

New Ford V-6 Will Be Game Changer

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New CGI block material speaks volumes about Ford's ambitions.

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A picture may be worth 1,000 words, but knowing an engine block's material composition is worth 10,000.

When Ford announced its new 2.7L EcoBoost V-6 would be made of compacted graphite iron at the North American International Auto Show, most journalists and civilians just scratched their heads. But everyone in the powertrain community knew immediately what the automaker was up to: a super-quiet engine capable of potentially mind-boggling output.

CGI is a metallurgically modified form of cast iron that is 75% stronger than conventional gray iron and 45% stiffer and has double the fatigue strength. These properties allow engine designers to create exceptionally strong architectures that are lighter and more compact with thinner walls and structures. But until Ford's 2.7L EcoBoost, it only has been used for diesels and some race-car engines.

Audi's 3.0L CGI V-6 diesel is 5 ins. (125 mm) shorter than Mercedes-Benz's aluminum 3.0L V-6 diesel and about 33 lbs. (15 kg) lighter, for example. But with tough fuel-efficiency and carbon-dioxide emissions limits looming all over the world, interest in CGI no longer is primarily focused on reducing engine weight.

"Now, it's all about downsizing without losing power," says Steve Dawson, CEO of CGI supplier SinterCast. The company developed a process-control technology that enables cast-iron foundries to reliably produce CGI, and it has been the industry leader for CGI control and know-how since the early 1990s. I first wrote about the company in 1991.

Ford has been a leader in using CGI in high-volume diesel applications for more than 10 years, starting with the introduction of Jaguar's 2.7L V-6 diesel in Europe in 2003, back

when Ford owned Jaguar. More recently, Ford used CGI for the block of its 6.7L V-8 Power Stroke diesel introduced in 2010 in the F-150 Super Duty pickup.

In addition to strength, the material has superb noise, vibration and harshness characteristics. A key factor that helped the 3.0L diesel in the Ram 1500 pickup win a 2014 *Ward's 10 Best Engines* award is excellent NVH. Its block and bedplate are made from CGI.

“Most CGI engines end up being 0.5 to 1.5 decibels quieter than the old gray-iron engine,” Dawson says. “If you put the engineers around the dyno when they first run the engine, it’s the first thing they usually comment on.”

“It’s a real benefit. Imagine what an engineering team would do to get a decibel of noise out of an engine,” he says. “They could work for a year on that.”

But CGI’s ability to create quiet and compact diesels has been known for years. The shocker is Ford using CGI for a high-volume gasoline engine. That’s never been done before. This new engine should be capable of handling almost double the cylinder pressures seen in conventional gasoline engines.

Right now, Ford is promising “the same power as some midrange V-8s” for the V-6 EcoBoost. That could mean more than 130 hp/L output, if the automaker is targeting Ford’s 5.0L V-8 in the F-150, which currently makes 360 hp and 380 lb.-ft (515 Nm) of torque, or General Motor’s new 5.3L V-8, which makes 355 hp and 383 lb.-ft. (519 Nm) in the Chevy Silverado.

Considering Ford’s 1.0L and 1.6L EcoBoost engines both make 123 hp/L using conventional block materials, it’s not a huge leap. Even so, there is speculation the 2.7L will be closer to 100 hp/L – at least to start. The truth is the folks at Ford powertrain are a cagey lot.

In the spring of 2010, Ford’s 6.7L Super Duty diesel arrived in showrooms with 735 lb.-ft. (997 Nm) of torque and 390 hp.

Four months later, rival GM debuted with 765 lb.-ft. (1,037 Nm) and 397 hp from the revised Duramax turbodiesel V-8 in its all-new heavy-duty pickups.

Almost immediately, Ford announced a software tweak that pushed the Power Stroke to 800 lb.-ft. (1,084 Nm) and 400 hp. If you bought one of the earlier Super Duties, the missing 65 lb.-ft. (88 Nm) could be added simply by visiting the dealership and getting the electronic-control module reflashed for free.

Adam Gryglak, then the chief engineer for the Power Stroke, told me at the time the incredible strength of that engine's CGI block and related components would accommodate many power upgrades for the foreseeable future.

It is this easy upgradeability that should make Ford's new 2.7L V-6 a moving target – and a game changer.

Ford's announcement the first press day of NAIAS made Dawson a popular guy at the *Ward's 10 Best Engines* awards event two days later.

“It's a strong message from Ford. We'll see how the others react. I've had three top OEMs ask me about it,” he says, grinning like a Cheshire cat.

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