DIESEL PROGRESS

40TH ANNUAL ENGINE YEARBOOK

2019

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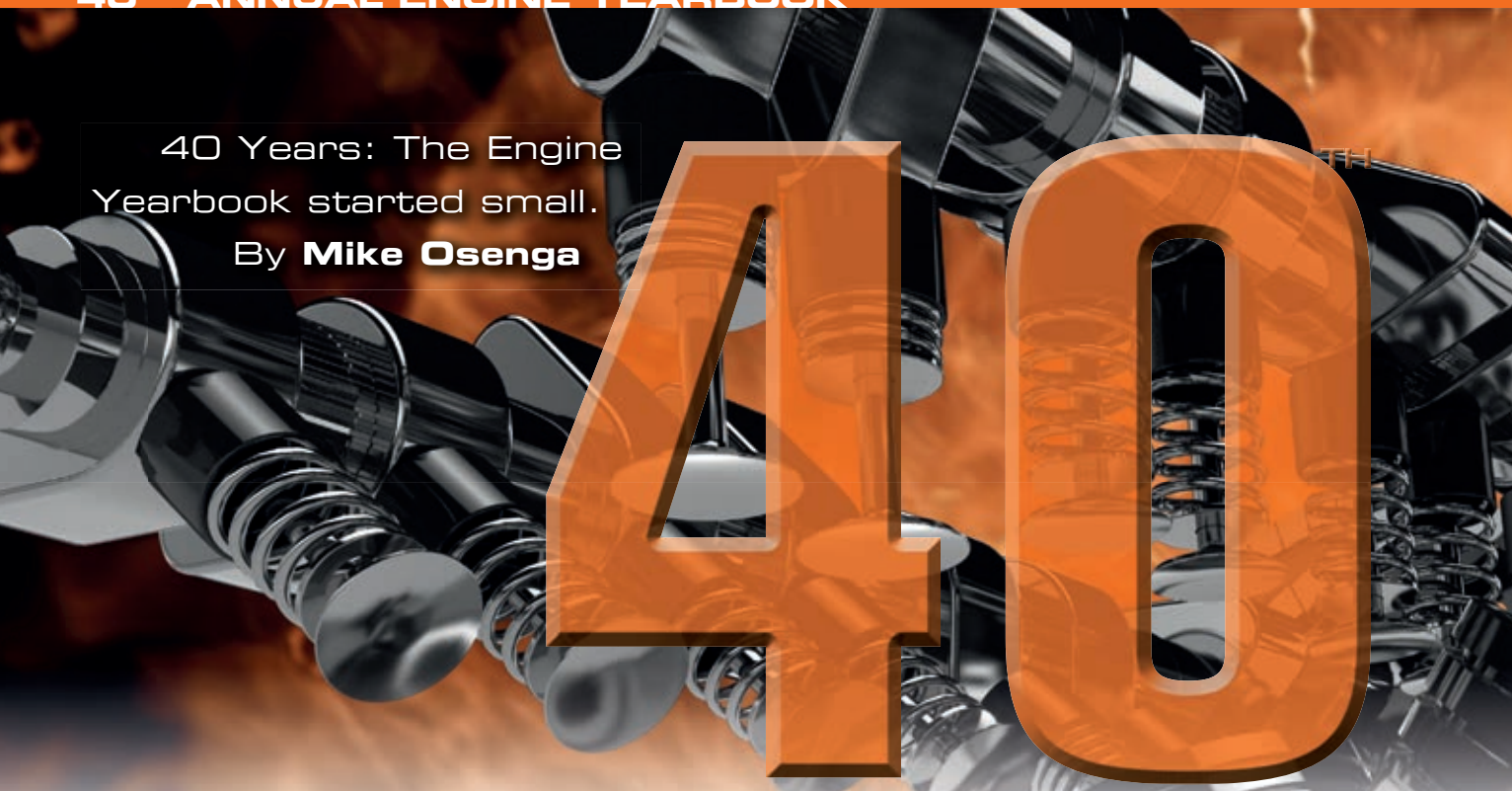


40 Years: The Engine Yearbook started small.

By **Mike Osenga**

40TH ANNUAL ENGINE YEARBOOK

While electrification and all that surrounds it are all the rage right now, it is readily apparent from the huge amount of information in the pages that follow, that the internal combustion engine, whether it be diesel, gasoline or gaseous fueled, is a long way from extinction.

In fact, you could make the case that some of the most impactful environmental engineering over the last 40 years has been done in the labs and shop floors of engine manufacturers around the world. Many/most of the engines mentioned on the pages that follow, are 98+% cleaner than they were when we first started doing what became the Engine Yearbook. Something that is 98+% cleaner is nothing to take for granted.

We are kind of proud that the Diesel Progress Engine Yearbook is 40 years old. There are magazines in these markets that are not 40 years old, much less a single continuous editorial section. (Diesel Progress itself is 84 years old).

At the risk of having to don my Methuselah costume, I was there at the beginning. In the late 1970s diesel engines, as well as gasoline and natural gas, though few knew it at the time, were on the cusp of historic changes. Most of that would come a little later in the 1990s when the Clean Air Act was expanded to encompass diesel engines. That set off the huge, and hugely expensive emissions changes that totally revolutionized the way engines were designed, manufactured and installed in on-highway, off-highway, stationary and marine equipment.

The hot subject in the late 1970s, and what caused the creation of the Engine Yearbook, was a new generation of smaller output diesels. To massively oversimplify it, America is a big country with a lot of land and lot of distance from point-to-point. That generally meant big engines. Asia and Europe have smaller farms, shorter distances and older and more compact cities. That meant smaller engines and smaller machines.

But very slowly, driven by a host of complex technological and societal factors, that historians will sort out for decades, the world was slowly becoming global. Today "global" is a given. Then it was an Emerging Trend.

TRICKLE OF DIESELS

Part of that transition to more global markets was the trickle of diesel engines coming into North America from Asia and Europe. They were smaller output engines than typically built by the Americans. These new (to North America) companies also made some big engines, but the interesting thing to Diesel Progress at the time was the emergence of the small diesel markets, which really hadn't existed here before. There still weren't a lot of machines built here that were small enough to use those engines, but that would come, and soon.

I used to love listening to the older engine sales people talk about going to truck stops or state fairs or trade shows with these small diesels. Lots of people came to look at them and most asked the same question; "what the heck am I gonna do with those little things?"

But slowly they started finding applications. I remember a Diesel Progress editorial meeting about that

time (I mostly recall a lot of cigarette smoke), when someone said, "I wonder if these small diesels are ever going to amount to anything?"

I was the new kid and hence got the nod (since it obviously wasn't all that important), "call all these small engine people and let's do a review of those things in the June issue."

And we did. And it turned out pretty well. They were very happy someone noticed they were here and in business.

REACTIONS

What we didn't expect was the reaction. The phone calls (land lines) and faxes, and even snail mail started coming in from the larger horsepower diesel manufacturers; "hey what about us? Don't we count?" Plus being in the Milwaukee area, the heart of the small gasoline engine world, we got the same questions, in person – "small diesels, nice, but how about us?"

From that the Engine Yearbook (it had other names along the way) was born. The premise was simple: a review of what happened over the last 12 months at manufacturers of essentially all kinds of industrial engines, big and small, outside of those used in cars and airplanes. I remember one of our senior editors at the time saying, "done right kid you should be able to capture all the news of the entire North America industrial engine business. Good luck." No pressure.

I knew we had it right when a few years later, one of the U.S. manufacturers, I think it was Cummins, had one of their summer communications interns assigned to gather the information (and pictures) of all that they had done over the previous year just for the Engine Yearbook. Cool.

A few years ago I went through and skimmed a lot of the older Engine Yearbooks. What I was struck by mostly with was that over that time, it really represents the history of the engine business from the 1970s through today. All via the words of the companies making that history.

THE FOIBLES

Oh, there were foibles. Early on, there were breathlessly pompous pontifications about gas turbines obviously being the mobile power of the future. Parnelli Jones almost won the Indy 500 in a gas turbine car (and we were there covering it). And from there the hyperbole took off. Mack had one in a truck, Ford in a tractor and Chrysler in a car. It was going to happen. Book it. Wave of the future.

Oops.

Later, when emissions descended on the diesel industry, after the "we're all going to go out of business," crying stopped, the Engine Yearbook started covering the technology that was going to make diesel engines cleaner than ever. During that time I often thought of Bob Seger's line of "working on mysteries without any clues" as we reported all that.

At the start of the Emissions Era, no one truly had many clues how they were going to get where the regulations were forcing them to go. But through some incredible engineering and organizational and corporate commitment, it began to happen. Tier 1, Tier 2 and on it went.

Some day someone should write a book about what it took this industry, engine manufacturers and the thousands of suppliers that serve it, to take a (frankly) very dirty 1970s era diesel engine and remake it into what they are today.

Until that book gets written, 40 years of the Diesel Progress Engine Yearbook will have to suffice. ■

AMERICAN HONDA MOTOR

HONDA ENGINES

POWER RANGE

Gasoline: 1 to 24.8 hp

engines.honda.com

NEW ENGINES

In January 2019, Honda introduced new additions to its GX Series of V-Twin general-purpose commercial engines. Expanding the lineup are four new Honda V-Twin engines, the iGX700/iGXV700 and iGX800/iGXV800, models for commercial construction and turf industry applications.

The engines are equipped with fuel injection technology and an integrated electronic self-tuning regulator (STR) governor that delivers drive-by-wire remote control capability to manage key aspects of engine operation.

The new Honda V-Twin engines, available in both horizontal and vertical shaft configurations, share the same footprint as existing models. The electronic governor allows the engine to regulate power when the load changes for the demanding commercial applications including concrete and construction equipment (power screeds, hydraulic power units, concrete saws, ride-on concrete trowels, vibratory rollers, generators and pressure washers) and commercial turf equipment (zero-turn radius mowers, lawn tractors, garden tractors, utility vehicles, trenchers, stump grinders and chipper/shredders).

Like the current Honda GX630/GXV630 and GX690/GXV690 models, the new iGX700/iGXV700 and iGX800/iGXV800 engines feature technological elements, including a hemispherical combustion chamber, an integrated cylinder and cylinder head, forged steel connecting rods and a 9.3:1 compression ratio, contributing to high efficiency as well as low noise and vibration, Honda said.

In addition, the integrated cylinder and head eliminate the need for a head gasket, resulting in better cooling and reliable performance. The integration of electronic fuel injection (EFI), along with the advanced combustion chamber design and the integrated digital capacitive ignition (CDI) with variable timing, results in excellent fuel efficiency and enhanced operation, Honda said.

ENGINE TECHNOLOGY

The EFI configuration on the Honda iGX700/iGXV700 and iGX800/iGXV800 V-Twin engines and offers a number of performance enhancements, including:

- Honda said the V-Twin engines with EFI boast excellent fuel efficiency due, in part, to an electronic control system that continually monitors and adjusts the engine's air/fuel ratio according to variable operating conditions and engine load requirements, maintaining optimal combustion conditions.
- In addition to optimizing air/fuel ratios, the Honda V-Twin EFI-equipped engines offer improved ignition timing over the complete range of operating speeds and compensate for other factors to continually maintain optimal performance.

One of four new Honda V-Twin engines, is the iGX800/, targeted for commercial construction and turf industry applications.

- The iGX700/iGXV700 and iGX800/iGXV800 V-Twin engines have easy starting performance in both hot and cold temperature conditions, Honda said, such as when the equipment is started cold or temporarily stopped mid-job. The EFI system and high-pressure fuel pump allow for an ideal air/fuel mixture before it is emulsified and vaporized.

Central to the iGX concept on the new V-Twin models is an integrated ECU with a self-tuning regulator (STR) governor system that allows the engine to communicate with the machine it is powering to monitor key parameters, control engine speed and diagnostics.

The ECU enables drive-by-wire remote control operation of the engine, and speed of the models can be programmed and varied based on the load and speed requirements of equipment applications.

Potential new commercial applications and attributes of this technology include pressure washers that idle, then stop, when the user squeezes or releases the trigger handle (requires OEM componentry). Also water pumps that can be automatically activated based on water level by a remote switch (also requires OEM componentry).

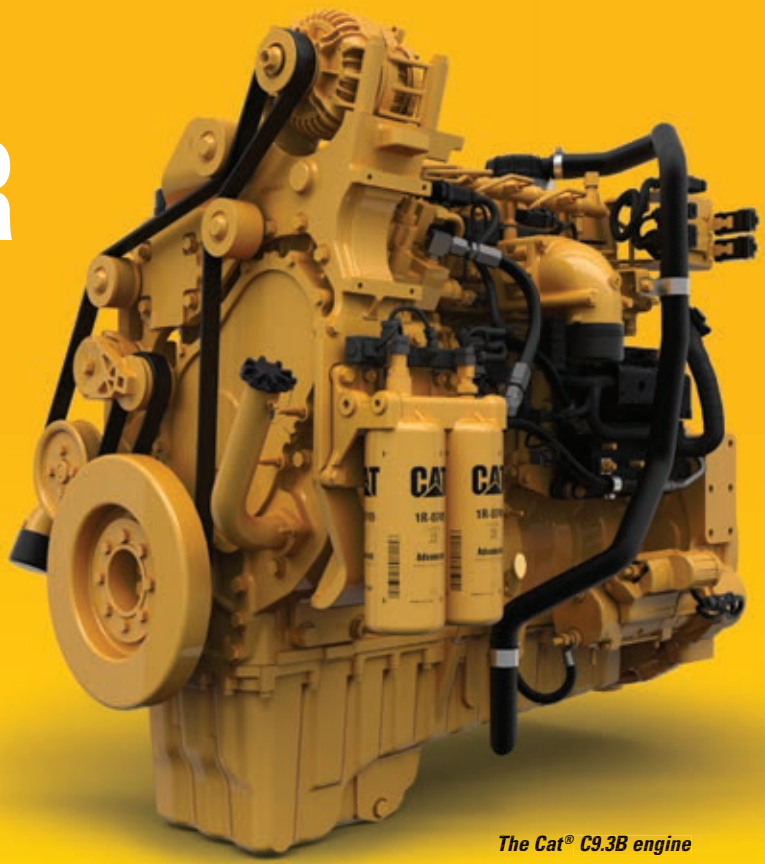
Applications also include generators that can automatically start when required and vary engine speed based on electrical draw (again OEM componentry), and lawn mowers that can automatically vary engine speed based on load so the engine does not slow in thick grass.

Because the new Honda V-Twin iGX engines eliminate the need for manual manipulation of the choke and throttle, they also are targeted for rental applications.

Additional iGX design features include a digital ignition system; long-life air filter; automotive-style starter motor; low- pressure and high-pressure fuel pumps; engine temperature monitoring; and parameter-setting ECUs.

As a result of Honda's adoption of the SAE standard J1939 vehicle bus,

GET MORE FROM YOUR ENGINE



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JCB

POWER SYSTEMS

the recommended practice used for communication and diagnostics among vehicle components, the new Honda V-Twin models also offer a standardized method for communication across ECUs.

The new Honda V-Twin models feature a control panel with an LED indicator that informs the user about potential problems with diagnostic trouble codes. This indicator is designed either to stop the engine or alert the operator if any corrective actions need to be taken. These alerts protect and help extend the life of the engine.

The new Honda V-Twin models have comparable base frame footprints of other Honda engines, ranging from the GX630 to the iGX800. The design compatibility minimizes changing time, making it easy for the user to install the new V-Twin models when older engines reach the end of their service lives.

The Honda iGX700/iGXV700 and iGX800/iGXV800 and V-Twin engines will be available nationally later in 2019. All models will carry a three-year, non-declining warranty. Parts and services will be available via the Honda national dealer network.

ARROW ENGINE CO.

POWER RANGE

Gaseous: 6 to 215 hp

www.arrowengine.com

BRIGGS & STRATTON

POWER RANGE

Gasoline: 6.5 to 40 hp
Gaseous: 6.5 to 37 hp

www.vanguardengines.com

NEW ENGINES

Vanguard introduced the Vanguard 400, the second in a line of all-new single-cylinder horizontal shaft commercial gasoline engines. Vanguard's new engines were developed around key areas of performance critical to improving overall productivity, including starting, maintenance intervals, service and support, and total cost of ownership. The new line will span from 5.0 to 13.0 gross horsepower (all power levels are stated at 3600 rpm per SAE J1940) to meet power requirements for a range of global commercial applications.

The first model in the new single-cylinder line, the 6.5 ghp Vanguard 200 is available now with the 13 ghp Vanguard 400 available in the fall to OEMs and for engine repowers. The remaining models will be introduced over the next year.

