In a '94 Toyota Supra TT, with boost pressure identical on both runs, StreetBlaze 100 allowed additional spark advance and leaner air-fuel ratios, generating 51.8 additional HP (+14%) at the wheels compared to 91 octane premium pump gas (chart courtesy of DSport Magazine – July 2006).

NOTE: VP encourages its customers to obey all traffic and safety laws, as well as confine racing activities to the track using appropriate safety gear.

**Motorsport™ 101** – This 101 octane (R+M/2) fuel allows an increase in timing and more powerful nitrous oxide systems, with substantial power increases compared to premium pump gas. Designed for CRs up to 13:1 in cast-iron head engines and up to 14:1 with aluminum heads, MS101 is particularly effective in turbo- and supercharged applications. It contains no metal compounds and won't harm catalytic converters or oxygen sensors.

**Motorsport™ 103** – MS103 provides power and protection equal to some leaded racing fuels. Compared to Motorsport 101, it allows even more aggressive timing and higher compression—up to 14:1 in cast iron head engines and up to 15:1 with aluminum heads. Can allow doubling of stock boost – consult your engine builder. Also contains no metal compounds and won't harm catalytic converters or oxygen sensors.

**C10™** – The best *non-oxygenated* unleaded racing gasoline available. Offers significant increases in horsepower and torque. Used by national champions in SCCA and IMSA stock classes.

**MS109™** and **MS109E™** – These oxygenated fuels produce more power than any unleaded fuel designed for sport compacts. Recommended for higher boost applications with CRs up to 11:1 or normally aspirated engines up to 13:1.

### Leaded

**NEW! Q16™** – Q16 can be used with naturally aspirated, nitrous or blower applications with CRs up to 17:1. Makes 3-5% more power than competitors' 116 octane fuels and provides better protection against detonation. Oxygenation expands the range of air/fuel ratio acceptability, offering more consistent performance from run to run and it won't vary as much with altitude or density changes.

**C16™** – Designed for use in turbocharged engines, blown engines and nitrous applications with CRs up to 17:1. Recommended by the top nitrous oxide companies and used by top Sport Compact teams including Titan Motorsports, Scranton Bros. Racing, SSC Racing and other champions in NHRA Sport Compact, NDRA and IDRC.

**NO2™** – Recommended for fogger or three-stage nitrous oxide applications with CRs up to 18:1. Higher octane and lower specific gravity than most nitrous fuels. May require enriching fuel mixture more than C16 would require.

**C23™** – Recommended for ultimate performance with a nonoxygenated fuel in nitrous oxide applications with CRs up to 18:1. Spec fuel for Pro Modified cars in NHRA Comp Eliminator and approved for use in Sport Compact classes.

**VP Import™** – For all-out ultimate performance when fuel rules permit use of oxygenates. Maximum power and torque in small displacement, high RPM, all motor, turbocharged or nitrous sport compact applications. Makes 5% more power than C16 and similar non-oxygenated fuels. Works well in high temperature induction systems. May require enriching fuel mixture more than C16 would require. Used by top Sport Compact teams, including Titan Motorsports and others.

### Methanol

**M1™** – Offers the highest quality, purity and consistency of any methanol on the market. Allows engines to run cooler and they'll be less subject to corrosion. Meets NHRA's stringent fuel test specs for methanol.

Property/ Typical Values	SB 100	MS 101	MS 103	C10	MS 109	Q16	C16	C23	NO2	VP Import	Test Method
Spec Gravity @ F	.746	.800	.743	.763	.722	.716	.735	.709	.699	.744	ASTM D 4052
Motor Octane	96	99	99	96	101	116	117	120+	120+	120+	ASTM D 2700-86
R+M/2	100	101	103	100	105	120+	117	120+	120+	120+	
Research Octane	104	103	107	104	109	120+	117	120+	120+	120+	
Reid Vapor Pressure Distillation )?	6.80	5.29	2.86	1.90	6.17	6.76	1.85	4.54	1.71	3.70	ASTM D 323 ISO 33405
10% Evap.	148.0	168.0	190.0	212.0	147.0	141.0	211.5	172.2	204.3	178.9	
50% Evap.	210.0	229.6	210.4	224.0	167.8	174.0	213.1	207.6	205.2	218.2	
90% Evap.	216.0	282.0	217.1	266.0	213.3	214.5	215.8	211.4	207.1	323.2	
E.P.	238.0	374.4	225.7	281.0	263.8	260.2	233.3	230.2	211.3	350.9	
Leaded	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	ASTM D 3237
Oxygenated	Yes	Yes	Yes	No	Yes	Yes	No	No	No	Yes	Elem Analysis
Color (O = Orange)	O	Yellow	Red	Clear	Clear	Yellow	Blue	Blue	Clear	Clear	

To store these fuels, keep them in a tightly sealed container. Do not expose the fuel to direct sunlight as the ultraviolet rays will oxidize the lead. (VP produces a variety of Motorsport Containers and gasoline containers, each of which is suitable for storage and transportation of fuel. Contact your regional VP Racing sales manager for more information.)

## 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 particular 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** – This is simply the rating of 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. Pump Octane Numbers represent an average of RON and MON (R+M/2). VP uses MON because this test method is more relevant to racing. Most other companies use RON because it is higher, easier to obtain, 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 than 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 four-stroke engine, but can be a big gain in two-stroke engines.

## The VP Racing Story

For more than 30 years, VP Racing's strength has been its passionate dedication to technological innovation through R&D, setting 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. today, 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 is it's likely we've 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](mailto: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.

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[www.vpracingfuels.com](http://www.vpracingfuels.com)

Headquarters: San Antonio, Texas.

Offices in Delaware, Indiana, California, Georgia; Independently owned VP distribution centers in Florida, Kansas and Washington International:

Calgary, Montreal and Toronto, Canada; Sydney, Australia