SMOG TUNING

A LOOK AT WHAT'S INVOLVED IN MAKING YOUR HIGH-PERFORMANCE PONY SMOG LEGAL

By Joe Pettit

The right combination is what all Mustangers are after when it comes to performance. All the parts have to work together to get maximum performance from your machine. While we're most concerned with teasing out as much horsepower and making our machines as fun to drive as possible, the powers of the state are concerned with how our fun is affecting the air we all breathe.

A big part of that concern has focused on what combinations of parts we can run on our cars and still be allowed to register them for street use—and for good reason. The amount and types of emissions produced by an engine are directly related to its overall design and combination of intake, compression ratio, cam profile, exhaust system, ignition timing, and state of tune. In short, just about everything affects the emission of pollutants.

Given that pollution is a problem we all have to deal with, it makes sense to know at least a little bit about how building your engine and the way you tune it and drive it affect the pollution problem. And since knowledge is power, we stopped by Kaufmann Products in Downey, California, and talked to Chris Kaufmann about how to live within the letter of the law while still enjoying the pleasures of our favorite pony.

Chris and his crew are in the vanguard of low-emissions performance equipment. They are highly involved in showroom stock racing, where their efforts are put to the test. As a result of his involvement in low-emissions performance, Chris has some insight into the history of performance-minded gearheads and a pollution-concerned bureaucracy.

"Most states have sniffer-only tests," Chris said. "They don't have visual inspections. As long as your vehicle produces less than the limits for hydrocarbons (HC) and carbon monoxide (CO), you pass inspection. They don't care how you do it as long as you pass. In California it's a different story. We have visual inspections to confirm that pollution control devices are present and operating.

"I used to be against the visual inspection until I found out more about pollution controls and why they are there. While HC and CO emissions are bad, the really big pollution problem from cars is oxides of nitrogen (NOx). It stays in the atmosphere the longest and causes the most damage. NOx is the reason for the visual inspections in California. There's been a lot of research on engine design and tuning and the emission of pollutants. And we know by testing what conditions produce NOx, and that the systems mandated by law work to reduce NOx as well as HC and CO. They only measure HC and CO levels, because NOx is produced mostly when the engine is under load or with very lean mixtures. So instead of requiring all the smog stations to have chassis dynos, which would be very expensive, the stations measure HC and CO levels and infer the NOx levels from the observed levels of HC and CO. The theory is that if the systems are present and working and the car is tuned properly (HC and CO levels are directly related to the state of tune and efficient use of fuel), NOx emissions will be low.

"I think hot rodders became militantly antismog device because of the timing and manner in which pollution control devices were mandated by law," Chris explained. "The technology in the late Sixties and early Seventies was primitive and inefficient, and so we lost a lot of performance. Which is why people, especially hot rodders, started defeating the systems. Back then if you defeated the systems, you could gain 15 to 20 horsepower. Your car would run cooler and get better gas mileage.

"Now it's a completely different story. In doing the dyno testing on our Showroom Stock racer we've found that it only takes 3 horsepower to drive the smog pump. So the technology is getting better, and we've found ways to make power and have a cleaner-burning machine. And that, of course, is the