The ground-up design process allowed Vanguard to engineer all-new carburetion, ignition and combustion systems to promote reliable starting. The engine is designed to start at temperatures as low as -20° F. All surfaces inside the carburetor that contact fuel feature a special corrosion- and stale fuel-resistant coating that helps prevent starting problems.

Vanguard also engineered the engines' main components to lessen the impact of vibration on performance, and engine and equipment wear, as well as to enhance operator comfort. To improve overall engine noise, acoustic engineers not only emphasized reducing decibel levels, but also the perceived harshness of the engines' sound.

The new line of engines also includes an advanced version of TransportGuard, Vanguard's exclusive single ignition and fuel shutoff system designed to prevent oil dilution during transport. The lever now incorporates throttle control, expanding application opportunities and repower capabilities. Additionally, the engines' dimensions and bolt configuration make them a drop-in solution for equipment.

SERVICE, PARTS & REMAN

To reduce maintenance and downtime, the engines are designed to be oil efficient and can run for 200 hours between oil changes. This was achieved through a combination of improved machining process, tighter tolerances, improved seals, cooler engine temperatures and cleaner intake air from the advanced fully-cyclonic air filtration system. The cyclonic air filtration system lessens downtime by extending recommended air filter replacement intervals to 600 hours and comes standard on new Vanguard single-cylinder horizontal shaft engines.

The first model in Vanguard's new single-cylinder line is the 6.5 ghp Vanguard 200.

ELECTRIFICATION

Along with the new engine line, Vanguard said it is actively innovating. While electrification is still in its infancy, as time goes on, the industry will be exploring alternative power, such as battery solutions. Vanguard is constantly evaluating power technologies and developing solutions to equip customers with the right power for their specific application.

CATERPILLAR

POWER RANGE

Diesel: 11 to 7576 hp
Gaseous: 95 to 9051 hp

www.cat.com/engines

ENGINE TECHNOLOGY

Caterpillar says it now offers a full line of EU Stage 5 industrial engines. the Cat Stage 5 engine lineup spans engines from two-cylinder, 0.5 L to the 16-cylinder, 78 L models with outputs from 8 to 2100 hp (6 to 1566 kW).

Included in the expanded Stage 5 offering are the 74 hp (55 kW) Cat C2.2, the 134 hp (100 kW) Cat C3.6 and the Cat C4.4 available with outputs from 110 to 200 hp (82 to 150 kW). The new Cat Stage 5 engines offer up to 20% greater power density than comparable previous generation models and incorporate more than 1.2 billion hours of off-highway operating experience with Stage 3b/4 diesel particulate filter (DPF) technology.

Typical of the new offerings, the Cat C4.4 delivers a 15% increase in power, 10% more torque and a 5 to 10% reduction in fuel consumption compared to its predecessor. It also includes aftertreatment upgrades to ensure transparent regeneration.

Cat also has applied platform upgrades to increase power density on the Stage 5 certified C9.3B, offering 19% more power and 21% more torque while reducing system weight by 12% and lowering fuel consumption by up to 8%.

One of Caterpillar's Stage 5 diesel range, the Cat C4.4 delivers a 15% increase in power, 10% more torque and a 5 to 10% reduction in fuel consumption compared to its predecessor.

The Cat C13B is now available in multiple power ratings from 456 hp (340 kW) to 577 hp (430 kW) with peak torque reaching 2634 Nm (1943 lb.ft). It delivers 20% more power, 19% more torque and the aftertreatment is 65% smaller than its Stage 4 predecessor allowing OEMs to downsize engine platforms, lower installation costs and maximize uptime. The C13B, like all Cat Stage 5 engines, is available in multiple configurations including as an industrial power unit (IPU) to provide a plug-and-play solution that minimizes machine design, validation and installation costs.

DIGITAL

Caterpillar also has expanded the range of engine-focused digital solutions available to end users to support data-driven operational, maintenance and service decisions. Caterpillar telematics and digital solutions provide a gateway to the global Caterpillar technical support and dealer networks to ensure customers receive the tools, parts and service expertise they need.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

CUMMINS

POWER RANGE

Diesel: 49 to 4400 hp
Gaseous: 49 to 2682 hp

www.cummins.com/Stage 5

Cummins Stage 5 construction engine models from F3.8 to X15 are all in production. The company has over 200 machine installations completed or in progress, which is more than at this point in Stage 4.

Cummins Stage 5 products come with more power and torque, are less complex and easier to install, and require less servicing. This offers OEMs the ability to increase machine capability and offer more value or downsize engines to reduce cost. The B6.7 for example, offers 30% higher torque than Stage 4 with 326 hp (243 kW) of power, enabling it to replace an engine of higher displacement with no impact on machine operation.

The Stage 5 range was expanded with power units. Delivered as a complete power package, it comprises an engine, Single Module aftertreatment, radiator and cooling system – as well as auxiliaries such as mounting feet, hoses and an air cleaner. The units are more than 70% pre-approved for installation, reducing customers' time and resources for integration. Stage 5 engines and power units are available from 100 to 675 hp (75 to 503 kW).

Cummins announced the availability of fixed speed G-Drive Stage 5 engines at Bauma. The benefits seen with the variable speed Stage 5 engines are higher power density and reduced complexity

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Perkins® Syncro engines are tailor-made for compact machines and engineered for flexible integration into 80+ models. Perkins engines deliver optimal power and simplified maintenance whatever the application.

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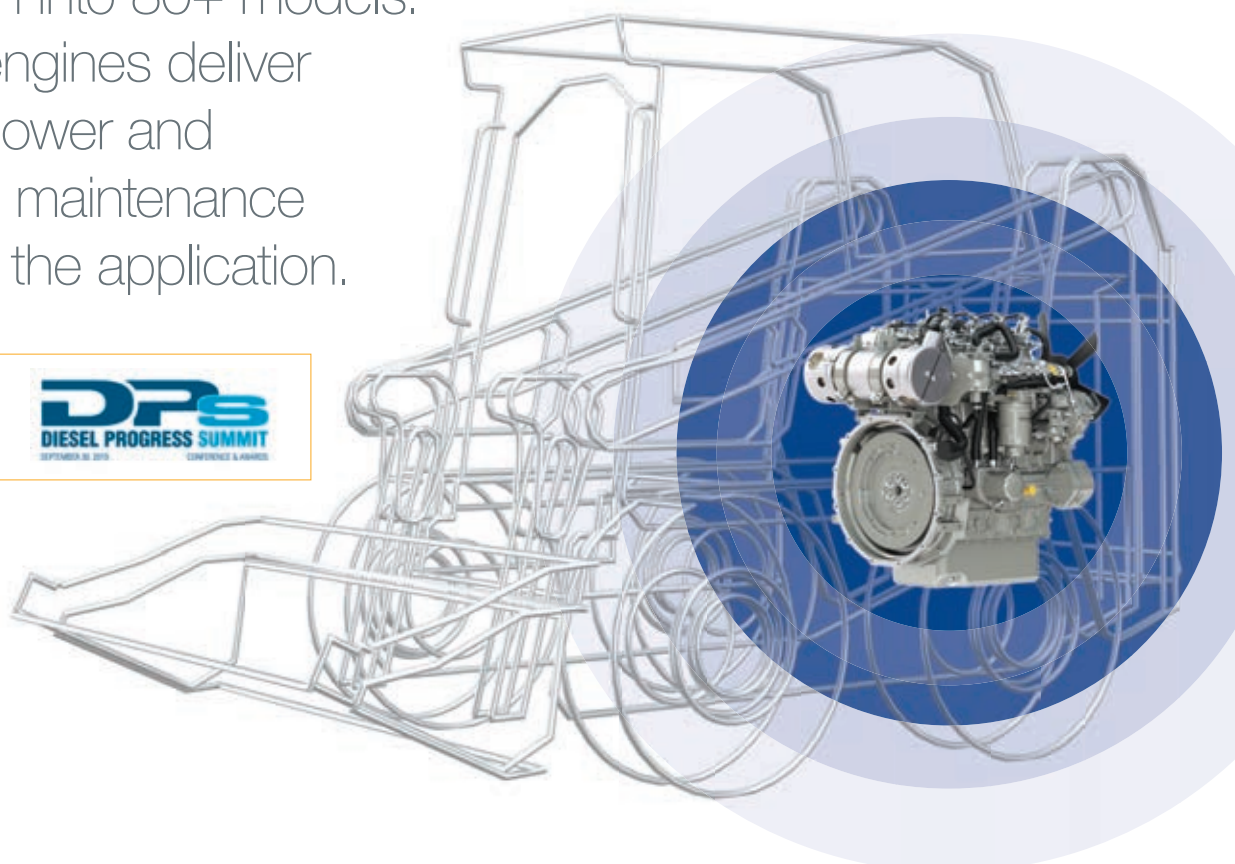

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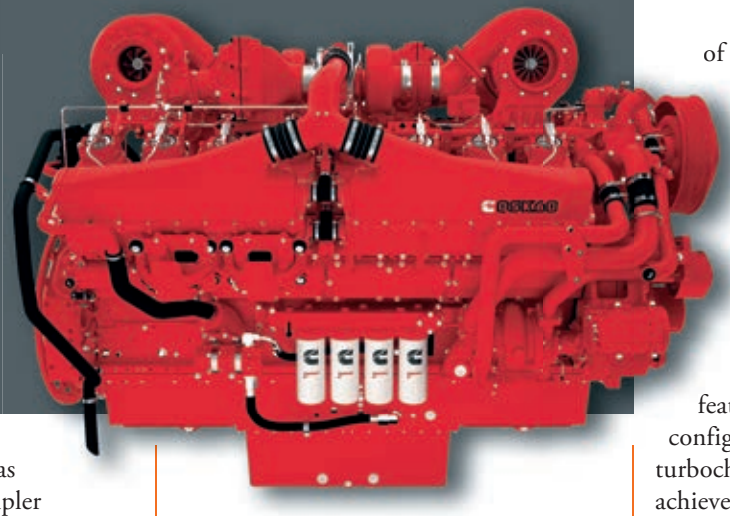


Cummins debuted the QSK60 Stage 5 mining engine. It is available from 1875 to 2850 hp (1398 to 2125 kW) with a peak torque of 11,218 Nm, and is applicable for excavators, dump trucks and front-end loaders.

(by the removal of exhaust gas recirculation and using a simpler aftertreatment system) have been carried over, with further optimization for generator set use. The increased power capability offers downsizing opportunities with easier installation to OEMs. Initially B6.7 and L9 stand-by and prime power ratings at 50 and 60 Hertz will be available, with other engines to follow later.

NEW ENGINE

Cummins debuted the QSK60 Stage 5 mining engine. It is available from 1875 to 2850 hp (1398 to 2125 kW) with a peak torque of 11,218 Nm, and is applicable for excavators, dump trucks and front-end loaders. It is part of a mining engine line-up from 74 to 2850 hp (55 to 2125 kW).

Cummins selected SCR as the best solution to meet Tier 4 final and Stage 5 because the company said it delivers the best balance of installation, efficiency and total cost of operation. The integrated aftertreatment unit replaces the exhaust muffler, minimizing design modifications. The SCR system is used to reduce NOx to the required level and features an integrated decomposition chamber and Cummins' airless dosing system designed to last the life of the engine.

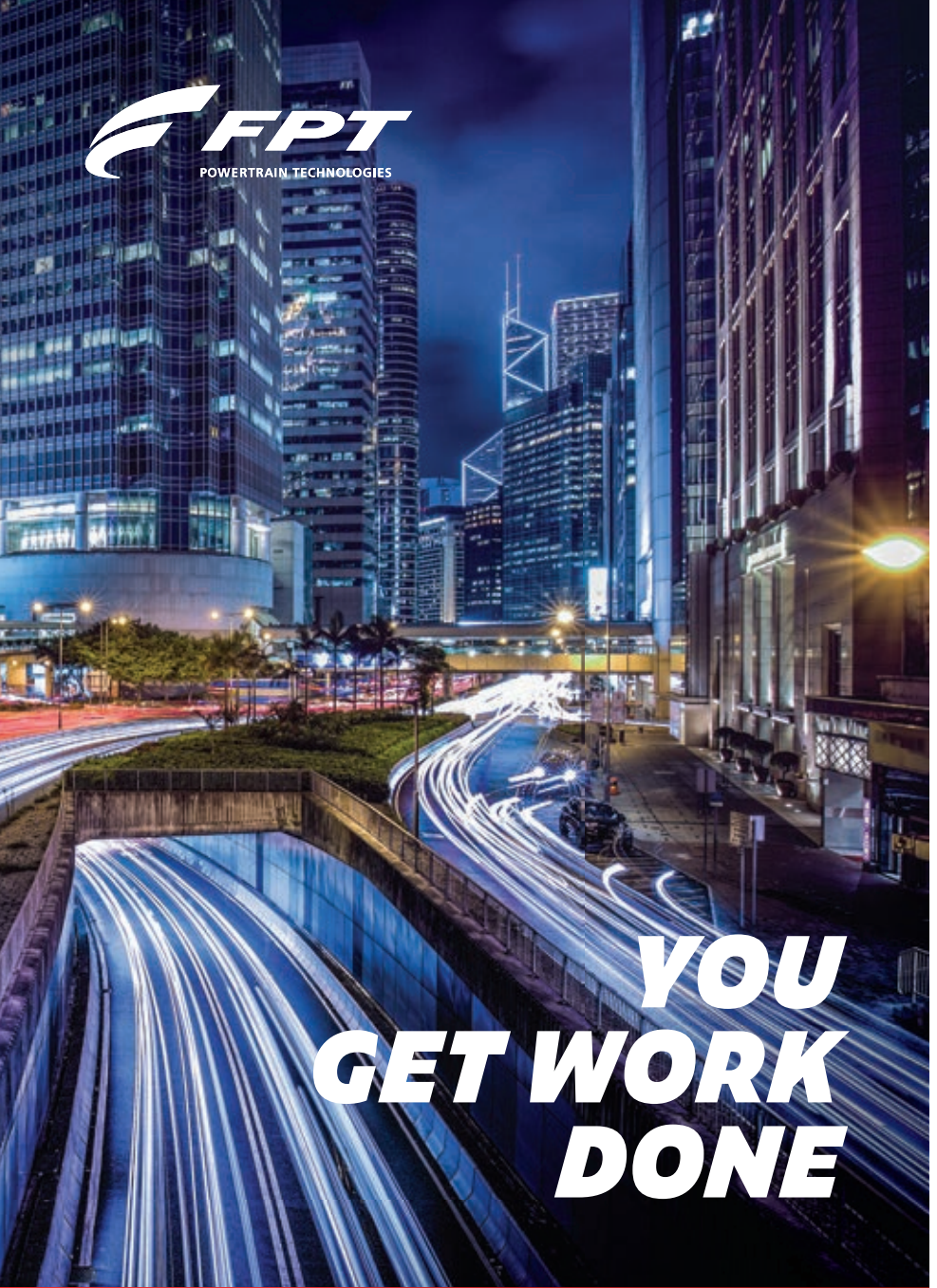
The new QSK60 platform has no loss of power or torque, Cummins said. Heat rejection is similar to the Tier 2 engine, so there is no need to re-engineer the cooling package. The redesigned power cylinder, optimized wastegate turbocharger and improved crankcase breather system work to keep particulate matter levels low.

The two-stage QSK60 engine features a simplified air handling configuration using Cummins turbochargers with intercoolers to achieve an altitude capability of up to 11,500 ft. (3500 m) without loss of power and capability to reach beyond 16,400 ft. (5000 m). The projected life-to-overhaul exceeds 1.1 million gallons (4.2m liters) of fuel burned, making it applicable for repowers as well as new equipment, Cummins said.

NATURAL GAS GEN-SETS

Cummins also launched the HSK78G natural gas generator series, offering a package of gas generator capabilities and gas technology for prime and peaking power applications.

With a power density of up to 2 MW from a 78 L engine, the HSK78G generator series is designed to provide



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Winco DR250 generator
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reliable power, regardless of the natural gas source or the climate, including extreme heat up to 131° F (55° C) and extreme altitudes.

The HSK78G models are suitable for a diverse set of industries from mining and manufacturing to shopping malls and hospitals. A high electrical efficiency of up to 44.2% (50 Hz) and 43.5% (60 Hz) is achieved on a wide range of pipeline natural gas down to 70 methane number (MN) without impacting power output and efficiency.

The fuel flexibility of the HSK78G enables the utilization of low-cost, low-BTU and free fuel sources, that would otherwise be considered waste products, delivering power even with very aggressive fuels with minimal derating. By eliminating the need and the space required for gas-cleaning systems customers can optimize their capital and operational expenditures.

The efficiency of the HSK78G is maintained by automatic engine adjustments, which account for fuel quality changes and quick load-step performance, without the need to calibrate or switch off the engine. As a result there is more stability, greater uptime and lower fuel costs leading to lower total cost of ownership, Cummins said. In the case of a grid failure, the HSK78G can also switch to island mode offering more reliability.

