inlet pressure control. Instead, the diesel's injection-system governor and standard exhaust system provide the means of limiting boost to 9 psi. Kas notes that up to 12 psi is possible by changing to a more free-flow exhaust, but then it's likely that the injection system will have to be set a bit richer.

Our brief testing of Bernard's diesel showed a 1.3-sec improvement in 0–60 mph time (14.5 vs 15.8), but more telling was the improved response in mid- and upper-speed ranges. There are plenty of times (you Rabbit Diesel owners would recognize them) when our long-term diesel has to be rowed into 3rd to maintain speed. By contrast, there's accelerative capacity left in top gear of Bernard's 5-speed turbo Rabbit. And maybe *that's* why there's a gleam in his eye.

VOLKSWAGEN RABBIT DIESEL

Supplier/Installer	Arkay, Inc
Cost	$995
Turbocharger	Rajay
Boost Control	Maximum boost of 9 psi limited by injection-system governor and standard exhaust system
Special Features	Kit includes inlet manifold and VDO boost gauge

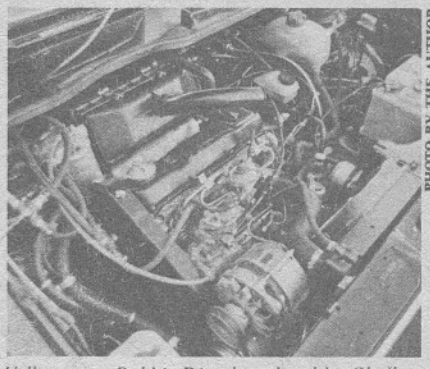

PHOTO BY THE AUTHOR

Volkswagen Rabbit Diesel, turboed by Shelby-Spearco, Inc.

Volkswagen Rabbit Diesel

GEORGE SPEARS, of Shelby-Spearco, Inc, showed us another variation on the turbo Rabbit Diesel theme. His kit's turbo comes from IHI (Ishikawajima-Harima Heavy Industries), for which Shelby-Spearco is a U.S. distributor.

One of the novel features of this turbo is an integral wastegate that allows a particularly neat installation—you have to look closely to see the unit tucked behind the transversely mounted diesel. Also, the turbo's compact dimensions translate into efficiently short plumbing. The kit comes with a low-restriction, larger-diameter exhaust system as well. Normal maximum boost is 9 psi.

Boost-actuated fuel enrichment is another special feature. George notes that this device eliminates several potential problems of turbocharging a diesel, among them smoke at idle or during transients and poor fuel economy traceable to an overly rich injection schedule. The advantage of boost-actuated enrichment is that the added fuel is injected only when there is pressurized air for its combustion. Mercedes-Benz, for example, uses a similar control.

The difference between a normally aspirated Rabbit Diesel and George's personal turbo Rabbit is apparent as soon as the engine is started: For one thing, there's reduced noise of diesel combustion. During our acceleration testing, we were able to lower the stock 0–60 mph time of 15.8 to a turbo time of 14.3 sec—this, using the shift marks on the speedometer at George's request, and thus shifting a bit earlier than optimal. Like other turbo diesels we've driven, the Shelby-Spearco Rabbit exhibited a smooth increase in power, a reduced noise level and an all-around feel of adequacy that's sometimes lacking in a diesel—such as when a long hill looms ahead.

VOLKSWAGEN RABBIT DIESEL

Supplier/Installer	Shelby-Spearco, Inc
Cost	$1332

PHOTO BY THE AUTHOR

Turbocharger	IHI
Boost Control	Integral wastegate, maximum boost 9 psi

Performance	Stock	Turbo
0–60 mph, sec	15.8	14.3
¼-mile, sec	20.4	20.0
¼-mile, mph	66.0	69.5

Special Features	Kit includes intake manifold, exhaust system, boost-actuated fuel-enrichment, boost gauge

Volkswagen Scirocco

THE SCIROCCO is one of our favorite cars, and a Windblown Systems turbocharger makes it even more pleasant. At the risk of sounding redundant, the Windblown Systems system ("It's not a kit," says the company's Fred Dellis, "it's a . . .") makes use of a concept known as bias boost control, and this is the key to one of the nicest, albeit not least expensive, turbo applications we've evaluated.

The basics are there: a Roto-Master turbo, a Turbonetics wastegate, all the proper piping, even a spray-can of high-temperature paint. The trick, though, is in how the wastegate gets its control signal(s). With a traditional system, a wastegate's control input comes from intake manifold pressure; when the desired maximum inlet pressure is reached, the wastegate opens to stabilize boost. With Windblown's bias boost, the wastegate is controlled by two separate signals, the usual one from the intake manifold and another from the exhaust upstream of the wastegate. The ratio of these signals seen by the wastegate depends on engine rpm, load and throttle opening, and the result is a wastegate control that doesn't just stabilize boost, but diminishes it as engine parameters approach detonation territory. This means the turbo can be sized for good low-end boost without things getting really out of hand at the top end. Another benefit is elimination of any auxiliary form of detonation control. A nifty idea, and it works.

The turbo Scirocco is very much at the Saab end of the spectrum, and delightfully so. Its turbo doesn't come on with a bang; there's just a smooth increase in power as rpm climbs—enough power, though, to propel the Scirocco from 0 to 60 mph in 8.8 sec (vs a stock 11.2). Boost comes on as early as 2000 rpm, it's really apparent by 3000, and an upshift at 5000 drops revs back into the high torque range. There's a feeling of 3rd-gear responsiveness in 4th, and 5th becomes a freeway gear with more than a bit left in reserve.

As the accompanying table indicates, a Windblown Scirocco compares favorably in performance, and indeed in total cost, to more than several cars that usually leave VW's stylish coupe in the dust.

Volkswagen Scirocco, Windblown Systems.

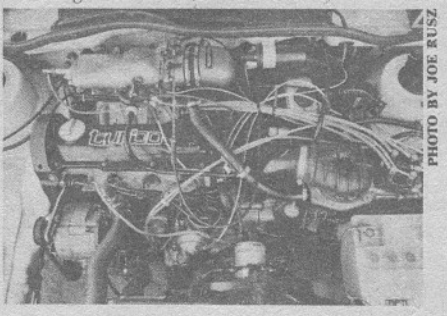

PHOTO BY JOE RUSZ

VOLKSWAGEN SCIROCCO

Supplier/Installer	Windblown Systems
Cost	$1825
Turbocharger	Roto-Master
Boost Control	Turbonetics wastegate, maximum boost 6 psi
Detonation Control	Bias boost control reduces boost as speed and load increase

Performance	Stock	Turbo
0–60 mph, sec	11.2	8.8
¼-mile, sec	18.4	16.8
¼-mile, mph	74.5	83.0

Special Features	Dual signals to wastegate provide bias boost control

So this is where aftermarket turbo cars are at. Your turbo Honda can harrass a BMW. Your turbo BMW can best a Ferrari. Or your diesel Rabbit can beat most other people's diesel Rabbits. And isn't that a boost to the old ego?