A year after launching its first air-cooled, closed-loop EFI engine, Briggs & Stratton has expanded its EFI engine offering with the launch of new horizontal and vertical shaft EFI engines, ranging from 33 to 37 hp, targeting both turf and commercial equipment applications.

EXPANDING EFI IN ALL DIRECTIONS

Starting with one engine in 2014, Briggs & Stratton grows its Vanguard vertical and horizontal shaft EFI engines into wider range of applications

BY MIKE BREZONICK

What a difference a year can make. A year after unveiling its first air-cooled, closed-loop EFI engine, the Vanguard 810 EFI in 2014 — and roughly 10 months removed from launching open-loop EFI into its Big Block engines for marine applications — Briggs & Stratton Commercial Power has continued to expand its EFI engine offering with the launch of new EFI engines targeting both turf and commercial equipment applications, such as generator sets and ride-on concrete trowels.

In all, the company will offer four EFI engine lines with a total of 10 ratings spanning an output of 23 to 37 gross hp (see related chart). That signifies a pretty rapid evolution for a supplier that acknowledges it was the last of the major air-cooled engine manufacturers to offer EFI technology.

"It's always good to be first to market," said Jeff Coad, vice president of Engine Products at Briggs & Stratton. "In most cases, I'd prefer that. But I think that some of the things we learned from not being first to market with EFI have really been beneficial.

"The breakthrough for us was, when we looked at the technology, we always talked about it from a neat technical perspective. Once we shifted that conversation to what's the benefit to the customer and worked on understanding what that was — because I don't think we always did understand that — that's when things changed.

"For commercial turf, it was fuel economy, fuel economy, fuel economy. Sure it's nice that they can just turn the key and it starts right up, but these are expert users, and they know how to use a choke. They're not going to pay extra money just so they don't have to use a choke. So when we actually started talking to those customers and asking them, 'If we had EFI, what would that mean to you?' they came back and said if we could demonstrate that it really is 25% more fuel efficient, we will buy it."

Coad said that following the launch of the 810 EFI in 2014, they did just that. "It didn't hurt that we first put it on a brand new engine, the 810, that had a very good price point and had performed very well in the market," he said. "But it was nice to see how quickly the 810 EFI has been accepted.

"When we started talking to our people about it a couple of years ago, our product development leader at Ferris (commercial mowers) said yes, that's nice, but he wasn't sure the commercial guys were going to pick it up. But because of the fuel efficiency, which for the commercial turf industry translates to productivity and all the other things EFI does, now he's telling us that the volume is transferring to EFI far faster than anticipated."

Vanguard followed the launch of the 810 EFI later in the year with a Big Block marine engine using an open-loop EFI system. For the marine application, the open-loop system is preprogrammed to deliver specific amounts of fuel based on direct operator throttle inputs rather than the actual output of the engine, as in a closed-loop system. This simpler system is intended to provide many of the benefits of EFI without the cost of more complex closed-loop systems. For this application, an idle air control device and throttle position sensor was also added to control the low idle speed requirement of 850 rpm.

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Vanguard EFI Engine Specs

All Power Levels Gross hp At 3600 rpm Per SAE J1940

Engine Model	Configuration	Displacement	Bore x Stroke	Gross hp
Vanguard 810 EFI	Vertical Shaft	810 cc	83.8 x 73.4 mm	24 hp
Vanguard 810 EFI	Vertical Shaft	810 cc	83.8 x 73.4 mm	26 hp
Vanguard 810 EFI	Vertical Shaft	810 cc	83.8 x 73.4 mm	28 hp
Vanguard Big Block EFI	Horizontal Shaft	896 cc	85.5 x 77.9 mm	33 hp
Vanguard Big Block EFI	Horizontal Shaft	993 cc	85.5 x 86.6 mm	35 hp
Vanguard Big Block EFI	Horizontal Shaft	993 cc	85.5 x 86.6 mm	37 hp
Vanguard Big Block EFI	Vertical Shaft	896 cc	85.5 x 77.9 mm	33 hp
Vanguard Big Block EFI	Vertical Shaft	993 cc	85.5 x 86.6 mm	35 hp
Vanguard Big Block EFI	Vertical Shaft	993 cc	85.5 x 86.6 mm	37 hp
Vanguard Small Block EFI	Horizontal Shaft	627 cc	75.4 x 70.1 mm	23 hp

"That's an example of how everything we do with EFI is focused on providing solutions that address the intended use of the engine," said Jim Cross, marketing manager at Briggs & Stratton Commercial Power. "We don't just produce EFI for EFI's sake. We prioritize how we apply it based on user input and voice of the customer.

"In marine, they just want to go fast, and they don't care much about fuel savings. For what they pay for the engines and what they do with them, they're not going to worry about paying 30 cents more a gallon for gas.

"On the other hand, for commercial turf users, it's all about fuel economy. Construction guys need startability — it's just got to start every day. For fire and rescue, it's also got to start every time, no matter how much they turn it on and off.

"So all of our EFI engines are application-engineered, with EFI specifically designed for each application."