ELECTRIFICATION

Cummins has developed a 3.5-ton electric prototype mini-excavator. Powered by Cummins BM4.4E flexible battery modules (4.4 kWh each), the prototype is designed to support a full work shift and charge in under three hours. The machine eliminates all gaseous emissions and substantially reduces noise, making it useable in urban and suburban construction.

The excavator contains eight BM4.4E modules connected in a series configuration to provide a total energy of 35 kWh. Mounted near the base of the excavator, the Cummins-designed and built battery modules utilize Li-ion technology to achieve a higher energy density and proprietary control technology to maintain the battery state-of-charge for a longer zero emission range. The modular design also allows for scalability to other applications and duty cycles.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

DETROIT

POWER RANGE

Diesel: 200 to 600 hp

www.demanddetroit.com/engines

ENGINE NEWS

Detroit marked the start of vehicle production on the Detroit DD8 mid-range engine in 2018. Also, Thomas Built Buses began accepting orders for the Detroit DD5 and DD8 engines.

Detroit celebrated the production of its one millionth heavy-duty engine platform (HDEP), a shared milestone between Detroit's Redford, Mich. manufacturing facility and Daimler AG's Mercedes-Benz plant in Mannheim, Germany.

Introduced in 2007, HDEP was jointly developed in Germany, Japan and the United States. HDEP engines have 90% shared parts worldwide.

The first HDEP engine launched in North America was the Detroit DD15. The Detroit DD13 and Detroit DD16 engines were later introduced to meet the needs of additional heavy-duty applications.

NEW ENGINE RATINGS

The Detroit DD15 added a new 455 hp/1750 lb. ft. engine rating. This, the company said, is designed to provide better responsiveness in fuel-efficient applications and has become one of Detroit's most popular ratings. The high torque is used to power the fast axle ratios and keep engine revs down while at highway speeds and the extra horsepower enables drivers to still have enough left to pull out and make passes, said the company.

DEUTZ CORP.

POWER RANGE

Diesel: 24 to 831 hp
Gasoline: 45 to 72 hp
Gaseous: 57 to 321 hp

www.deutz.com/en/

NEW ENGINES

As the result of a memorandum of understanding (MOU) with Kukje Machinery Co. in Korea, Deutz Corp. has expanded its line of diesel engines under 25 hp.

The under 25 hp segment is an important one for Deutz as it

As the result of a memorandum of understanding with Kukje Machinery Co. in Korea, Deutz Corp. has added two new engines, the models D1.2 (shown here) and the D1.7. Both will carry the Deutz brand and will be available for delivery throughout the Americas in the second quarter of 2019.

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encompasses aerial platforms, welders, trenching equipment and mini skid-steer loaders, as well as equipment for lawn care and pump applications.

The agreement adds two new engines, the models D1.2 and the D1.7. Both will carry the Deutz brand and will be available for delivery throughout the Americas in the second quarter of 2019 and will be supported by the existing Deutz parts and service network.

The D1.2 and D1.7 are naturally-aspirated, three-cylinder, liquid-cooled configurations offered in 1.2 L and 1.7 L displacement with output ratings of up to 25 hp. Specifically, the D1.2 is rated 24 hp at 2600 rpm and the D1.7 rated 24 hp at 2200 rpm.

The D1.2 and D1.7 can also be utilized with the new E-Deutz products to provide hybrid packages as well.

Most recently, Deutz is introducing a new pair of engines, with a third model likely to follow, in the lower output portion of its engine range. The two engines, a 2.2 L, and a 2.9 L model, and possibly a 3.6 L version, will be offered as gasoline engines, along with LPG versions, or as a bi-fuel engines.

The new Deutz G 2.2 L3 is an inline, three-cylinder engine, while the G 2.9 L4 is an inline, four-cylinder design. Initial ratings for both are a somewhat conservative 35 to 72 hp at 2800 rpm.

The 2.2 L is in production now as an LPG engine (gasoline to follow). The 2.9 L will be available as prototypes to U.S. customers in December 2019 in both gasoline and LPG versions. Eventually, as the models come into the market, all will be available as a stand-alone gasoline engines, stand-alone LPG engines, or as a bi-fuel models. As well as the corresponding diesel versions.

ELECTRIFICATION & ALTERNATIVES

With a market launch in Europe planned for 2021, Kobelco Construction Machinery Europe B.V. unveiled its first mini-excavator, the model SK17SR, fitted with an all-electric drive. As systems integrator, Deutz AG is drawing on its modular product kit to supply the drive system, including a lithium-ion battery, for the 1.7 ton machine.

Deutz and Manitou are also cooperating on electrified demonstrator telehandlers; both versions were seen in action at Bauma 2019. The fully-electric Manitou MT 1135 telehandler is powered by a 60 kW electric motor in a 360V system architecture and features a battery with 30 kWh capacity.

The other machine has been fitted with a diesel-electric hybrid drive, with a Deutz TCD 2.2 diesel engine which generates 55 kW output power and a 20 kW electric motor in a 48V electric system.

Deutz AG is also investigating hydrogen as an engine fuel. It has signed a letter of intent on collaboration with Munich-based start-up Keyou. Deutz and Keyou intend to jointly develop hydrogen engines for off-road and on-road applications, as well as for power generation, and bring those engines to production readiness. Keyou has developed a prototype for its Keyou-inside technology that can turn a conventional diesel engine into hydrogen-fueled engine. Deutz provided support as a development partner, supplying the engine.

Keyou's first 7.8 L prototype Deutz engine was unveiled to the public in 2018 at the Bauma China trade fair and was showcased at Bauma in Munich in April. Specific pilot projects with vehicle manufacturers and end users are in the planning stage, with the appearance of the first prototype vehicles expected in the first half of 2020. The aim is to bring the engines to production readiness by 2021/22.

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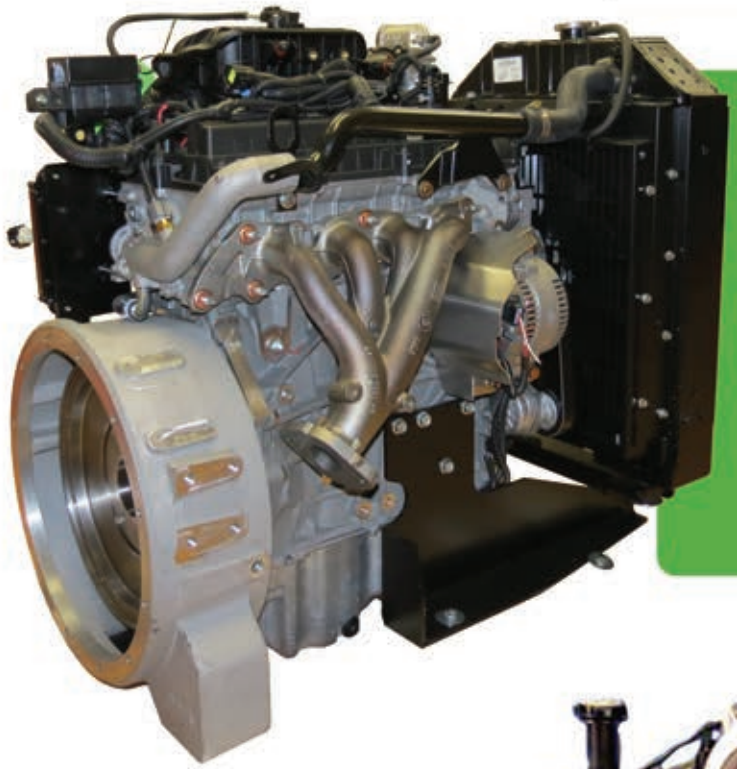

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SERVICE, PARTS & REMAN

Deutz Corp. celebrated the 10th anniversary of its dedicated diesel engine remanufacturing operation, Deutz Xchange, in Pendergrass, Ga. near its Norcross, Ga. North American headquarters.

Over the 10 years, the company has built more than 16,500 Xchange engines which have been sold to nearly 300 different customers. Deutz Xchange now offers a remanufactured version of every pre-Tier 4 final Deutz engine. Deutz further announced plans to expand Pendergrass, along with plans to begin offering remanufactured TCD 2.9 engines in 2019.

Deutz Corp. and Terex AWP, a business unit of Terex Corp. that includes the Genie brand, have announced that Deutz Power Centers are now authorized service and parts centers for Genie-branded mobile elevated work platforms (MEWPs).

Staff at Deutz Power Center locations in Chicago, Ill., St. Louis, Mo., Kansas City, Mo. and Rock Hill, S.C., are trained and equipped to perform service, warranty, unplanned repairs and supply service parts for Genie Z and S booms, GS scissor lifts and GTH telehandlers.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

DOOSAN INFRACORE CO. LTD.

POWER RANGE

Diesel: 9 to 1110 hp
Gaseous: 60 to 605 hp

www.doosaninfracore.com/engines/en

NEW ENGINES

Doosan has added new engines to its product line: the G2 Stage 5 engines, DX12 marine engines and DX22 electronic engines for power generation.

The G2 family of industrial engines, the D18, D24 and D34, have enhanced specifications for meeting Stage 5 emission regulations while maintaining its compact design and high efficiency, said the company.

One of the main enhancements is the SDPF (SCR on DPF technology) aftertreatment system with no EGR. By adopting its SDPF system the company said its new G2 engines provide lower cost and compact size. This advanced system also enables the engine to put out less heat rejection and exhaust gas emissions.

On the marine engine side, Doosan has expanded its output range from 355 hp to 444 hp as the maximum power by unveiling its DX12 marine engine, model 4L126TI. It's an in-line six-cylinder 11.1 L engine that meets

The Doosan G2 family of industrial engines includes this D18, which is now available to meet Stage 5 emission regulations. The D18 is a 1.8 L engine rated 55 hp at 2500 rpm.

Tier 2 regulations. The engine is offered in different power horsepower ratings backed on the type of use (heavy, medium and light) by customers. Equipped with a new panel control, all of the engine's operating parameters are available immediately.

The company also introduced another DX engine series for power generation at the Middle East Electricity (MEE) convention held in March in Dubai. The new DX22 engine is a 12-cylinder, 21.9 L vee-engine and covers 516 to 605 hp. Designed with electronic functions, the DX22 can also be switched between 50 Hz and 60 Hz and has enhanced specifications such as cooling capacity, replacement times, etc. Also new to the DX series is the implementation of common rail technology, which helps introduce electronic injection to power generation applications.

COMPANY NEWS

In October 2018, Doosan Infracore signed a deal with Arbos, an agricultural tractor manufacturer based in Italy, to supply 27,000 G2 Stage 5 diesel engines, further expanding its presence in the European machinery and equipment market. Under the agreement, Doosan will supply engines for six years from 2020 after developing 1.8 to 3.4 L G2 Stage 5 engines for agricultural machinery.

Another supply agreement was made with China's KION Baoli Forklift Co., a subsidiary of KION Group, based in Germany, to supply 12,000 G2 Stage 5 diesel engines. After Doosan signed with KION in 2015 and later signed a long-term contract with the company in 2017, Doosan also entered the Chinese agricultural machinery engine market.

The Lovol Doosan joint venture was established in 2018. It began constructing an engine manufacturing factory in March to build G2 engines from June 2020. It is expected to have a manufacturing capacity of more than 100,000 engines annually.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

EDI (ENGINE DISTRIBUTORS INC.)

POWER RANGE

Gaseous: 20 to 200 hp
Gasoline: 20 to 200 hp

www.edi-dist.com

FPT INDUSTRIAL NORTH AMERICA

POWER RANGE:

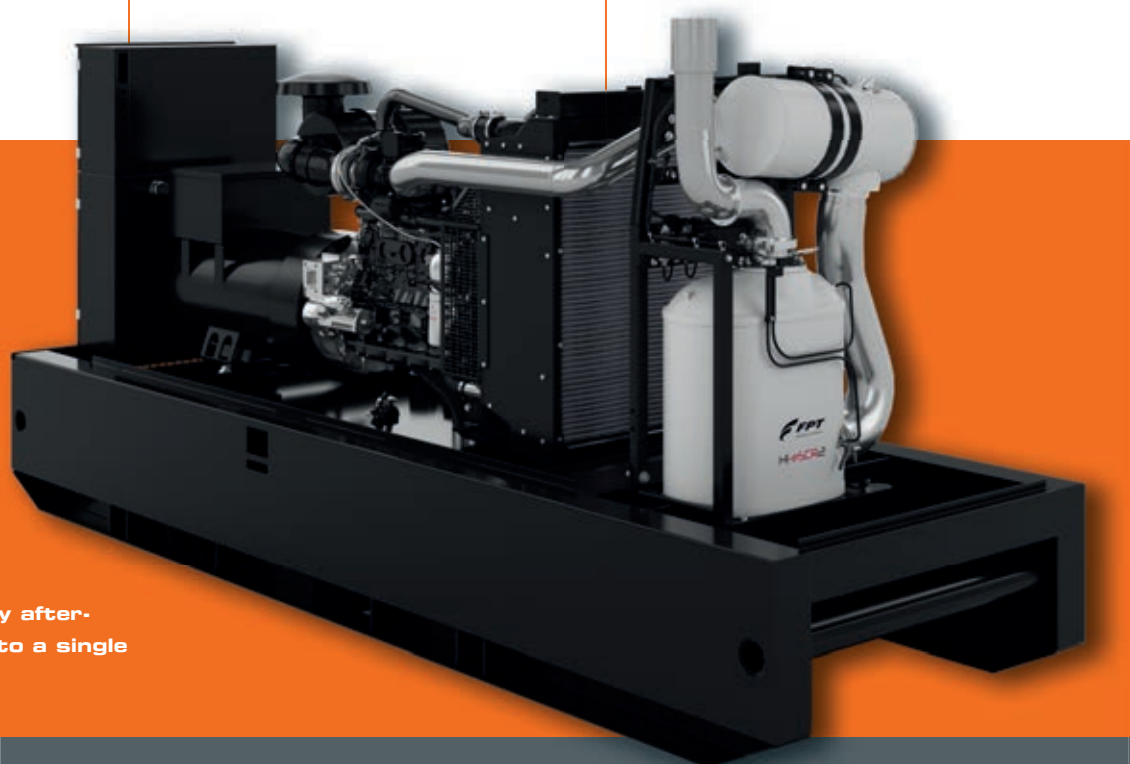
Diesel: 41.5 to 992 hp
Gaseous: 134 to 460 hp

www.fptindustrial.com

ENGINE TECHNOLOGY

FPT Industrial showed its Stage 5 portfolio for the off-road segment during Bauma 2019. Those engines included the Cursor 9. Developed for heavy-duty operations, Cursor 9 Stage 5 is fitted with an HI-eSCR2 system, the latest generation of FPT Industrial's aftertreatment technology, which allows the engine to achieve uprated standards without exhaust gas recirculation (EGR) and maintaining fuel economy, power and torque density, said the company. It is a maintenance-free technology, granting low operating costs and maximum uptime, together with oil service intervals of 600 hours. The six-cylinder engine delivers maximum power of 449 hp (330 kW) at 1800 rpm and maximum torque of 1800 Nm at 1500 rpm.

Also, the 3.4 L four-cylinder F34 diesel engine is rated 74 hp. For compliance with recent emissions standards, it uses ›



The FPT N67 200 kWe Tier 4 final engine, fitted with the HI-eSCR after-treatment system. The engine is shown with the company's After-Treatment System installation solution (ATS Pack), which the company said is designed to make emission compliance and machine upgrade easier, by gathering all key after-treatment components into a single pre-assembled set.

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HatzNorthAmerica.com

HATZ DIESEL

a DOC (diesel oxidation catalyst) and a DPF (diesel particulate filter) aftertreatment system. The F34 Stage 5 engine is designed for compact equipment, with high torque output to ensure quick engine response in variable loads conditions, said the company.

Features such as the 600-hour oil change interval and single-side service access reduce operating costs and simplify maintenance operations.

The F36 covers a power range from 75 hp to 141 hp. The 3.6 L engine generates up to 443 ft.lb. of torque and uses the HI-eSCR2 after-treatment package for low emissions and a 600-hour service interval. Power density is achieved through a redesign of FPT Industrial's previous generation 3.4 L engine. With a new turbocharger and improved piston design, power and torque have been improved by 14% and 20%, respectively, with no change to the engine's external dimensions, said the company.

FPT Industrial engines are available in a PowerPack configuration, which encompasses key aftertreatment components into a single package. The product's main advantage is its simplicity for installation, said the company, because it includes the required components for these purposes, such as DOC, SCR-on-filter, urea injection system, sensors and manifolds.

