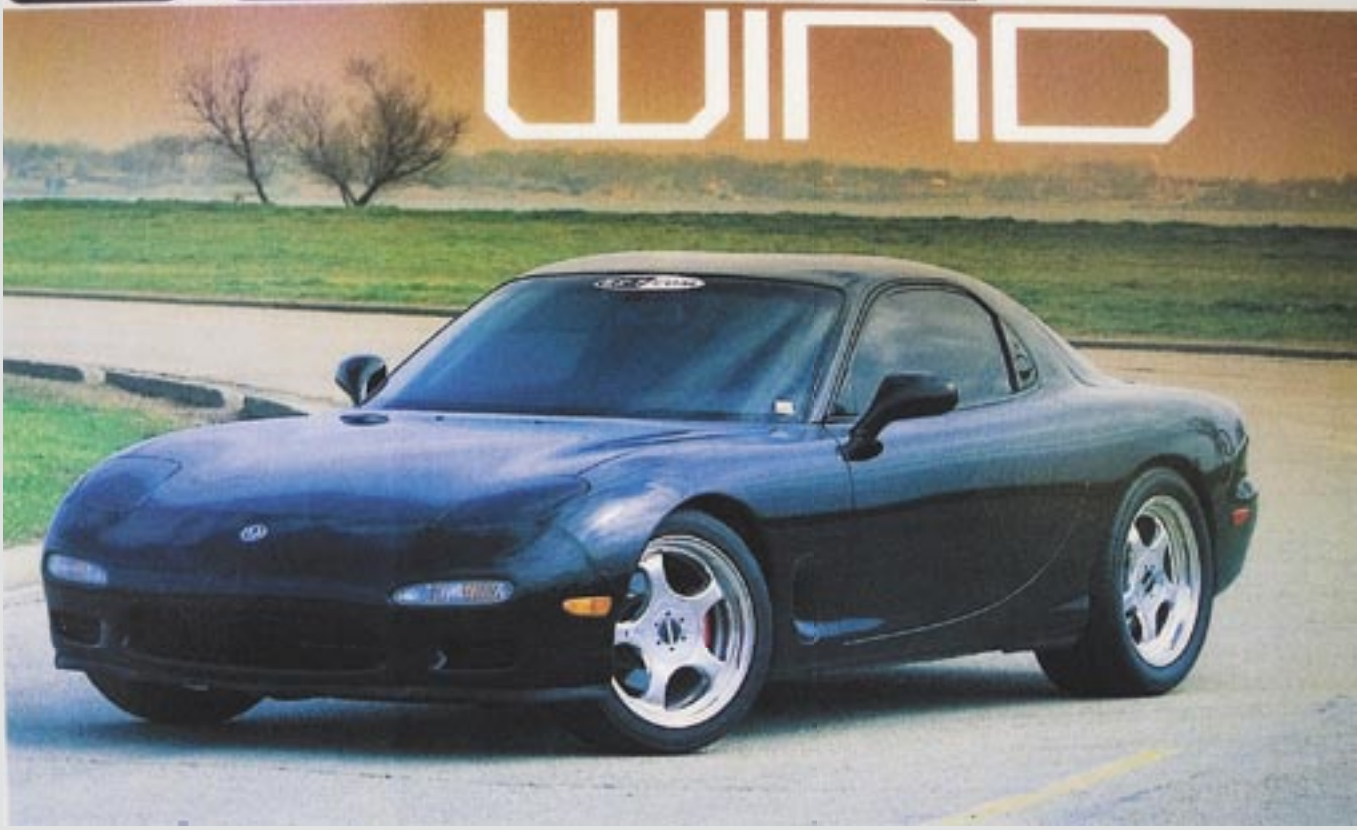
BLACK WIND



400 HP AT THE WHEELS,

Let's face it: Making more power is easy. There are about a thousand things I can think of that would be a lot harder to do than say, doubling the power output on my car's engine. For example, standing over a Dixie cup and peeing in it without spilling a drop... now that's hard to do. Or how about climbing up Mt. McKinley in your jogging shorts and tennis shoes? Man, that would suck. What about going up against Shaquille O'Neal and beating his ass in a game of one-on-one hoops? Better pack a lunch

No, making a lot of power isn't all that hard to do. Something that's a lot harder to accomplish is making more power and still being able to grab traction. Or making more power and keeping parts from constantly breaking. Or, possibly the hardest goal to attain; making more power and still being able to bass a basic emissions test. That is perhaps the most elusive goal of all in the world of high powered engine tuning.