With that philosophy in mind, Briggs & Stratton has recently introduced new vertical shaft Vanguard Big Block V-twin engines for commercial turf applications in ratings of 33, 35 and 37 gross hp. Unlike the EFI marine Big Blocks, the new vertical shaft engines — with displacements of 993 and 896 cc — utilize the same Delphi closed-loop fuel system used on the 810 EFI engine. That system incorporates a Delphi 12 Vdc fuel pump module with low- and high-pressure filters and an electric pump and regulator that deliver fuel to a pair of port fuel injectors via a fuel rail.

"We just launched our largest displacement of 993 cc, and we'll be following that up very quickly with the 896 cc and then opening it up to different commercial applications outside of turf," said Paul Leech, engineering director, New Product Development at Briggs & Stratton. "Turf is always one of the tougher markets from a costing and pricing standpoint, but it's such a big chunk of business that it's hard not to start there."

Regarding horizontal shaft engines, Briggs & Stratton has developed new 33, 35 and 37 gross hp Big Block engines that primarily target a growing range of construction equipment applications. With the same closed-loop Delphi fuel injection system, the engines offer similar advantages in fuel economy, startability and altitude compensation as the turf equipment configurations, the company said.

All of the new EFI-equipped Big Blocks maintain the same premium features as their predecessors, Briggs & Stratton said. These include overhead valve (OHV) configurations; aluminum crankcases with cast-iron cylinder sleeves engineered for longer serv-

New vertical shaft Vanguard Big Block V-twin engines target commercial turf applications and are available in ratings of 33, 35 and 37 gross hp. Offered in displacements of 993 and 896 cc, they utilize the same Delphi closed-loop fuel system used on the 810 EFI engine.

New horizontal-shaft Big Block engines target a growing range of construction equipment applications and are available in ratings of 33, 35 and 37 gross hp.

ice life; automotive-type JCC AC8A alloy pistons with a three-ring ring pack and a chrome-plated top compression ring designed for high durability and improved oil control; dynamically balanced ductile-iron crankshafts and connecting rods with larger bearing surfaces, both of which are designed to yield durability and longevity; 5.0 in. Donaldson cyclonic air cleaners intended to improve intake-air-filtration efficiency; and full-pressure lubrication systems with spin-on oil filters.

Vanguard has also developed a horizontal shaft small-block (627 cc) engine, with an initial application in fire and rescue equipment. Offered in a 23 gross hp rating, the engine incorporates an open-loop EFI system developed by Japan's Kokusan Denki Co. Ltd. and has the ability to be operated with either an electric starting system using a battery or a recoil starting system.

"This one is a bit unique," Leech said. "It's completely different than the Delphi system we use on the other engines in that it can work with a battery or without. Kokusan developed a technology that Delphi did not have."

Batteryless EFI itself is not new, as it has been a staple on small two- and four-stroke engines used on such things as off-road motorcycles and snowmobiles. The Kokusan system uses energy generated by the pull of the recoil starter to power the engine control unit (ECU), fuel pump and injectors — in that order — to start the engine.

The Vanguard small-block engine with recoil start has been specified by a global manufacturer of fire equipment for a portable generator set used in fire and rescue applications.

"They are one of the industry leaders in that market," Leech said. "As they move forward with the EFI engine, a lot of the others will follow suit."

All of the new engines will be supported by the expanded service support system that Briggs & Stratton launched with the 810 EFI engine.

"One of the things we learned by not being first with EFI was that we'd better have a full-service solution for the guys in the field so they would feel comfortable servicing the engines," Coad said. "Those people at the dealers can influence what decisions the customers make. If they're comfortable with the engine as far as the service solution — 'We'll always have you up!' — that gets back to productivity, and that's a big deal."

All of the EFI engines offer three diagnostic modes, including two versions of Tiny Scan diagnostic code readers that connect to the diagnostic port incorporated into the engine wiring harness. The Tiny Scan readers can provide either blink codes or numeric trouble codes and can be linked to the company's service website.

In addition, new Vanguard Service Solution software is designed to provide quicker diagnosis of engine issues and can also be used to download and flash new or updated engine calibrations into the ECU while in the field. All of the engine information can be exported to Microsoft Excel for later analysis, the company said.

Finally, Briggs & Stratton has sought to further streamline service by developing a single service/diagnostic manual for all of its Vanguard EFI engines. Modeled after automotive service systems, it utilizes flow charts, color images and color wiring diagrams in an effort to make service and repair quicker and easier.

"I think for years, what happened was EFI engines were just out there," Cross said. "Then a year ago, when we came out with EFI, and along with that, we provided comprehensive training, everybody was crazy about the training. EFI had been out there for years, but a lot of people still really didn't know how to service it.

"We approached service in a very comprehensive way that addressed all of our channel partners. We addressed the OEMs (original equipment manufacturers) so they don't ever have to worry about whether it can be supported. We've addressed the dealers because they want EFI, and they want to be able to service it all the time. And we addressed the end user, who maybe doesn't even know he wants it, in a lot of cases.

"As far as service, we've addressed all those various constituencies in a very thoughtful manner. We didn't just go, 'Hey we should put EFI on stuff!' That probably would have been easier to do, but it's not who we are." dp

diesel Weblink

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