For increased installation flexibility, the aftertreatment pack can come engine mounted, as a ready-to-use solution, or as a loose pack to allow original equipment manufacturers to design their own layout. In both cases, all electrical signals and connections are managed by a single cable for fast and reliable linking to the engine and machine electronic management system.

NEW ENGINES

FPT Industrial launched its Tier 4 final power generation engines for the North American market at the 2018 Power-Gen International show. FPT said it offers a range of engines for energy delivery in applications that include construction sites, shipyards, banks, hospitals, shopping centers and household applications.

ELECTRIFICATION

FPT Industrial participates in VISION-xEV (Virtual Component and System Integration for Efficient Electrified Vehicle Development), a project that was created to contribute to the advancement of all kinds of future electrified powertrain systems. With the support of 14 partners and a total budget of €3.9 million, VISION-xEV is funded by the European Commission as part of the European Green Vehicles Initiative, under the Horizon 2020 program.

The company said the project reaffirms its position in the market as a multi-power solutions provider. To this end, last year, the brand launched its e-Powertrain organization, a team entirely dedicated to the development of electric powertrain solutions.

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Diesel

D18	62hp[45kW] / 2600rpm	**D24**	75hp[55kW] / 2600rpm
D34 (no SCR)	75hp[55kW] / 2600rpm	**D34 (with SCR)**	138hp[101kW] / 2600rpm
DL06	192hp[141kW] / 2000rpm	**DL08**	290hp[213kW] / 1800rpm

LPG

P24	62hp[46kW] / 2600rpm	**P34**	91hp[68kW] / 2700rpm

DOOSAN

ALTERNATIVE FUEL

An FPT Industrial engine is powering the new natural gas methane-powered wheel loader concept – Project Tetra – from Case Construction Equipment, which was shown at Bauma 2019. The new wheel loader concept is the first natural gas construction machine from Case Construction Equipment – which is part of CNH Industrial along with along with FPT Industrial – and is powered by a six-cylinder NG engine from the engine manufacturer's NEF family.

The power unit is rated up to 230 hp and has torque up to 873 ft.lb., has diesel-like performance, but with a smoother and quieter drive, said the company. It also offers the same reliability and durability and fuel savings up to 30%. The engine runs on compressed natural gas (CNG), for 15% less CO2 and 99% less particular matter than its diesel-based counterpart, said FPT Industrial.

DISTRIBUTION NEWS

FPT Industrial announced a strategic partnership that allows Southwest Products, a manufacturer of power generation solutions and a distributor of diesel engines, to represent FPT in the western United States.

Based in Surprise, Ariz., and founded in 1967, Southwest Products designs and manufactures a variety of generators in both mobile and stationary configurations, power packs, pumps, and industrial power units. Southwest Products' new FPT Industrial territory includes the states of Washington, Oregon, California, Arizona, Nevada, Idaho, Utah, Colorado, Hawaii and Alaska.

HATZ DIESEL OF NORTH AMERICA

POWER RANGE

Diesel: 6 to 86 hp

www.hatznorthamerica.com

NEW ENGINES

At the recent Bauma show, Hatz unveiled its new E1 single-cylinder, air-cooled engine technology for Tier 4 final and EU Stage 5 applications. The new engine lineup includes:

- The 1B30E, with a bore and stroke of 80 x 69 mm, an overall displacement of 0.347 L and a peak rating of 6 hp and 11 ft. lb. at 3600 rpm.
- The 1B50E, with bore and stroke dimensions of 93 x 76 mm, a displacement of 0.517 L and a maximum rating of 10.6 hp and 17 lb. ft. at 3600 rpm.
- The 1D90E, with a bore and stroke of 104 x 85 mm, a displacement of 0.772 L and a top rating of 14.5 hp and 26.5 lb. ft. at 3000 rpm.

With the E1 engines, Hatz said it is offering full-authority electronic control unit for single-cylinder engines. E1 technology paves the way for transferring equipment such as smaller hand-held machines, mobile lighting towers and generators, etc., into the era of the Internet of Things (IoT).

The key component of E1 technology is the control unit. Constant measurements of conditions such as engine speed and fuel injection rate are used to provide precise data on the load condition of the machine. In addition to regulating the engine, the control unit communicates engine-related data to the CAN J1939 network. This allows, Hatz said, service life, capacity, engine condition and service information to be accessed through the company's HDS² diagnostic tool.

Hatz also announced its full range of EU Stage 5 engines, which incorporates the electronically controlled B- and D-Series engines with E1 technology, along with engines in the H50 Series and mechanically controlled B-, D-, G-, L- and M-series diesels.

CONNECTED SERVICES

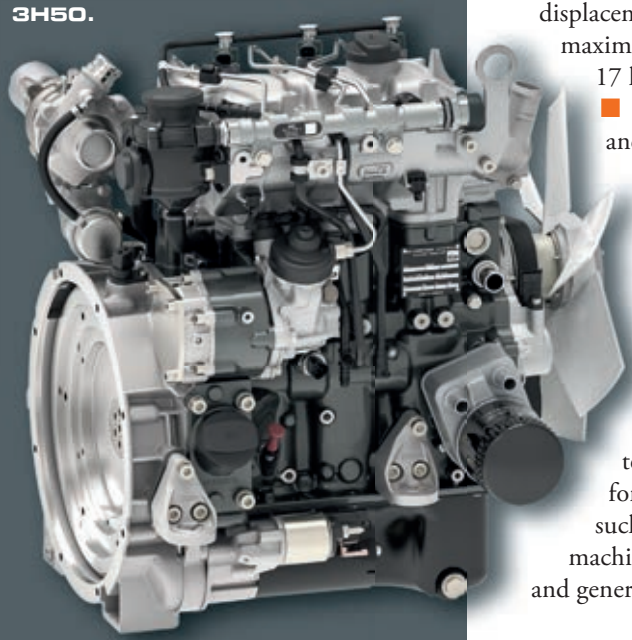
Also at Bauma, Hatz launched Hatz Connected Services, which combine digitally controlled engines and machines with the internet and information systems using the E1 engine technology. This covers not only the single-cylinder engines, but also the flagship liquid-cooled H-Series, which ranges up to 86 hp.

ENGINE PACKAGING

Hatz said its modular New Silent Pack system is available for both three- and four-cylinder liquid-cooled H50 diesels. The Silent Pack is factory engineered to provide a plug-and-play combining insulation designed to reduce noise emissions by as much as 60% while providing protection against contact, rain, dirt or vandalism. It is based on open power unit (OPU) engines and can therefore be ordered as complete and ready-to-install variants. Along with new installations, Hatz said the New Silent Packs can also be used for retrofit applications.

CORPORATE NEWS

Earlier this year, Hatz changed the name of its Waukesha, Wis.-based subsidiary to Hatz Diesel of North America to provide



Hatz has received EU Stage 5 certification from the German Federal Motor Transport Authority for its 3H50.

The new Isuzu 4.6 L alternative fuel engine is also available as a power unit.

a more accurate representation of what territory the company covers – the U.S., Canada, Mexico, Puerto Rico and the U.S. territories – and highlight a period of change that included a remodeling of its Waukesha headquarters and renewal of its website.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

ISUZU MOTORS

POWER RANGE

Diesel: 11.8 to 500 hp
Gaseous: 78.4 to 79.8 hp

www.isuzuengines.com

NEW ENGINES

Isuzu is launching a new alternative fuel engine and power unit for off-highway, industrial and rental markets. The new 4.6 L engine provides a range of power in liquid petroleum (LP) rated 82.5 hp (61.5 kW) at 1800 rpm or 56.3 hp (41.9 kW) at 2200 rpm.

For natural gas the 4.6 L is rated 78.4 hp (58.5 kW) at 1800 rpm or 79.8 hp (59.5 kW) at 2200 rpm. The diesel-based design lends itself to better durability and reliability as well as lower overall maintenance costs; examples of this include a coil on plug ignition system and replaceable dry fit liners.

SERVICE, PARTS & REMAN

Isuzu diesel engines range from 11.8 hp to over 500 hp and are backed by limited lifetime warranties from 2 years to 5 years/5000 hours based on years or hours of service.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

JCB POWER SYSTEMS

POWER RANGE

Diesel: 74 hp to 173 hp

www.jcb.com

ENGINE TECHNOLOGY

JCB's powertrain development is focused on reducing air quality and greenhouse gas emissions. Several technology routes are being followed, depending on the application.

Recent engine development has focused on EU Stage 5. The deployment of this technology is expected to follow

in other markets including India, China and North America.

JCB Power Systems will use a combination of particulate control technology, diesel oxidation catalysts (DOC) and selective catalytic reduction (SCR) to meet new European Stage 5 emissions regulations. JCB Power Systems said all its Stage 5 engines have been designed to fit within existing engine canopies and will not require redesign of machinery to accommodate.

JCB Group Director of Powertrain Alan Tolley said: "JCB engines have low emissions, high efficiency combustion systems developed for Stage 3b and Tier 4. This means that we developed Stage 5 from a very good position. We've added exhaust treatment systems to control the number of particles leaving the exhaust pipe. These are compact systems that are integrated within our existing machines' engine bays. In normal operation, they are invisible to the customer and require no operator intervention or additional service attention."

JCB's new 3.0 L Dieselmax 430 engine will continue to provide an output of 74 hp (55 kW) along with an increased torque of 440 Nm. The engine will benefit from the addition of an electronic wastegate turbocharger and a DOC and filter system.

The new 3.0 L engine will feature auto-stop technology and fuel savings of up to 10%, reducing operating costs for customers. In addition, where the engine replaces the previous 4.4 L, there will be a dry weight reduction of up to 30%.

Tolley said: "At 74 hp the JCB 430 Dieselmax engine, equipped with JCB's new particulate control technology, will be used in many of JCB's own mid-range machines and external OEM customer equipment"

The company's 4.8 L engine, which produces 108 to 174 hp (81 to 129 kW) and torque outputs of 516 Nm through to 690 Nm, will feature a compact aftertreatment system, with a DOC and a SCR filter. This engine will also benefit from the adoption of a wastegate turbocharger and auto-stop technology to reduce fuel consumption.

In both cases the particulate control technology will feature auto regeneration with no requirement for operator intervention in normal operation. Indeed, there is no additional service or maintenance required at Stage 5.

Tolley said, "at 81 to 129 kW, the JCB 448 engines, fitted with JCB's new combined particulate control and nitrogen oxide (NOx) reduction technology, will be used in a wide range of JCBs OEM customer's equipment as well as JCB's excavators, loading shovels, backhoe loaders, Loadalls and other equipment."

ELECTRIFICATION

JCB's powertrain developments have not been limited to combustion engines. The company has developed battery electric powertrains for small excavators, forklift trucks and other applications. These have been launched in the JCB 19C-1E excavator and the JCB 30-19E Teletruck.

TELEMATICS

JCB has developed the JCB LiveLink telematics system. The system provides a range of information, in real time, about machine use to the owner or fleet manager, allowing improved operating cost efficiencies. This information includes machine location, running time, engine speed and load, fuel consumption and service diagnostics. A specially developed version of this system is now available for OEM

customers in North America and other markets.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

JOHN DEERE POWER SYSTEMS

POWER RANGE

Diesel: 48 to 684 hp

www.JohnDeere.com/jdpower

ENGINE NEWS

The John Deere Power Systems (JDPS) family of Stage 5 engines have received official certification. This includes its variable-speed engine families below 75 hp (56 kW) and above 174 hp (130 kW) as well as its constant-speed engine families.

The company said it has 1 billion hours of global experience with diesel particulate filter (DPF) technologies as the foundation to implement emissions solutions for OEM customers.

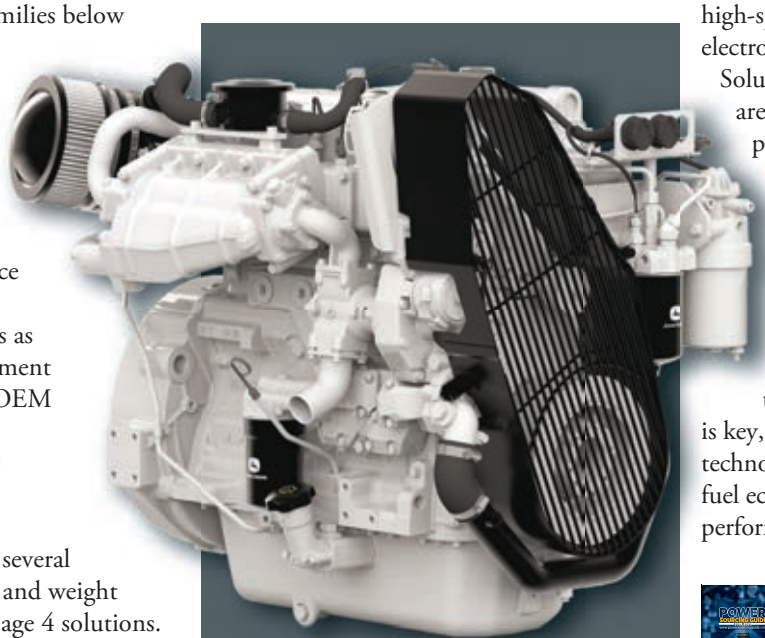
Stage 5 aftertreatment technologies from John Deere are optimized for flexible integration, and several offer reduced packaging and weight compared to previous Stage 4 solutions. These technologies are built on the same engine platform as current Stage 4 solutions, reducing the need for OEMs to re-engineer due to hardware or mounting changes.

For John Deere PowerTech 4.5 L platforms, the no-DPF models continue as Tier 4 final-only models. This includes the PWL 4.5 L model from 85 to 141 hp (63 to 104 kW) and the PSL 4.5 L model from 126 to 175 hp (93 to 129 kW).

Adding to the marine lineup of propulsion, generator drive, and constant- and variable-speed auxiliary engines, John Deere is now shipping its new PowerTech 4045SFM85 marine engine to boat owners and builders. Its high power-to-weight ratio delivers torque in a compact engine package, making it applicable for planing and semi-displacement hulls.

Sea trials for the 4045SFM85 were conducted with an integrated team of John Deere marine application engineers, engine distributors and marine dealers. The trials showed excellent fuel economy and impressive power, based on the customers' individual experiences.

The 4045SFM85 engine ratings meet U.S. Environmental Protection Agency Marine Tier 3 and Recreational Craft Directive II emissions regulations as well as International Maritime Organization Tier II standards for commercial and recreational applications.



Sea trials for the John Deere 4045SFM85 were conducted. The 4045SFM85 diesel ratings meet U.S. Environmental Protection Agency Marine Tier 3 and Recreational Craft Directive II emissions regulations as well as International Maritime Organization Tier II standards for commercial and recreational applications.

NEW TECHNOLOGY

While off-highway equipment manufacturers continue to explore and evaluate hybrid and electrification solutions for their respective markets, the demands of the end customer for reliability and productivity continue to increase. In response to this, John Deere has debuted new electric drivetrain components. These power generation and traction drive solutions are designed specifically to meet the demands of the off-highway market and to provide durability while giving OEM customers the flexibility they need to easily implement hybrid power in their equipment.

The new electric drivetrain components from John Deere feature compact, high-speed motors controlled by power electronics from John Deere Electronic Solutions. These eMachine components are integrated in various John Deere pump drive and transmission solutions, resulting in a flexible drivetrain portfolio for ease of OEM implementation.

In early 2019, the John Deere 644K and 944K hybrid wheel loaders collectively logged more than 1 million operating hours in the field. This level of experience is key, JDPS said, as OEMs look to new technologies to reduce emissions, improve fuel economy, and enhance machine performance and reliability.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

KAWASAKI ENGINES USA

POWER RANGE

Gasoline: 14.5 hp to 35 hp

www.kawasakienginesusa.com/

SMALL INDUSTRIAL ENGINES 9 kW-64 kW
LARGE INDUSTRIAL ENGINES 600 kW-2000 kW
LARGE MARINE ENGINES 429 hp-1676 hp
GAS ENGINES 280 kW-1500 kW

MITSUBISHI ENGINE

WWW.MITSUBISHI-ENGINE.COM

The diesel engines used in the Kioti Tractor range of compact tractors are built by its parent company, South Korea-based Daedong.

KIOTI TRACTOR

POWER RANGE

Diesel: 24.5 to 73 hp

www.kioti.com/products/engines/

ENGINE NEWS

The compact tractors sold by Kioti Tractor, a division of Daedong-USA Inc., are equipped with diesel engines built by its parent company, Daedong Industrial Co. Ltd. The latest models in the DK10SE series of tractors, for example, are powered by a liquid-cooled, three-cylinder Daedong ECO diesel engine rated 39.6 to 57.7 hp.

The company said that more than 70 years of continual innovation have created a line of diesel engines ranging from 24.5 to 73 hp, all of which meet the latest certifications.