"Everyone who builds a fast car reaches the point during the year when they need to pass smog." states Rotary Performance/RX7.com's Chris Ott. "So they take all this stuff off their car, get it inspected, then have to put everything back together again. We don't worry about that with this car."

The car he's talking about is Rotary Performance's latest project vehicle, the black third-gen (1993) RX7 pictured. I love featuring cars like this, real world projects that aim high enough to effectively double the power output at the wheels, but are executed with a high degree of competence and attention to detail. These last traits allow this car to be a real-world performer, adhering to all aspects of what a high-performance, street-driven vehicle should be: powerful, controllable and street legal. This last term gets tossed around a lot in the aftermarket and automotive press alike, but unless you're actually looking at an official emissions test printout from a certified tester, all you can really do is take the builder's word for it.

Rotary Performance's third-

Text by Karl Funke
Photography by Henry De Kuyper

AND EMISSIONS LEGAL TO BOOT

gen RX7 is street legal in the purest sense. Not only that, but at its rear wheels, it now makes nearly double the power with which it was rated out of the factory. Actually, that was the whole idea from day one.

"The purpose of this vehicle was to be a driving, real-world, emissions-passable RX7 with 400 hp at the wheels," Ott notes. "It was also intended to be stealthy; bodywork and interior treatments were kept simple."

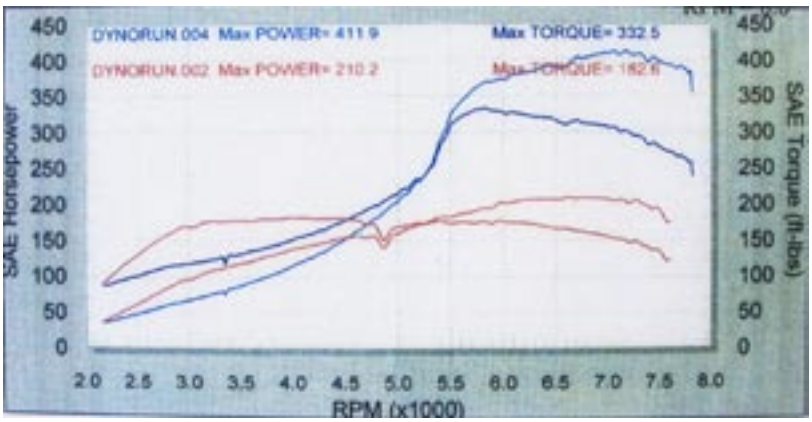
That said, there are no aftermarket kit pieces attached to the gracile factory body panels. Hell, the rear end doesn't even sport a subtle factory wing. The only real modifications that were carried out were the addition of Japan-spec round taillights from a 1997 third gen and a set of H4 headlamp bulbs to increase nighttime visibility. The only exterior clues to the car's performance potential might be the slight ride height drop (about 0.75 inches) effected by the Suspension Specialties springs and adjustable Tokico dampers. The altered running gear might also catch your attention, 17-inch Forgeline RS wheels wrapped in some serious Yokohama AVS Sport meats, sized 225/45-17 up front and 285/40-17 in back.

Other suspension mods have been kept fairly basic. The system still incorporates factory-issue lower stabilizers and a factory rear upper strut tower brace. The only addition is a Suspension Specialties upper strut tower brace that was bolted onto the shock towers in the engine bay. Even the brakes remain unaltered, aside from a set of Bönez Stage One performance pads to clamp the factory rotors and Rotary Performance stainless braided lines to relay pressure from the factory master cylinder. While the stock binders have so far been up to the task of keeping a tight reign on this street-legal monster, Ott acknowledges that pushing the car to its absolute limit would probably warrant installation of a big-brake package.

Now let's take a look at what makes this car truly impressive as an ultimate street performer.

Keeping with the sleeper theme outlined in Rotary Performance's initial project prospectus, no crazy kit pieces sully the smooth, flowing exterior lines of the third-gen RX7.

The factory twin turbo system has ben replaced by a GReddy T78 turbo kit. Boost is set at 17psi and monitored by GReddy's PRofec-B control module.



