FROZEN POWER

Liquid Carbon Dioxide drops intake temperatures to increase horsepower.

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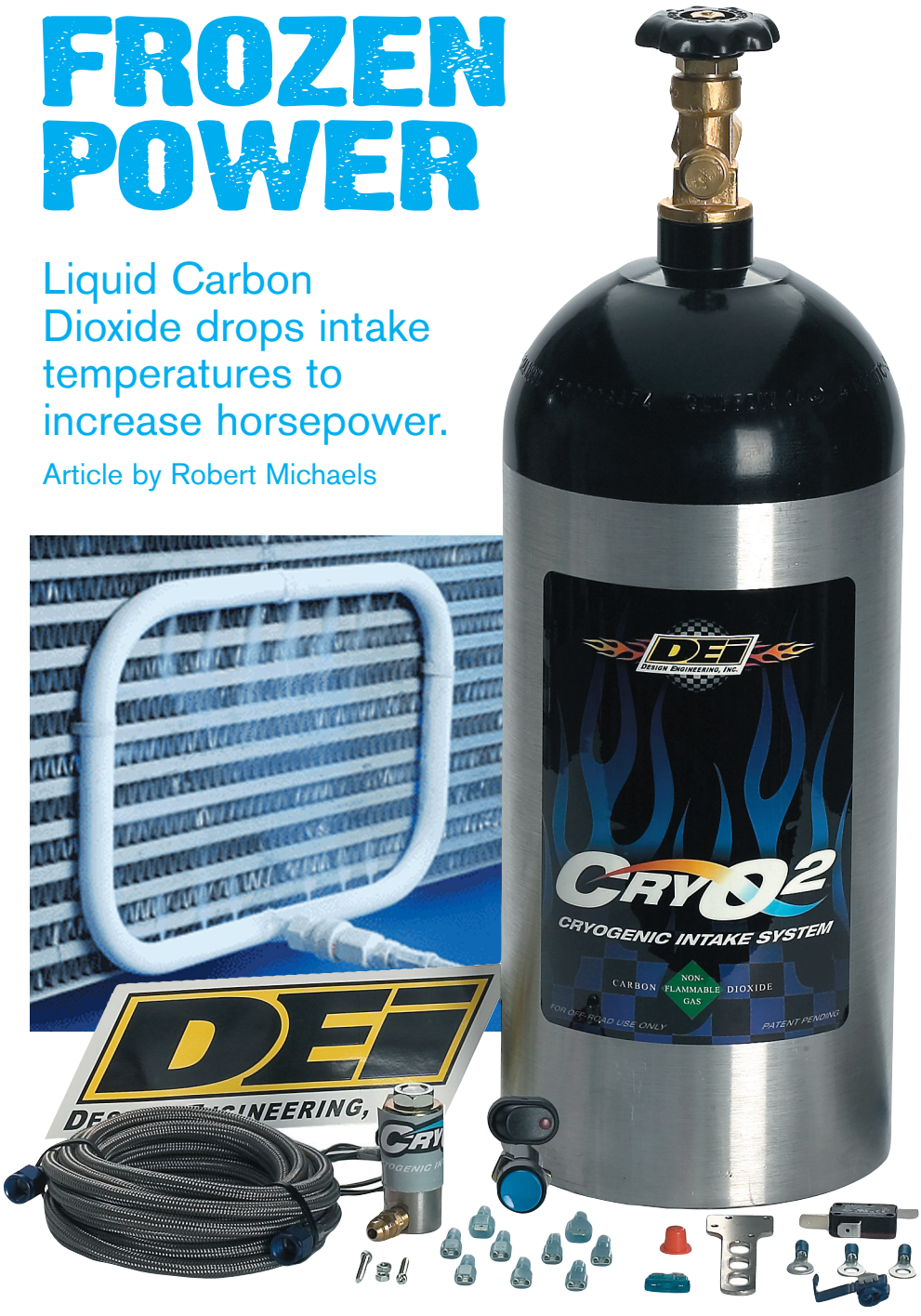

If your first thought when you hear the word Cryogenics is Walt Disney, then as Desi used to tell Lucy "we've got some splainin to do."

Cryogenic technology revolves around the use of liquefied carbon dioxide to super cool an item. The thought that someone would want their body to be fast frozen to allow them to come back in the future appears to be nothing more than an urban legend. No, Walt is not lying in a freezer somewhere waiting to be brought back.

Cryogenics is the science of low temperatures and is in use today in the defense, biomedicine, aerospace and the refrigeration industries. Anywhere that super cooling power can improve a product would be an application for cryogenics. What's this all got to do with high performance automobiles?