Daedong ECO diesel engines use common rail direct injection, cooled exhaust gas recirculation and diesel particulate filter (DPF) to meet Tier 4 final regulations. The engines are the result of rigorous testing, monitoring and data analysis, said the company, and are designed with a high ratio of common parts for easy upkeep. Single-side service helps make oil filling, oil gauge and oil filter maintenance easier, said the company.

CORPORATE NEWS

In December 2018, Kioti Tractor opened a new distribution center in Mississauga, Ontario, Canada. The approximately 60,000 sq. ft. office and distribution space is expected to expand upon the company's North American distribution network by strategically placing assembled inventory and parts supplies in a key market, ready for expedited delivery to dealers. Longer term, the new facility is expected to support the planned growth of the company's dealer network across Canada.

The Canadian expansion followed the announcement of a $13 million, 162,000 sq.-ft. warehouse expansion and nearly 15,000 sq.ft. office addition to Kioti's North American headquarters in Wendell, N.C. The expansion will double its existing facilities and is expected to be complete in late 2019.

KOEL AMERICAS CORP.

POWER RANGE

Diesel: 4 to 1250 hp (non-EPA)
Diesel: 48.7 to 156 hp (EPA Tier 3 for emergency standby generators)

http://koel.kirloskar.com/content/international-business

CORPORATE NEWS

KOEL Americas Corp. is the wholly owned subsidiary of Kirloskar Oil Engines Ltd. (KOEL). Based in India, Kirloskar group has a 120-plus year heritage that includes more than 73 years of engine manufacturing. The company has four diesel engine manufacturing factories in India that export to more than 60 countries worldwide.

The engines manufactured by Kirloskar cover a power range from 4 to 1250 hp. It makes more than 225,000 diesel engines annually that are used for more than 100 applications around the world in industries such as agriculture, power generation, construction, material handling, defense and maritime applications.

The company said it is driven to become a multinational business, powering industries with its engines, generators and aftersales service. The company is present in international markets other than the United States, as well, with locations in Dubai, South Africa and Kenya, a representative office in Vietnam and representatives in Indonesia and Nigeria.

To help reach its global goal, the company developed and certified engines specifically for the U.S. market.

Following nearly three years of engineering work, it recently unveiled a range of generator-drive engines for emergency stand-by applications.

In early 2016, with the development of U.S.-bound Environmental Protection Agency (EPA) certified engines under way in India, the company established KOEL Americas Corp. in the Houston suburb of Magnolia, Texas. The subsidiary will support the Americas, including Mexico, South America and the Caribbean. Magnolia is also home to the company's offices; a warehouse for engines, spare parts and generator sets for Latin America exists in Miami, Fla.

ENGINE NEWS

The new KOEL Americas product line for North America is comprised of three engine families with four engine models. The model 4R810NA1 is a 3.24 L four-cylinder, naturally aspirated engine rated 48.7 hp. The next two models in the power range share the layout of the previous engine but also add a turbocharger and aftercooler. The 4R810TA1 is rated 95 hp while 4R810TA2 is rated 65 hp. The largest engine in the current line-up is model

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MAN Engines

MAN

KOEL Americas Corp. recently introduced a range of generator-drive engines in the U.S., including the naturally aspirated 4R810NA1 diesel shown here.

4K1080TA1, a 4.33 L four-cylinder diesel engine rated 156 hp. The latter engine is also turbocharged and aftercooled. The engines are rated by the EPA as Tier 3 for emergency stand-by generator set applications. Depending on the requirements of the customer, the company will sell them as bare engines up to complete generator-drive packages ready to be dropped onto a frame or inside an enclosure. KOEL said it has decided not to sell complete generator sets in the U.S. to avoid competing with packagers – customers that will be offered the generator-drive engines.

KOEL Americas has planned for five distributors to handle the U.S., which will be supported by the Houston-area office for sales and warranty work as well as the parent company in India. Distributors may order container loads of engines from India or top-up orders from the warehouse in the U.S. Product training, including train the trainer programs, will take place at the distributor's location, KOEL Americas headquarters or at the parent company's location in India.

KOEL said its current original equipment manufacturer diesel engine partners include some of the world's most recognizable brands that have manufacturing facilities in India, including builders of backhoe loaders, wheel loaders, excavators, farm tractors and harvesters, de-watering pumps and more. The company's KFP Series (Kirloskar Fire Pump) of diesel engines are supplied to fire pump manufacturers around the world including the United States for export. These KFP series engines are FM Global approved and Underwriters Laboratories (UL) listed. The engines were designed specifically for fire pump applications and cover 38 different ratings in a power band of 55 to 336 hp at speed ranges of 1760 to 3000 rpm.

While the company's initial target in North America is the power generation market, KOEL said it is also gearing up to supply mobile equipment manufacturers and said additional engine sizes that carry the required EPA Tier 4 final certification are planned. KOEL showcased a new engine family, called R550, during the recent Bauma 2019 exhibition in Germany. The line will consist of two, three and four-cylinder compact diesel engines rated 10 to 65 hp for various industrial applications. The engines are expected to be introduced to the North American market in 2020.

KOHLER

POWER RANGE

Diesel: 6.1 hp to 134 hp
Gasoline: 4.5 hp to 38 hp
Gaseous: 7 hp to 25 hp

www.KohlerEngines.com

GASOLINE ENGINES

Kohler has expanded its Command PRO commercial engine lineup targeting professional lawn and landscape applications. The new CV173, CV200 and CV224 Command PRO vertical shaft engines are available in three displacements – 173, 200 and 224 cc – and are engineered to bring a range of benefits to commercial walk-behind mowers, including what Kohler said was a best-in-class torque rating on the 224cc model (class defined as EPA Class I gasoline engines 225 cc or below), along with the company's exclusive Consistent-Cut Technology, which is designed to help maintain engine speed in difficult mowing conditions.

Durability features integrated into the new engines include cast-iron cylinder bores, intended to ensure peak performance for the life of the engine; dual lubrication, which the company said optimizes performance in all mowing conditions and helps to extend maintenance intervals; and the heavy-duty Quad Clean cyclonic air filtration system designed to protect the engine from contaminants and includes a fully-sealed latching system for additional effectiveness. The engine's blower housing and recoil are also constructed of steel for long-lasting performance and dependability in the field, Kohler said.

The new Command PRO walk-behind engines are designed to accommodate the larger mowing decks and faster ground speeds, especially for commercial cutters which have been trending in the industry for both ride and walk-behind applications.

DIESELS, HYBRIDS

In the United States, Kohler's compact diesel engines achieve Tier 4 final emissions compliance without a DPF. For other global regions, the company is now offering Kohler Flex, a suite of advanced engine systems that can be integrated into the KDI line – based on the specific needs of equipment manufacturers – to meet emissions standard around the world.

Kohler diesel engines are also being utilized in a new hybrid platform shown at Bauma. The K-HEM 2504 is the newest addition to the Kohler Hybrid Energy Module (K-HEM) line for construction and industrial equipment.

K-HEM is a hybrid electrical and mechanical combined power generation unit, which was initially launched as a prototype last November. As a parallel hybrid system, K-HEM can run on mechanical energy or a combination of mechanical energy and electrical energy, or only on electrical energy based on the specific requirements of an application.

Kohler said the K-HEM platform is suitable for a variety of applications, including boom lifts, telehandlers, skid steers, woodchippers and forklifts.

The new K-HEM 2504 combines a KDI 2504TCR diesel engine with a 48 V electric motor/generator, while the previously introduced K-HEM 1003 combines a 48 V motor/generator with a Kohler KDW 1003 diesel. Both models offer a variety of benefits for equipment operators, including reduced noise and gas emissions, excellent transient response, fuel savings and low total cost of ownership, Kohler said.

Compared to battery-electric solutions, Kohler said its K-HEM technology represents a cost-effective and simple way to meet global emissions requirements while offering the additional benefits of more on-board power and easier machine integration.

Kohler has expanded its Command PRO commercial engine lineup targeting professional lawn and landscape applications. The new CV173, CV200 and CV224 (pictured) vertical shaft engines are available in three displacements – 173, 200 and 224 cc.

SERVICE, PARTS & REMAN

Kohler said it has re-energized its focus on dealers and recently rolled out enhancements based on feedback secured through dealer surveys and in-person discussions. These enhancements include:

- More than a year ago, Kohler Engines formed a dealer council comprised of dealers from throughout the country. The council meets regularly to network, share best practices and provide feedback about how Kohler Engines can contribute to their success.
- Dealers voiced some concern over how technician shortages were impacting their business. Kohler responded by investing in enhanced educational resources for engines technicians and rolled out an online

training program. In just over a year, the company has signed up thousands of technicians and delivered tens of thousands of hours of training on its new platform. Kohler said it will continue to add new modules to its expanding digital curriculum while also enhancing its hands-on training for when deeper-level instruction is preferred.

■ Dealers interested in representing Kohler Engines at the highest level in only certain markets now have the opportunity to do so, the company said. This is intended to allow many more dealers to enjoy the benefits of enhanced status while maintaining their expertise in a specific equipment category.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

KUBOTA ENGINE AMERICA

POWER RANGE

Diesel: 6 to 210 hp
Gasoline: 24 to_87 hp
Gaseous: 25 to 87 hp

www.kubotaengine.com/products/engines/vertical-diesel

NEW ENGINES

Kubota introduced the D902-TE4 diesel engine that provides customers with the highest output among Kubota's Super Mini Series engines. The turbocharged, three-cylinder diesel engine brings 24.8 hp at 2800 rpm with 53.2 lb.ft. of maximum torque at 2400 rpm.

The D902-TE4 provides the same engine footprint as Kubota's naturally-aspirated D902-E4 and the spark-ignited WG972-G/GL engine. This engine is designed for applications that require a compact engine in a compact compartment. Offering high-altitude capabilities and minimal noise, the D902-TE4 is targeted for applications such as turf equipment, utility vehicles, mini track loaders and welders, among other applications. The engine is EPA Tier 4 and Stage 5 certified.

Kubota also debuted the V1505-CR-T four-cylinder, 1.5 L diesel engine. This turbocharged engine with a common rail system was specifically developed to deliver high power density and provides an output of 44.3 hp at 3000 rpm with maximum torque of 87.4 lb. ft. at 2000 rpm. The vertical, water-cooled engine complies with EPA Tier 4 and Stage 5 regulations with its aftertreatment of diesel oxidation catalyst and diesel particulate filter.

DISTRIBUTION

Engine Power Source (EPS), Rock Hill, S.C., which has been a Kubota engine distributor since 1986, has added the state of Florida to its area of responsibility. EPS will be offering Kubota engine sales, ›

Kubota generator sales, genuine Kubota parts, service and warranty support.

Anderson Industrial Engine Co., Inc. (AIE), Omaha, Neb., a Kubota engine distributor since 1986, expanded to the west by adding California, Northern Nevada, Idaho, Utah, Colorado, Wyoming and Montana. AIE will be offering Kubota engine sales, Kubota generator sales, genuine Kubota parts, service and warranty support.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

MAN ENGINES & COMPONENTS INC.

POWER RANGE

Diesel: 150 to 2000 hp
Gaseous: 50 to 750 hp

www.man-engines.com

NEW ENGINES

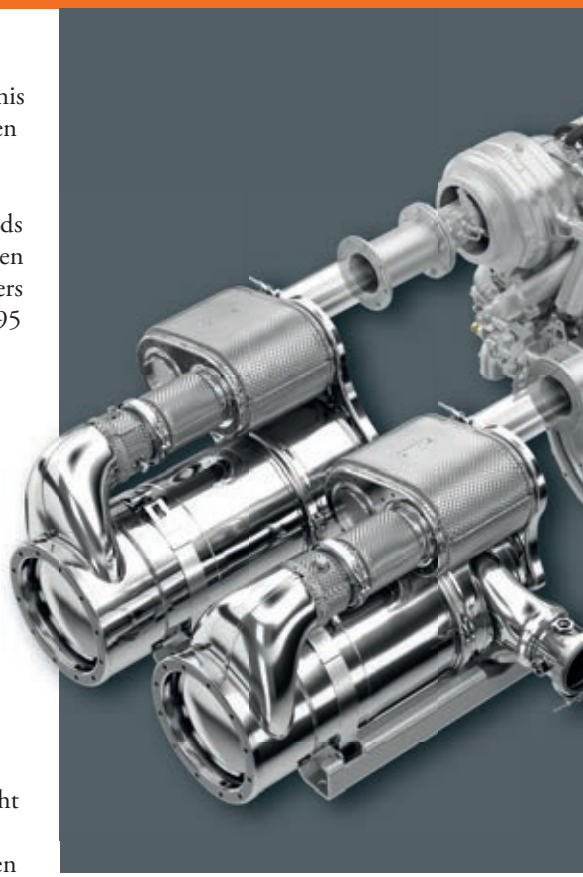
At Bauma 2019, MAN Engines presented the 9 L model D1556 diesel engine for construction machinery. This straight-six power unit delivers between 275 and 434 hp (205 and 324 kW). Its highest power variant achieves a maximum torque of 1970 Nm at speeds between 1150 rpm and 1300 rpm. Even at low speeds, the MAN D1556 delivers high torque. It has a dry weight of 1895 lbs. (860 kg).

Further at Bauma, MAN Engines debuted its new straight-six engine, the D4276, with 142 mm bore and 170 mm stroke. This power unit has been developed specially for applications that demand high power with full power operation at up to 70% of the duty cycle. It delivers its maximum torque of 3280 Nm at speeds as low as 1100 rpm and maintains a constant torque up to 1500 rpm.

The straight-six engine offers also features a notable high power-to-weight ratio. With a dry weight of 2822 lbs. (1280 kg) it delivers an output between 604 and 690 hp (450 and 515 kW) depending on its power stage.

NEW ENGINE RATINGS

The 24 L MAN V12-2000, 12-cylinder marine V-engine is rated 2000 hp.



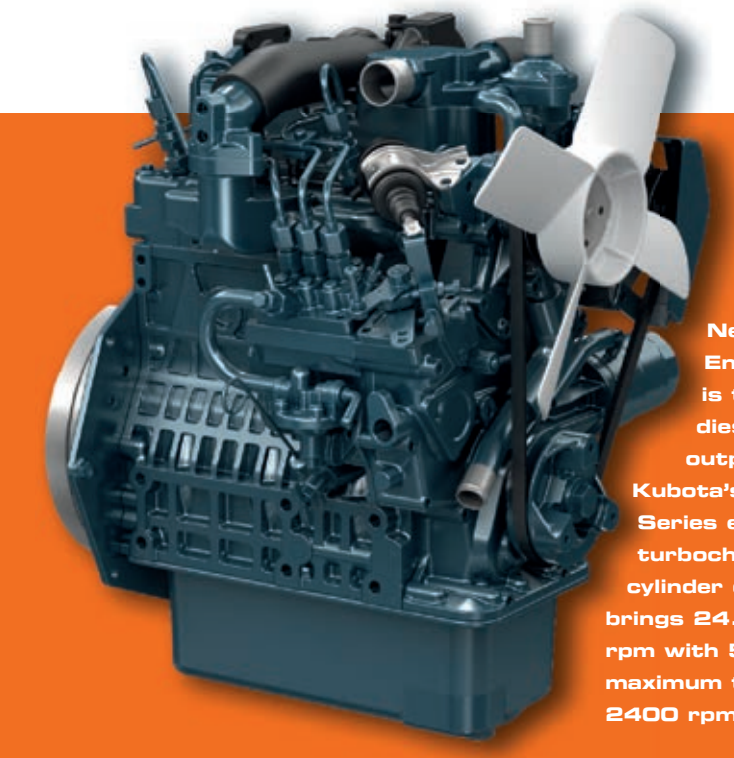
Likewise, the new 16 L V8-1300 diesel for yachts and sport fishing boats puts forth 1300 hp (956 kW).

For the electrical power generation markets MAN Engines released its E3268 gas engine at 320 kWm variant for the first time for 50 Hz operation. The V8 engine is available in a natural gas-optimized variant with a compression ratio of 12:1 and can also be used with biogas with a compression ratio of 13.6:1. Thanks to a cylinder bore of 132 mm and a stroke of 157 mm, the E3268 LE242 offers 17.2 L of cylinder capacity.

For markets with a 60 Hz mains frequency, MAN Engines also offers an operating variant of E3268 LE242 for natural gas with a rated speed of 1800 rpm. This has an output of 340 kWm and achieves a mechanical efficiency rate of 40.3 % and a thermal efficiency rate of 48.2%, or 88.5% in total.

ALTERNATIVES

MAN Engines has supplied its first natural gas engine, the model E3262 LE202 to its Mexican OEM partner



New for Kubota Engine America is the D902-TE4 diesel. The highest output among Kubota's Super Mini Series engines, the turbocharged, three-cylinder diesel engine brings 24.8 hp at 2800 rpm with 53.2 lb.ft. of maximum torque at 2400 rpm.