Emissions Test Results

	High Speed Emissions Test			Low Speed Emissions Test		
	Standard	Current Reading	Result	Standard	Current Reading	Result
rpm		0			0	
HC (ppm)	220	16	PASS	220	33	PASS
CO (%)	1.20	0.00	PASS	1.20	0.00	PASS
CO2 (%)		10.1			9.9	
O2 (%)		0.1			0.1	
Dilution (%)	> 6.00	10.10	PASS	> 6.00	9.90	PASS

Gas Cap Integrity: PASS

Malfunction Indicator Light: N/A

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Work on the 13B-REW rotary powerplant was carried out in two stages. The first was making the power, and the second was tending to emissions issues. To begin with, the factory twin turbo configuration was dismantled and replaced with a single-turbo induction system. This new system is centered around a GReddy T78 turbo kit, which includes a T78 turbocharger, stainless steel exhaust manifold and GReddy Type R wastegate. Boost is controlled by a GReddy PRofec-B, with a maximum of 28 psi possible. Normal Running boost is set at a more modest 17psi, the setting at which Rotary Performance's 400 hp dyno run was made.

To keep operating temperatures down and efficiency up, the intercooler system was also upgraded. Rotary Performance tested two different setups here, using both traditional and front mount configurations. While the standard mount was effective, the testers found it was more prone to heat soak and, consequently, gradual power loss after repeated runs on the dyno. For this reason, Rotary Performance went with the front mount system. Even without a special bumper to allow unrestricted airflow into the core, Ott tells us there are no flow or cooling problems with this system. Mounted directly behind the intercooler core you'll also find an aluminum Fluidyne radiator, installed to remedy the RX7's well-known overheating problems.

Fuel enrichment is provided by a quartet of 850cc injectors, which are fed by a Rotary Performance competition fuel pump. An SX regulator monitors and maintains correct fuel

pressure. Fuel management is actually overseen by two computers, teh stock Mazda ECU and Haltech Fuel Management computer. The Haltech unit is normally used as a stand-alone ECU replaceemnt. To keep this car street-legal, Rotary Performance linked the two together so the Haltech computer controls air/fuel ratios and ignition mapping while the RX7's ECU handles emissions monitoring duties. The ignition system has been upgraded using Jacobs Electronics' Rotary pro Pack, Jacobs Performance Coil, and NGK wires and plugs.

With the necessary performance componentnts in pace, Rotary Performance turned its attention to the second part of the quest for true street legal power: upgrading and fine-tuning the emissions system. First, the 13B's exhaust was opened up using a Japan=spec GReddy race exhaust with 3 3/4-inch (90mm) stainless-steel tubing. According to Ott, the new augmented power output was causing the car to spit increased levels of hydrocarbons (unburned fuel) out the exhaust ports and into the exhaust tubing itself. Such foolishness leads to the demise of many a catalytic converter, and is also often the cause of chronic smog test failure. To help properly combust these fuel particles, Rotary Performance installed a remote air pump to direct air into strategic points along the exhaust passage. Air is now injected through the nozzles at the exhaust ports and through a special conduit that leads to the catalytic converter.v

"The trick is to minimize emissions before they enter the cat," Ott testifies; that was the easy part, apparently. "The tough part was finding a cat that could hold up to the heat, punishment and exhaust flow that we were going to subject it to," he continues.

The answer was a massive (7 inches across) catalytic converter that Rotary Performance sourced from Bönez, which features stainless-steel internals that, according to Ott, make it virtually indestructible on this application. In fact, the guts in this cat are of the type more often found cleaning up the toxic emissions from industrial smokestacks.

According to Ott, there haven't been any real probelms hooking the 400 horses up to the pavement; more problems have stemmed from weaknesses in the drivetrain, specifically the standard torsion-type differential. While the increased torque in this application tends to eat up helical gears found in the torsion-type diff, Rotary Performance went with a Kaaz clutch-type differential that so far has proved to be unbreakable. A new Bönez Street Comp clutch with a braided flex hose assists in transferring power from the flywheel to the drivetrain.

So what's in store for the future? Can Rotary Performance squeeze more power out of the 13B rotary and still keep it smog legal?

"We've considered switching to a ball-bearing turbo to enable the system to spool up more efficiently," Ott professes, "and that might get us to 450 hp, but after that I think it's the end of the line." Short of using nitrous or race fuel, that is. All things considered, this is one project that has achieved every goal it set out to, and in the grand scheme of things, that's what makes a great project vehicle. Even without the extra 50 hp, I'd say there aren't many cars on the street that can take this Mazda toe-to-toe. If they can, can they do it and still pass smog?

"The car has been unbeatable on the street, " Ott testifies. "Living in Texas, the land of redneck pickups, Camaros, and Mustangs, it's been endless fun. Especially knowing the car will pass a smog test."

the SOURCE

ROTARY PERFORMANCE
Dept, THP, 311 E. Buckingham Rd.
Garland, TX 75040
(972)530-3335