Design Engineering, based in Cleveland Ohio has been the leader in thermal tuning products since 1995. Their broad range of products has been designed to prevent heat from causing the deterioration of horsepower in high performance applications. Such items as header wraps, starter shields, turbo insulation kits and many others, all aid in keeping heat away from important horsepower producing components, allowing the racer to reach peak efficiency with their engine. Too much heat causes a degradation of horsepower.

In 2003 Design Engineering brought to market a unique product combining cryogenics and aerodynamics, one that dramatically reduces the temperature of the air/fuel charge as it flows into the engine. Marketed under the brand name CryO^2, this is a non-invasive system designed to dramatically reduce the temperatures that effect the horsepower output of an engine. This system is designed with the drag racer in mind, easily installed, used only when necessary, providing dramatic results.

The heart of the CryO^2 system is a bottle containing liquefied carbon dioxide (CO^2), similar in size to a nitrous bottle, however unlike nitrous nothing is induced into the engine. Liquefied carbon dioxide is stored under pressure in the CryO^2 bottle. As it leaves the bottle, it registers 80 degrees below zero. It is this super cooling that is the heart of the CryO^2 system.

In addition to the bottle, there can be as many as three separate components working to lower the fuel/air intake charge thus increasing your engines power output. All of these components can be hooked in series to allow the temperature reduction at three separate locations in the induction system or the racer can use any of the system components alone. Flexability is a major feature in the CryO^2 system; in fact, you can run as many components as you can fit on the CO^2 delivery line. It is only limited by what the race car needs.

With all three components in place, intake air is cooled, fuel is cooled and intercooler temperatures are lowered. Here's how it works.

The bottle is mounted in a suitable location, usually in the trunk, similar to a nitrous bottle. Like nitrous, a stainless steel braided hose is routed to the engine compartment and connected through a cryogenic solenoid to the first component in the chain with a stainless steel braided hose.

Usually, the first component will be an air intake chamber that you have fitted to your intake tube. These are available in both 2 1/2" and 3" diameters; you would use the one that matches your intake tube. The CryO^2 air intake encompasses a cryogenic chamber that receives the CO^2 when the solenoid is actuated. When the air charge passes over the aerodynamic bulb in the chamber, heat is transferred and the intake charge cooled. Immediate temperature drops by 30 degrees are common, longer application times have resulted in the intake charge dropping to an amazing 40 degrees. Cold intake air, when mixed with fuel, results in a faster burning more efficient engine. Pre-ignition and hot spots are eliminated allowing increased timing to be input.

Next in the chain is the fuel bar. The fuel bar is installed in front of the fuel rail and is a precision machined aluminum manifold that accommodates passages for both fuel and CO^2 to pass thru. Fuel flows into the fuel bar prior

to it entering the fuel rail and eventually the injectors. Another length of stainless braided hose connects the air intake to the fuel bar, continuing the cooling path of the liquefied carbon dioxide. As the gas passes thru the fuel bar, it cools the incoming fuel on its way to the fuel rail. As before, a cooler fuel charge results in increased horsepower.

If you have an intercooler on your engine, the final link in the cooling chain is the intercooler sprayer. Once again, the path of the CO^2 is linked from the fuel rail with another length of stainless braided hose. D.E.I. offers a wide variety of sprayers depending on the surface size of your intercooler. The sprayer is easily mounted to the intercooler with the stainless hardware provided. The sprayer is the last component in the $CryO^2$ system since from here the gas is vented directly onto the cooling fins of the intercooler. Depending on intercooler size and amount of boost, operation of the $CryO^2$ system will improve intercooler performance up to 50%. If you have a really huge intercooler, two sprayers can be nested within each other to increase coverage

But you say, I don't have an intercooler. How can I run the $CryO^2$ system on my car? The engineers at D.E.I. have solved that problem. Recently, they began offering a single or dual purge kit that will vent the CO^2 similar to a nitrous purge. How cool is that!

Satisfied customer testimonials verify the success of the $CryO^2$ system in operation. A Renault Megane 2.0L Turbo engine produced +38HP with an air intake and intercooler spray. A 2003 SVT Ford Focus with an air intake improved drag race times by 3/10ths. The $CryO^2$ system improved track times on a 1997 Turbo Acura RSX to 13.12 seconds in the quarter. An increase of 4/10ths of a second! What other performance product can offer results like these without taking the engine apart or inducting some type of exotic substance into the engine? CO^2 is a fairly economical gas readily available from welding or medical gas suppliers. Your favorite performance retailer should be able to point you in the right direction.

If you want a cost efficient route to improved time slips, but don't want to start disassembling your engine, take a look at the $CryO^2$ system from Design Engineering Inc. It just might be what you are looking for.

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1 Here we can see how the CO^2 travels from intake, to fuel bar, to intercooler.

2 Close up of the aerodynamic intake bulb that cools the incoming air.

3 This huge intercooler features not one but two intercooler sprayers!

Info:

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