For the marine market, MAN Engines presented its solution for meeting the IMO Tier III and US EPA Tier 4 emission standards for commercial use on its D2862 diesel with a modular exhaust gas aftertreatment system.

Cysore SA de CV. This fledgling plant engineering company – which operates in the renewable energy industry – commissioned it for the first combined heat and power (CHP) plant to be built completely in Mexico, MAN said.

EMISSIONS TECHNOLOGY

At the WorkBoat show in New Orleans, MAN Engines showed a modular exhaust gas aftertreatment system as its solution for meeting the IMO Tier III and US EPA Tier 4 emission standards for commercial use. The modular EAT makes a range of installation configurations possible as the individual SCR components can be positioned differently.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

MTU

POWER RANGE

Diesel: 100 to 13,410 hp
Gaseous: 40 to 3487 hp

www.mtu-online.com

ENGINE NEWS

Rolls-Royce has introduced a next-generation Series 2000 MTU Onsite Energy diesel generator set product line for the North American market (60 Hz) with a power output range from 615 kWe to 1.250 kWe. The new systems, DS750, DS800, DS1000 and DS1250, offer up to three circuit breakers mounted and wired from the factory, a 74.7 dBA sound level, and a 190-mph wind rating in one package.

Rolls-Royce has also launched a next generation Series 4000 MTU Onsite Energy gas generator set. The Series 4000 L64FNER is designed for a range of applications including in extreme temperatures and air humidity as well

›

as at high altitudes. The natural gas power genset has been optimized for hot and humid environments, offering the power density with a high kilowatt-per-square foot ratio along with fast start capabilities. Rolls-Royce offers 8- to 20-cylinder MTU Series 4000 gas engines with power outputs from 776 to 2.530 kW.

SERVICE, PARTS & REMAN

Within the past year, Rolls-Royce announced its 'Customer Service 4.0' strategy for its Power Systems business unit. With its new Digital Solutions division, ValueCare Agreements and 24-hour support through global Customer Care Centers, Rolls-Royce Power Systems made advancements toward becoming a complete solutions provider over the course of 2018 and early 2019.

New digital tools such as MTU Go! Act and Go! Manage – which allow MTU experts and customers to monitor engines and power systems remotely, schedule maintenance work, and analyze operating data and check availability of parts – were launched in several vessels and power plants.

The company has also opened five new Customer Care Centers around the world, including one in Novi, Mich.

CORPORATE DEVELOPMENTS

In October 2018, MTU's parent company, Rolls-Royce, acquired a stake in Berlin-based energy storage and systems start-up Qinous, adding turnkey microgrids to its portfolio to support independent, cleaner and more reliable energy and to offer systems tailored to customer needs.

Additionally, in April 2019, Rolls-Royce announced a global microgrid technology partnership with ABB for utility, commercial and industrial customers focused on sustainable power options. The partnership integrates digital technology and hybrid power systems by combining MTU Onsite Energy diesel and gas genset system technology with ABB's modular microgrid solution.

MTU adapted its apprenticeship model to its MTU Aiken Plant in South Carolina to address the skills gap, while giving high school students a training system that provides an avenue to obtain work skills. As of December 2018, 21 Aiken-area high school students had graduated from the MTU apprenticeship program.

In other corporate news, MTU celebrated 100 years of apprenticeships in May 2019. This German apprenticeship concept was adapted for the MTU Aiken Plant in South Carolina beginning in Fall 2012 to address the skills gap, bringing a new approach to vocational job training while giving high school students a training system that provides an avenue to obtain work skills sought by employers. As of December 2018, 21 Aiken-area high school students had graduated from the MTU apprenticeship program.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

MITSUBISHI TURBOCHARGER AND ENGINE AMERICA

POWER RANGE

Diesel: 5.4 to 2247 hp
Gaseous: 380 to 2040 hp

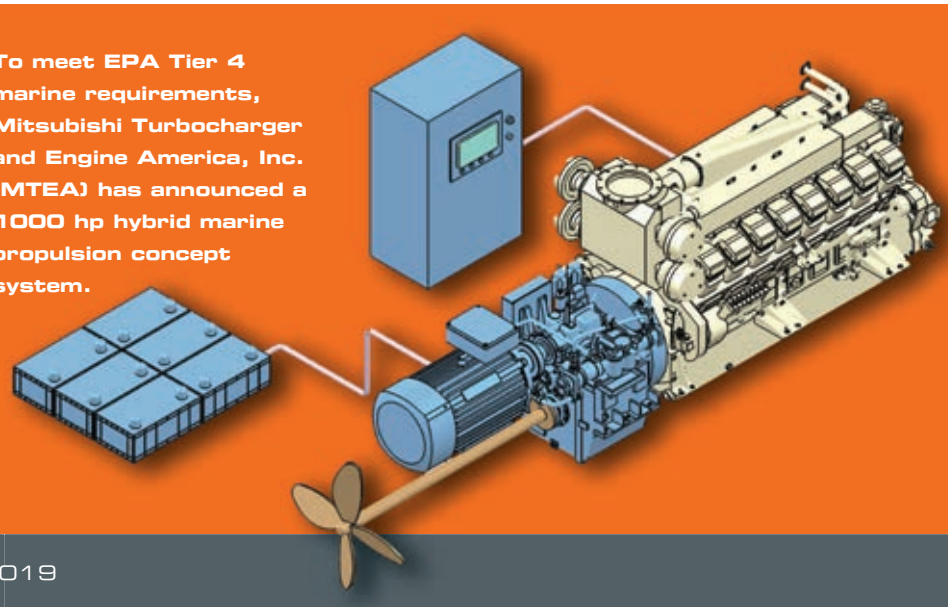
www.mitsubishi-engine.com

ENGINE NEWS

Mitsubishi's diesel L and SL lineup of U.S. Environmental Protection Agency (EPA) Tier 4 engines incorporate an electronic governor and atmospheric pressure sensor.

New products launched as part of the small engine product line include the 0.635 L L2E constant speed rated at 7.1 hp kW at 1800 rpm. The engine meets

To meet EPA Tier 4 marine requirements, Mitsubishi Turbocharger and Engine America, Inc. (MTEA) has announced a 1000 hp hybrid marine propulsion concept system.



Tier 4 final with mechanical governor.

Also being introduced as a new product is the 3.3L D04EG constant speed which is rated at 87 hp at 1800 rpm. This engine meets Tier 3 stationary emergency use with a mechanical governor.

MARINE ENGINES

Mitsubishi will launch new marine engine ratings that will meet International Maritime Organization (IMO) Tier 3 emissions standards.

According to Mitsubishi's schedule, the engine ratings to be launched are:

- S6R-T3 rated 630 hp at 1600 rpm HD
- S12A2-T3 rated 975 hp at 1800 rpm HD
- S12R-T3 rated 1260 hp at 1600 rpm HD

While Mitsubishi opted to keep a mechanical fuel system on the new ratings, the engines will be equipped with a selective catalytic reduction system to meet NOx control requirements.

Mitsubishi has also announced a 1000 hp hybrid concept system that complies with newest EPA emission regulations without aftertreatment system.

The hybrid system is combination of a six-cylinder, four-cycle, water-cooled mechanical diesel engine S6R2-Y3MPTAW (814 hp) and 100 to 630 kW electrical motor. The Mitsubishi S6R2-Y3MPTAW meets Tier 3 EPA certification, is a mechanical engine and because it is below 815 hp (600 kW) is not required to meet Tier 4 requirements and thus needs no aftertreatment.

Total output covers from 937 hp to 168 hp (699 to 1229 kW). The hybrid system is a propulsion-certified unit applicable for heavy-duty workboat applications, said the company, such as with tugboats, cargo ships and offshore vessels.

The hybrid system will be controlled by Mitsubishi's monitor kit, called Smart Cruising Assist. It can monitor engine performance in real time and control the hybrid system mode automatically via a feedback control to itself.

According to the company, the system provides a number of benefits. ›

Maintenance is enhanced as the engine can be operated without aftertreatment system such as SCR.

There are longer overhaul intervals as the operation of the main engines will be supplemented by an electric motor which will extend the engine life and overhaul intervals.

NATURAL GAS ENGINES

Finally. the company has the 450 kWe GS6R2 30L six-cylinder engine which it said has a 42% efficiency level. The engines are tailored for power generation and CHP applications and use lean-burn pre-chamber combustion technology, custom-matched Mitsubishi turbochargers and in-house developed control system.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

NAVISTAR

POWER RANGE

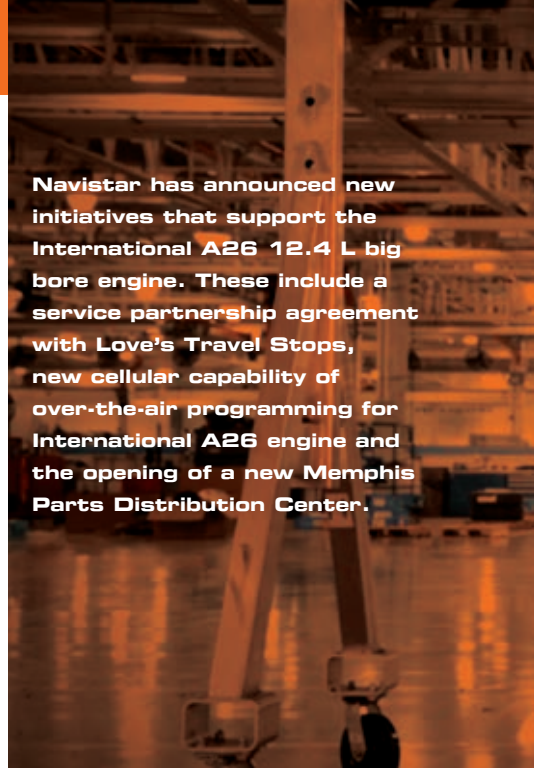
Diesel: 365 to 500 hp

www.internationaltrucks.com/-/media/navistar/trucks/pdf/brochure/a26/a26-specification-sheet.pdf

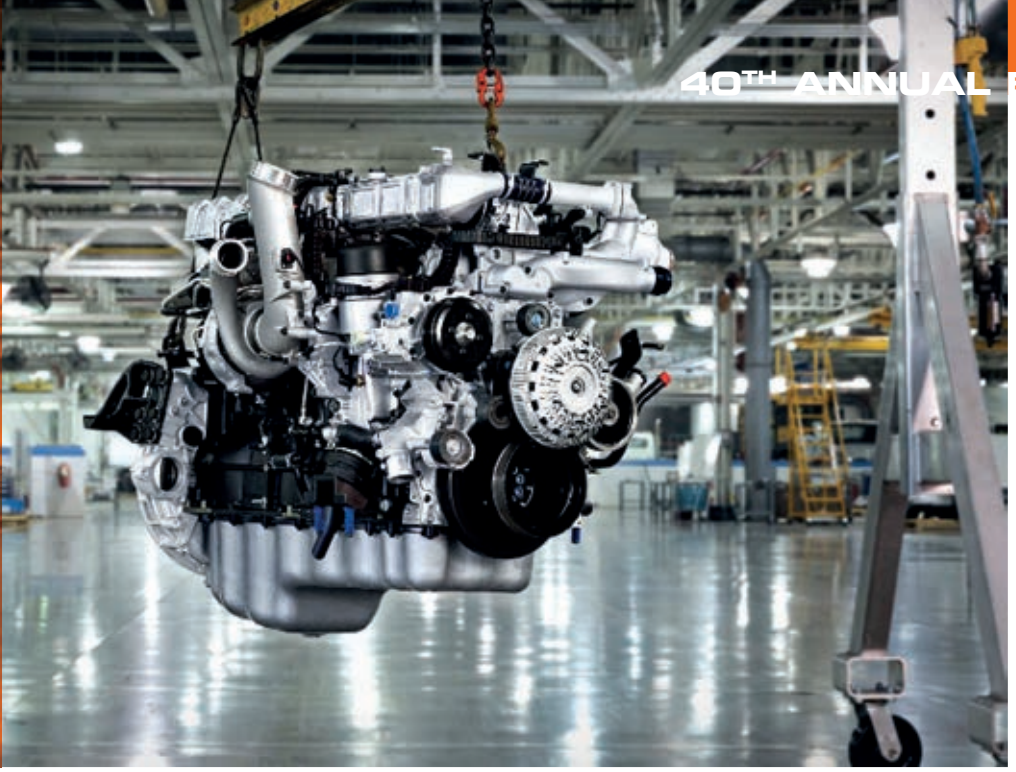
SERVICE, PARTS & REMAN

Navistar announced new initiatives that support the International A26 12.4 L big bore engine and improve customer uptime and total cost of ownership. These include new aerodynamic and powertrain packages in its International LT Series MPG Fuel Efficiency Packages, an established service partnership agreement with Love's Travel Stops, new cellular capability of over-the-air programming for International A26 engine, the opening of a new Memphis Parts Distribution Center, and extension of the International A26 Barrel Protection Program.

International Truck now offers aerodynamic and powertrain packages in its International LT Series MPG Fuel Efficiency Packages. Available for the International A26 and Cummins X15 engines in direct-drive and overdrive



Navistar has announced new initiatives that support the International A26 12.4 L big bore engine. These include a service partnership agreement with Love's Travel Stops, new cellular capability of over-the-air programming for International A26 engine and the opening of a new Memphis Parts Distribution Center.



offerings, the MPG Fuel Efficiency Powertrain Packages combine engine ratings with the Eaton Endurant transmission, predictive cruise control, high efficiency rear axles, and rear axle ratios as low as 2.15 for optimal fuel economy.

Navistar recently signed a service partnership agreement with Love's Travel Stops that added more than 315 Love's Truck Tire Care and Speedco locations and more than 1000 technicians to Navistar's International service network. The exclusive partnership, which will be fully operational in the second half of 2019, authorizes most Love's and Speedco service locations to perform warranty work with service repair times of three hours or less for all International Class 6 through 8 trucks.

The partnership between Navistar and Love's creates one of the commercial transportation industry's largest service network, bringing the International service network to more than 1000 locations in North America, in many cases with more convenient locations and hours of service for customers throughout the United States.

All International LT Series and RH Series models equipped with an International A26 engine built after June will include the capability to make remote cellular over-the-air updates to authorized engine calibrations and programmable

parameters. Remote engine calibration using cellular will allow customers to keep their engines operating with peak performance and fuel efficiency without returning to home base or stopping at a dealer location for an update. Additionally, remote programming of fleets' engine parameters enables customer to control factors that deliver performance, safety and efficiency.

The new Memphis Parts Distribution Center (PDC) will open in late 2019. The new PDC will be the company's seventh in the United States and its tenth in North America. Its location in Memphis will enable Navistar to deliver parts the next day to over 95% of its dealers' service locations.

The International A26 Barrel Protection Program covers barrel damage for any customer that experiences an A26 warrantable failure resulting in barrel damage for the truck's first four years in service. This coverage is provided at no additional cost to provide customer assurance for concrete mixer trucks powered by the A26 engine and has been extended for another year. Since beginning to offer this program in 2018, not a single claim has been filed, Navistar said.

ORIGIN ENGINES

POWER RANGE

Gaseous: 35 to 300 hp
Gasoline: 75 to 175 hp

www.OriginEngines.com

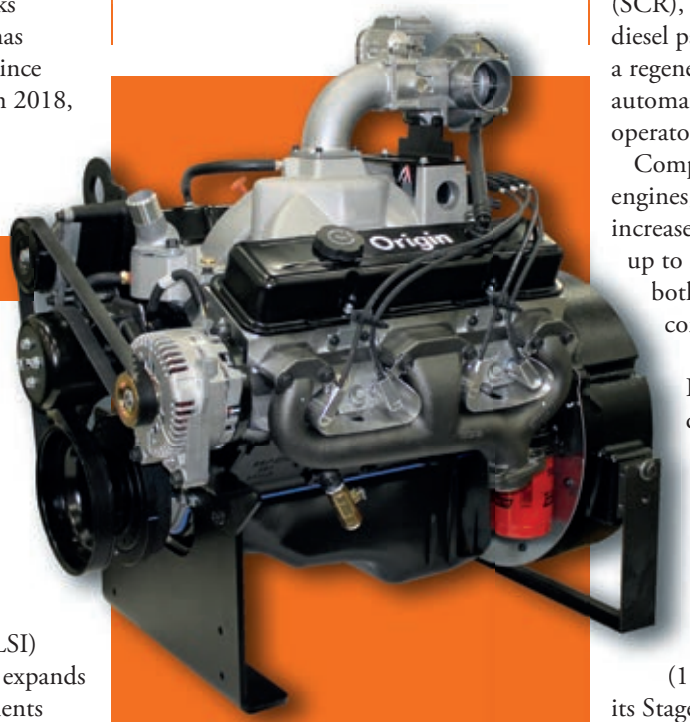
NEW ENGINES

Origin Engines has released a 4.3 L V-6 to its current product portfolio of large spark-ignited (LSI) industrial engines. This addition expands its portfolio to include displacements of 4.3, 5.7, 6.2, 8.0, 9.1 and 10.3 L. These models are available in naturally aspirated or turbocharged configurations for prime power and standby applications.

Origin Engines are manufactured in the U.S. and engineered specifically for industrial use. The company said its products are used in a range of applications which include prime and standby power generation, oil and gas production equipment, agricultural pumps and industrial power units. The company said it will enter the mobile industrial market soon.

Origin Engines is the manufacturer of record for emissions certifications for its entire range of engines. The engines have several U.S. Environmental Protection Agency certifications that permit the use of multiple fuels, including wellhead gas, pipeline natural gas, propane and gasoline for non-road stationary applications, fixed-speed mobile power units; as well as prime and emergency or standby power generation.

The company is also capable of customized engine design for distributors and OEMs seeking to develop engine packages optimized for specific uses and requirements.



Origin Engines' 6.2 L engine is designed to fit in the same footprint but provide more horsepower. It's rated 195 hp at 2800 rpm on propane.

CORPORATE NEWS

Origin Engines has announced a partnership with E-Controls Inc., a leader in the design, engineering and manufacturing of complete engine control and fuel delivery solutions for spark ignited engines.

PERKINS

POWER RANGE

Diesel: 5 to 2682 hp
Gaseous: 411 to 1341 hp

www.perkins.com

ENGINE NEWS

Perkins said it now offers 14 different engine platforms from 0.5 to 18 L that deliver power from 11 to 630 hp (8.2 to 470 kW) and meets U.S. EPA Tier 4 final and EU Stage 5 emissions standards. Perkins emission control technologies include common rail fuel systems, selective catalytic reduction (SCR), diesel oxidation catalysts and diesel particulate filters that feature a regeneration process that runs automatically without machine or operator interruption.

Compared to previous generation engines, the lineup offers power density increases up to 28%, torque increases up to 29% and improvements in both fuel and diesel exhaust fluid consumption.

New to the line is the 12.5 L Perkins 2406J-E13TA that delivers 577 hp (430 kW) and 2634 Nm (1943 lb. ft.) torque allowing OEMs to downsize engine platforms without sacrificing machine performance, Perkins said. Also new is the 4.4 L Perkins 1204J-E44TTA which delivers up to 201 hp (150 kW), a full 15% more than its Stage 4 predecessor while achieving a 5% reduction in fuel consumption. The 1204J-E44TTA uses an aftertreatment package that is the same size as its predecessor and a cooling package that is smaller.

Also, three new engines were

New to the Perkins line is the 12.5 liter model 2406J-E13TA that delivers 577 hp (430 kW) and 2634 Nm (1943 lb. ft.) torque.

introduced for the electric power industry; the 7 L model 1206, the 9.3 L model 1706 and 18 L model 2806. All meet Stage 5 emission standards and the core engines can be configured to meet requirements in lesser regulated areas offering flexibility for users in the rental and stand-by markets.

HYBRIDS

Following an investment in hybrid engines and electrification research, Perkins has shown a range of hybrid-electric, hybrid-mechanical and hybrid-hydraulic power technologies as OEMs design the next generation of off-highway machines. The technologies are available across the power range from 0.5 to 18 L.

SERVICE, PARTS & REMAN

The Perkins My Engine App that works with the Edison Award-winning Perkins SmartCap, has been upgraded to include a direct link to the Perkins on-line shop in the U.S. and U.K. allowing users to access parts directly from a smartphone. The app allows users to set their own service intervals and can give up to five different team members direct access to the same engine's data. It is available in English, German, French, Italian, Spanish, Portuguese, Turkish and Chinese.

Perkins announced plans to open a Regional Logistics Center (RLC) in Curitiba, Brazil, to serve South and Central American customers. The RLC opens in 2019 and will stock thousands of commonly-used parts which are available for rapid delivery to Perkins distributors and dealers within the coverage area. ›

POWER SOLUTIONS INTERNATIONAL

POWER RANGE

Diesel: 830 to 2480 hp
Gasoline: 20 to 500 hp
Gaseous: 10 to 2000 hp

www.psiengines.com

NEW ENGINES

The U.S. Environmental Protection Agency (EPA) certified PSI's new 40 L spark-ignited stationary engine in October 2018. The certification covers both stationary and mobile, non-road emission regulations for constant speed operation on both commercial pipeline-quality natural gas (CNG/LNG) and propane (LPG).

The 40 L engine has a range of 600 kWe to 800 kWe and is now ready for production, said the company. The engine is part of PSI's expanded natural gas product line, which ranges from 2.4 to 65 L of displacement and 25 kWe to 1.5 MW. The new engine is the product of a strategic investment and collaboration agreement between PSI and Weichai Power Co. Ltd.

Like all of PSI's power generation products, the 40 L engine is fitted with the company's fuel and emission control systems, which are designed to provide application-specific performance.

PSI's systems are used globally in stationary and mobile power generation applications supporting standby, prime, distributed generation, demand response and co-generation power (CHP). The 40 L engine is largely designed for energy market applications including power generation, oil and gas exploration and other industrial sectors.

CORPORATE NEWS

PSI designs, engineers and manufactures emissions-certified, alternative-fuel power systems. It provides integrated turnkey solutions to global original equipment manufacturers in the industrial and on-road markets.

SCANIA USA

POWER RANGE

Diesel: 275 to 770 hp (industrial)
Diesel: 220 to 1150 hp (marine)

www.scaniausa.com/industrial;
www.scaniausa.com/marine

ENGINE NEWS

Scania's solution to meet Tier 4 final emission requirements uses a SCR system with a low mixture and cooled exhaust gas recirculation (EGR). Scania redesigned the combustion chamber to improve engine efficiency and reduce harmful emissions. The company uses the same aftertreatment strategy for industrial, variable-speed engines as well as its new power generation, single-speed engines for prime power applications.

When developing the technical solution for European Union Stage 5 emissions standards for non-road engines, Scania said it focused on thermal management, which involves maintaining the optimum temperature in the exhaust gas aftertreatment system, and transient response, which is about how efficiently the engine builds torque.

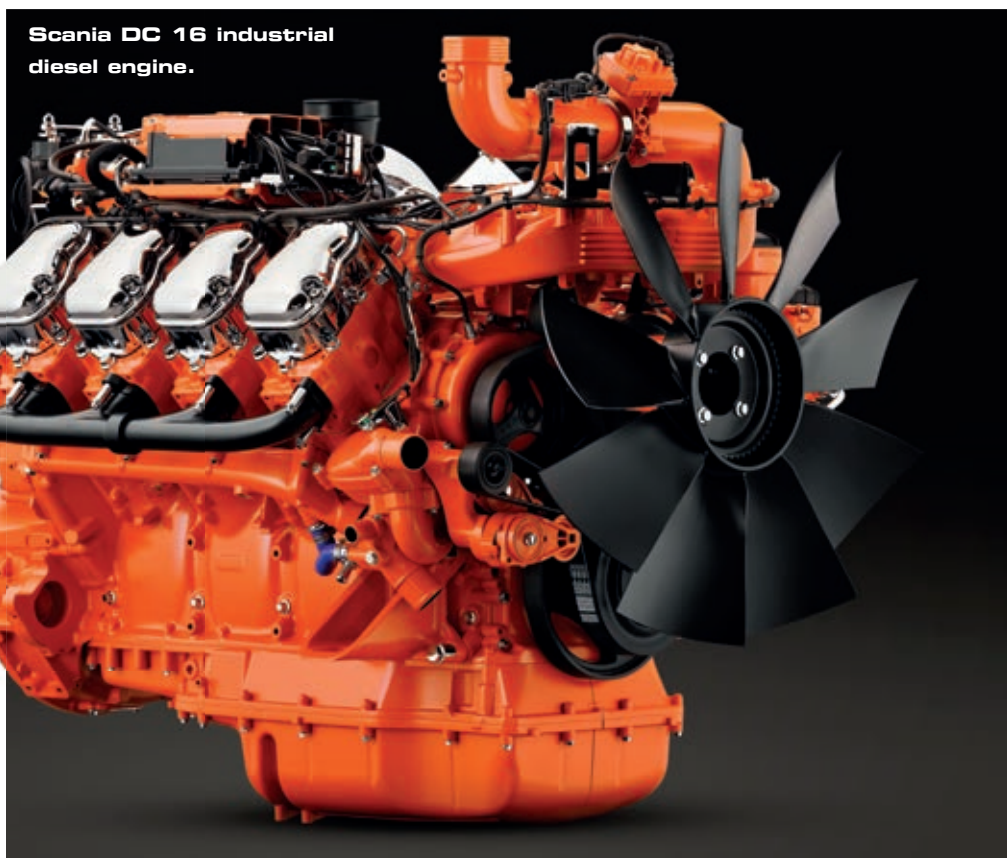
Scania said it has refined components used since 2011 and designed a distributed system to make the platform fit a wider range of applications. Its Stage 5 compliant industrial engines span from the 9 L, five-cylinder, and 13 L, six-cylinder inline engines to the 16 L V8.

DISTRIBUTION NEWS

Effective January 1, 2019, Mack Boring & Parts Co. was assigned additional territory in the United States, to include Florida and Georgia.

The company was already a Scania marine distributor for the Northeast. Mack Boring & Parts is also a distributor for Scania industrial engines and distributes them in the Northeast.

This year, Loftin Equipment has extended its Scania industrial engine territory in the southeast to include Louisiana, Mississippi and Arkansas.



Scania DC 16 industrial diesel engine.

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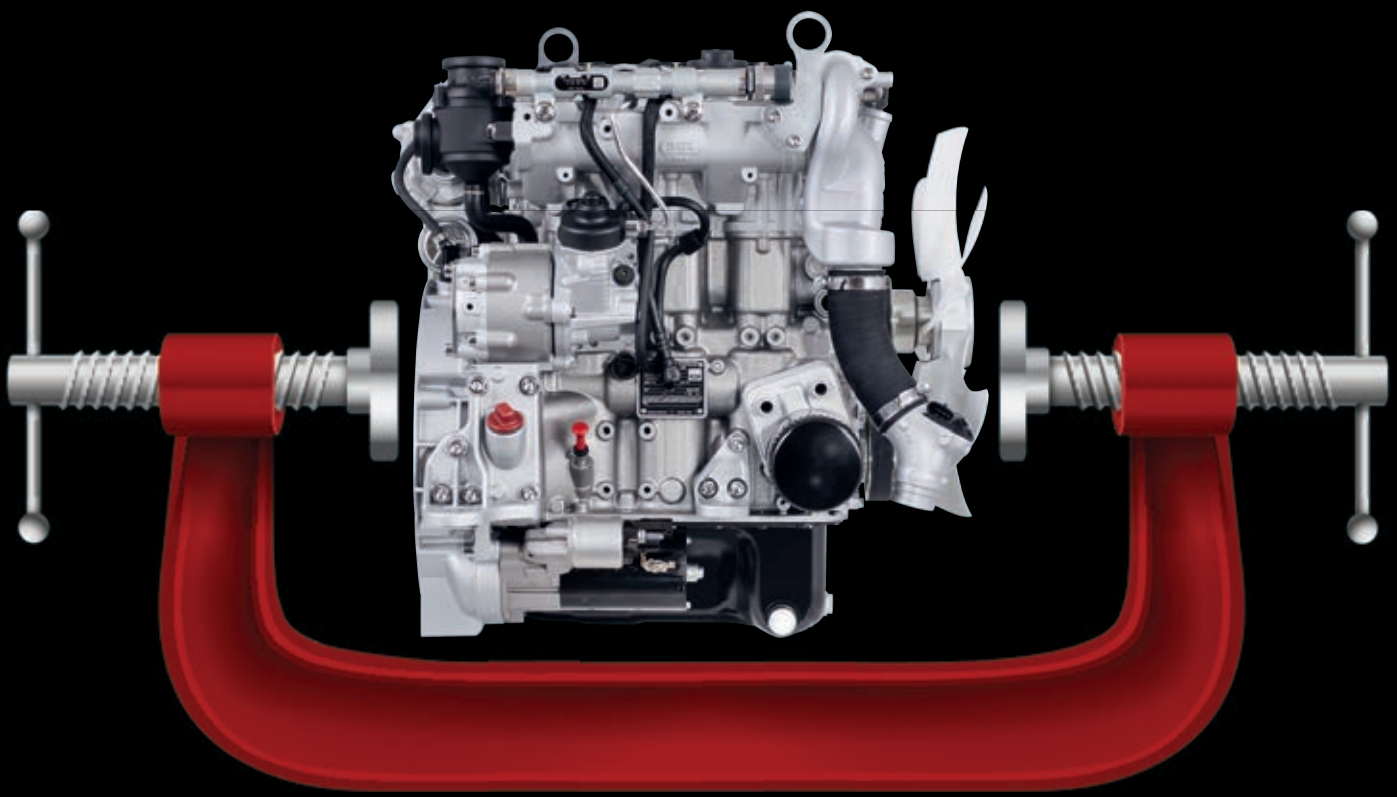

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HatzNorthAmerica.com

HATZ DIESEL

Loftin Equipment currently represents Scania's Tier 4 final industrial engine platform – the 9, 13 and 16 L diesel engines used for various applications including stationary, construction, agriculture and material handling. These engines, rated 275 to 770 hp, are currently being distributed by Loftin in Arizona, Nevada, Utah, New Mexico, Oklahoma and Texas.

In addition, Cascade Engines Center LLC has extended its marine Scania territory in the Gulf Coast and the Inland Waterways Region. Cascade Engines Center currently represents Scania's latest marine platform: 13 and 16 L engines for auxiliary and propulsion applications; and currently distributes them in Hawaii, Montana, Idaho, Oregon, Washington, Alaska and western Canada.

In addition, Cascade Engines will represent Alabama, Arkansas, Kentucky, Louisiana, Mississippi, Missouri, Tennessee, Texas, West Virginia and the southern parts of Ohio, Indiana and Illinois.

The company is also a distributor for Scania industrial engines throughout western Canada, Washington, Oregon, Idaho, Montana, California and Hawaii.

VOLVO PENTA OF THE AMERICAS

POWER RANGE

Diesel: 143 to 690 hp (industrial)
Diesel: 13 to 1000 hp (marine)
Gasoline: 200 to 430 hp

www.volvopenta.com/volvopenta/na

CORPORATE NEWS

Volvo Penta of the Americas, based in Chesapeake, Va., said it has seen significant growth across all business segments during the past 12 months. The company received its 16th consecutive Customer Satisfaction Index award for its gas sterndrive products, and a product innovation award from the National Marine Manufacturers Association (NMMA) at the Miami International Boat Show. In January the company achieved national certification as a Great Place to Work based on a survey of employees.

CORPORATE NEWS

Volvo Penta said its industrial engine segment continued to grow at double-digit rates annually. The company has expanded its network of distributors, dealers and original equipment manufacturers (OEMs) across multiple industries, and has instituted new programs for customer support, service and training. Significant market segments include emergency and mobile generators, construction equipment and mining machines, materials handling equipment, cargo-handling, cranes, forklifts, snow-removal equipment, pumps and firefighting vehicles. As an example, Volvo Penta customer Gillette Generators supplied a large order of standby power units to the Suffolk County Water Authority on Long Island for its well pumping stations.

Volvo Penta's new industrial engine final assembly facility in Lexington, Tenn., is now fully operational. The industrial assembly line, which includes a diesel engine test cell for on-site testing and certification, has dramatically shortened lead times for the company's finished industrial diesels in North America.

Volvo Penta has received numerous orders for its IPS drives for high-speed patrol craft, pilot boats, water taxis and other commercial craft. Last summer a new 55 ft. seagoing pilot launch was delivered to the Virginia Pilots Association. The vessel is powered by

Volvo Penta's Tier 4 final range of diesel engines.

twin 13 L, 900 hp EPA Tier 3 engines with IPS3 drive systems and Volvo Penta EVC electronic steering and joystick controls. Other recent IPS installations have included a new research vessel built by Armstrong Marine for the Scripps Institution and a 75 ft. crew boat built by Moose Boats. In addition, Volvo Penta is supplying IMO III D13 gen-sets and auxiliary engines for pumping systems for fuel barges.

Volvo Penta recently won a major U.S. government procurement program to supply the engines, drives and controls for a minimum of 46 new U.S. Coast Guard Cutter Boat Large rigid-hull inflatable boats to be constructed by Metal Craft Marine. They will be powered by Volvo Penta 3 L 220 hp Aquamatic sterndrive systems.

The repower business is steadily growing, said Volvo Penta, with large numbers of retrofits completed this year on commercial fishing boats, passenger vessels and workboats, especially in Canada, New England, the Gulf of Mexico and the Pacific Coast.

In the recreational boating market, Volvo Penta is integrating propulsion and control systems into a helm-to-prop solution built on Volvo Penta's Electronic Vessel Control (EVC) CANbus data platform, that has included a demonstration of a hands-free self-docking boat.

Other product innovations introduced during the past year included a new water sports control for OEMs, an automotive-style belt-driven air conditioning system for open-cockpit boats developed jointly with Webasto, Active Ride Control computerized stabilization system, Active Corrosion Protection to forestall galvanic corrosion on sterndrives and automatic dynamic positioning repositioning.

At the Miami International Boat Show in February, Volvo Penta and its subsidiary Seven Marine unveiled the new Integrated Outboard Experience, which made its debut on a Tiara Sport 38LS integrating Volvo Penta's EVC and Seven Marine's high-performance outboards.

ELECTRIFICATION

Volvo Penta last year issued a statement of intent to provide electrified power solutions for its industrial and marine segments by 2021. These will include both all-electric and hybrid systems.

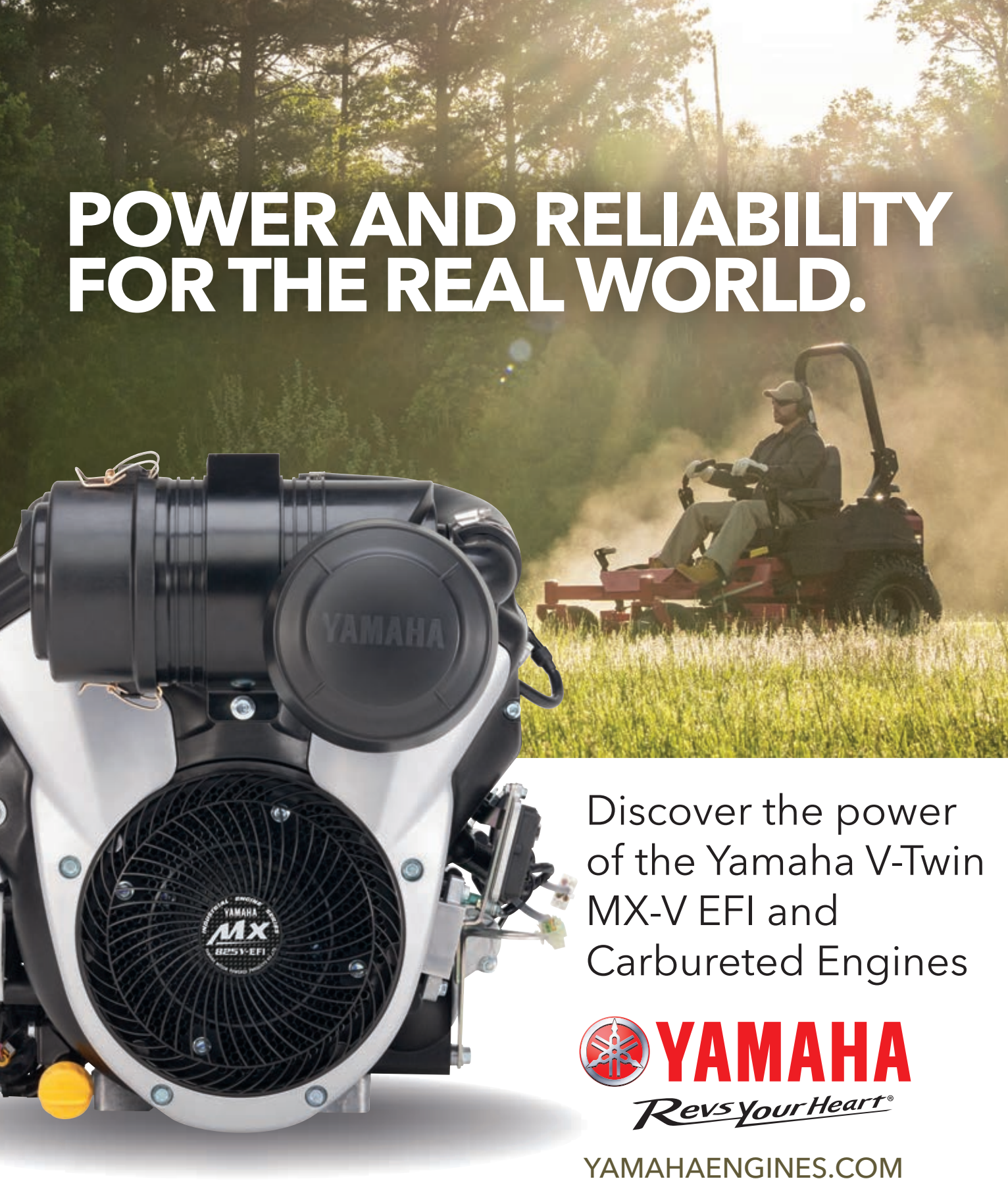
Volvo Penta's efforts are underpinned by the hybrid and all-electric technology by its sister companies within the Volvo Group, which include Volvo Trucks, Volvo Buses and Volvo Construction Equipment, all of which have extensive electrification R&D experience and expertise. As part of this increased commitment, Volvo Penta has established an electromobility development and test laboratory at its Swedish headquarters, and is field-testing early prototypes, and system validation is under way.

SERVICE, PARTS & REMAN

Volvo Penta continues to beef up its training programs for technicians with courses held in the company's main training center in Chesapeake and in remote locations across the continent. In 2018, Volvo Penta said it set a new record with a total of more than 1500 technicians completing training, compared to 1130 the previous year.

The company has also formalized and expanded its Train the Trainers program under which key partners can have a key technician go through a rigorous program to become an external certified Volvo Penta trainer, who can instruct their own technicians with standard Volvo Penta curriculum and course requirements.

POWER AND RELIABILITY FOR THE REAL WORLD.



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VOLVO TRUCKS NORTH AMERICA

POWER RANGE

Diesel: 325 to 500 hp
Gaseous: 350 to 400 hp

www.volvotrucks.us

ELECTRIFICATION

Volvo Trucks announced that it will introduce the all-electric Volvo VNR regional-haul demonstrator trucks in California, operating in distribution, regional-haul and drayage operations. Sales of the VNR Electric in North America will begin in 2020.

The Volvo VNR Electric will be based on the fully-electric powertrain technology currently being used in the Volvo FE Electric, which Volvo Trucks began selling in Europe in 2019.

Volvo VNR Electric models are part of partnership, known as LIGHTS (Low Impact Green Heavy Transport Solutions) between the Volvo Group, California's South Coast Air Quality Management District (SCAQMD), and leaders in transportation and electrical charging infrastructure. CARB has preliminarily awarded $44.8 million to SCAQMD for the Volvo LIGHTS project.

The Volvo LIGHTS project will involve 16 partners and will transform freight operations at the facilities of two of the United States' top trucking fleets. Volvo LIGHTS is part of California Climate Investments, a statewide initiative that puts of cap-and-trade dollars to work reducing greenhouse gas emissions.

SERVICE, PARTS & REMAN

Volvo Trucks North America has expanded its focus on training skilled professional vehicle service technicians through expansion of the Diesel Advanced Technology Education (DATE) program. In a program that began earlier this year, Volvo will partner with three colleges in Florida, Ohio and Texas.

The DATE for Volvo Trucks curriculum will be taught by dedicated Volvo-certified instructors at Jones Technical Institute in Jacksonville, Fla.; the University of Northwestern Ohio, Lima, Ohio; and Western Technical College, El Paso, Texas. DATE program graduates will receive an associate degree in diesel mechanics and a certification from the DATE program. The 500-hour DATE program will train students to work on Volvo trucks, including electrical and electronic systems, software and engine diagnosis and repair, chassis components, and Volvo powertrains.

WEICHAI AMERICA

POWER RANGE

Gaseous: 30 to 1710 hp

www.Weichaiamerica.com

CORPORATE NEWS

Weichai America recently completed the acquisition of 51% ownership of Power Solutions International (PSI).

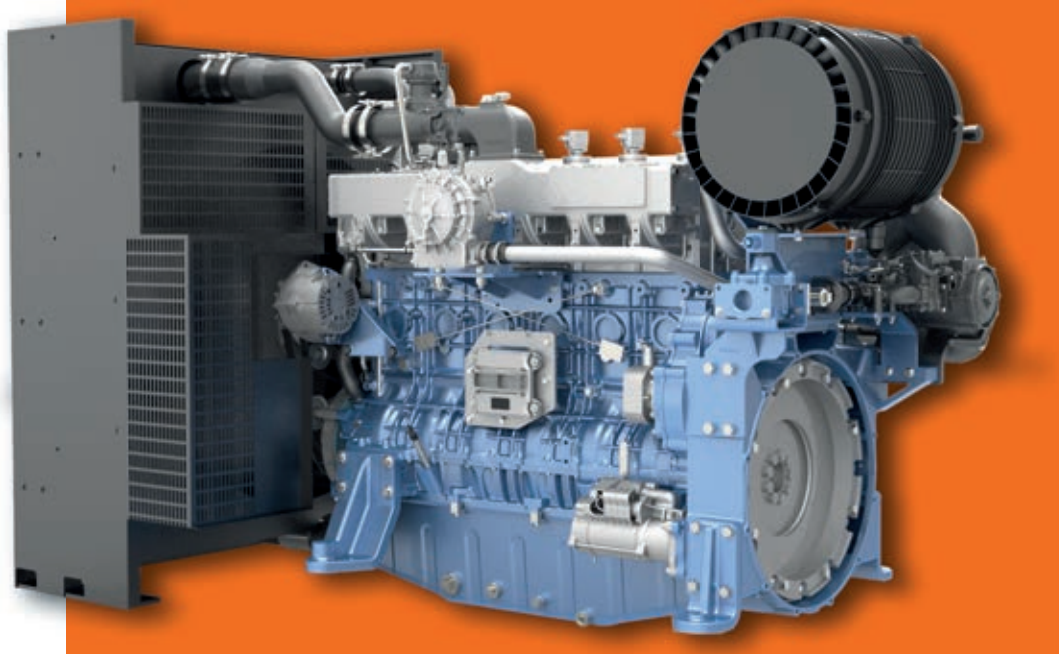
The company is part of Weichai Power and Weichai Group., which produces more than 700,000 heavy-duty engines annually and has more than 4 million engines operating globally. Weichai produces engines ranging from 2.1 to 580 L for global markets and currently produces EPA certified natural gas engines ranging from 4.5 to 53 L for North American markets.

NEW ENGINES

Weichai launched eight U.S. Environmental Protection Agency-certified engine models into the North American market: the 4.5 L naturally aspirated rated 73 hp at 1800 rpm, 6.7 L naturally aspirated rated 110 hp/turbocharged rated 201 hp, 10 L naturally aspirated rated 160 hp/turbocharged rated 316 hp, and 13 L turbocharged engine rated 402 hp at 1800 rpm. The new 32 L turbocharged rated 966 hp and 40 L turbocharged engine rated 1200 hp are certified by PSI. Each model has been developed specifically for natural gas, LPG, and wellhead fuels.

For 2019, Weichai America said it will continue to launch EPA certified natural gas engines. To be introduced are 17 L turbocharged, 20 L turbocharged, 53 L turbocharged natural gas engines along with new variants of existing models. The 53 L engine will be certified by PSI.

The 13 L gaseous-fueled engine from Weichai America.



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VORTICAL AIR FILTRATION

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ENGINES
THE TRUSTED ONE

Weichai America has modified its engines to fit the needs of the North American markets, adding local engine controls, fuel systems, ignition systems, air systems and more.

The company said it has already sold natural gas engines into the North American markets, with sales and development programs including in targeted markets such as power gen, oil and gas production, gas compression, agricultural and combined heat and power (CHP).

Based in Rolling Meadows, Ill., Weichai America said it is heavily invested to provide products and solutions to the North American markets. This includes the company's majority ownership of PSI; an R&D center acquisition and other strategic relationships; local assembly, manufacturing, sourcing, and product development.

YAMAHA MOTOR CORP. USA

POWER PRODUCTS DIVISION

POWER RANGE

Gasoline: 3.5 to 33 hp

www.yamahaengines.com

NEW ENGINES

Yamaha Motor Corp. USA said that its Power Products Division, based in Kennesaw Ga., has experienced growth with renewed focus on the multi-purpose engines category for the commercial landscape industry. Yamaha said it continues growing the commercial mower business by adding OEMs with the MXV Series engines and other new customers are installing Yamaha's line-up with the MZ, MX, MA Series single-cylinder engines and EH V-Twin Series engines.

The EH series engines will be shown in the 2019 GIE show, as production has begun at Yamaha's Kakegawa Factory in Japan. Under the Yamaha brand name, the EH engines will range in horsepower from 20 to 23 hp. This offering will complement the current engine Series: MA Engines (4.5 to 5 hp), MX/MZ Engines (4.8 hp to 12.8 hp) and MXV Series Engines (26 to 33 hp).

As Yamaha's flagship engine range, the MXV series engines (EFI and carbureted) deliver power ranging from SAE J1995, certified to SAE 2723, 26 to 33 certified gross hp. The 824cc V-Twin continues to utilize three-valve hemispherical heads and a low-friction, ground-up design, Yamaha said.

SERVICE, PARTS & REMAN

Yamaha Power Products Division also continues to strengthen its support

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network, expanding the distributor count to seven, to better serve the lawn and garden markets. Engine distributors are also supporting Yamaha's Outdoor Power Equipment, including conventional and inverter generators, water pumps, pressure washers and submersible pumps.

In addition to this expanded network, Yamaha continues to support Subaru Products through the IPA (Industrial Power Products of America) group and offers servicing dealers for Yamaha Power Equipment through Yamaha Motorsports and Marine channels.

Yamaha engines come standard with a three-year limited warranty.

YANMAR AMERICA CORP.

POWER RANGE

Diesel: 3.5 to 208 hp

www.yanmar.com/us/products/industrial-engines/

ENGINE NEWS

Yanmar launched two new engines at the recent Bauma show in Germany, extending its current power range up to 208 hp. The smaller engine family is a 3.8 L displacement engine, the model 4TN101, covering the 75 to 140 hp power range with torque up to 405 ft. lbs.

The larger family, the 4TN107, has a 4.6 L displacement with power ratings ranging from 120 to 208 hp and torque exceeding 593 ft. lbs. Both engines feature a common rail injection system, full authority electronics and aftercooled turbocharging (with a two-stage turbo on the 4TN107 upper ratings).

Both engine families will be EU Stage 5 certified.

In addition to larger engines, Yanmar launched the new 3TNV80FT with a torque rise of 62 ft. lbs. at 1800 rpm, turbocharged altitude performance and no aftertreatment. The engine is electronically controlled and Tier 4 final and EU Stage 5 certified.

Yanmar Co. Ltd. has released a list of diesel engines manufactured by the company that are certified for compliance with the European Stage V (EU Stage V) off-road emission standards set to come into effect from 2019. Yanmar has acquired certification not only for the stricter NOx*1 and PM/PN*2 standards imposed on the 19 kW and over range, but also for the newly imposed emissions standards for the under 19 kW range.

Yanmar America Corp. currently offers 10 power pack models and is working to grow this number for 2020. Yanmar power packs are built with mounts, radiator, air cleaner, harness, and control panel.

SERVICE, PARTS & REMAN

Yanmar America Corp. also offers reman engines in three options: HBC, ¾ complete and replacement engine options.

More information on these engines can be found in the 2019-2020 Power Sourcing Guide at www.powersourcingguide.com

Yanmar introduced two new diesels, the 4TN88G and the 4TN98G (pictured).

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USA HEAD OFFICE
KHL Group Americas LLC
3726 East Ember Glow Way,
Phoenix, AZ 85050, USA
Tel: +1 480 659 0578

USA CHICAGO OFFICE
KHL Group Americas LLC
205 W. Randolph Street,
Suite 1320,
Chicago, IL 60606, USA
Tel: +1 312 496 3314

USA WAUKESHA OFFICE
20855 Watertown Road,
Suite 220,
Waukesha, WI 53186-1873, USA
Tel: +1 262 754 4100

CHINA OFFICE
KHL Group China
Room 769, Poly Plaza, No.14, South Dong
Zhi Men Street, Dong Cheng District,
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Tel: +86 (0)10 6553 6676

SOUTH AMERICA OFFICE
KHL Group Américas LLC
Av. Manquehue 151, of 1108,
Las Condes, Santiago, Chile
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GERMANY OFFICE
KHL Group, Niemöllerstr. 9
73760 Ostfildern (Stuttgart), Germany.
Tel: +49 (0)711 3416 7471