Doosan has selected a Scania DC13 diesel engine rated 373 hp for its crawler excavators, including this DX490LC-5.

MANY MODELS, ONE ENGINE BRAND

New Doosan excavators, wheel loaders and ADTs all meet Tier 4 final with Scania

BY CHAD ELMORE

Doosan Infracore Construction Equipment America has introduced several new crawler excavators, wheel loaders and articulated dump trucks that meet Tier 4 final emissions regulations. The machines are all powered by Scania diesel engines.

"We started using Scania engines with Tier 4 interim on our larger wheel loaders as well as the articulated dump trucks," said Shane Reardon, product specialist, Doosan Infracore, West Fargo, N.D. "We have had a good relationship with Scania so it made sense to use them on the excavators, too. Whenever you can use a lot of commonality, it makes things easier for everybody."

The new Tier 4 final excavators are the DX420LC-5, DX490LC-5 and DX530LC-5. They meet the latest emissions regulations using a Scania DC13 high-pressure common rail (HPCR) diesel engine with cooled exhaust gas recirculation (EGR). A diesel oxidation catalyst (DOC) reduces particulate matter (PM) while selective catalytic reduction (SCR) reduces nitrogen oxides (NO_x). The DX420LC-5 crawler excavator is rated 338 hp while the DX490LC-5 and DX530LC-5 are both rated 373 hp.

"We didn't need to make a lot of changes to fit the new engines," Reardon said. "The rear hood is taller, but the structure of the machine stayed the same as we had for Tier 4 interim. We split our cooler group so we could keep the profile lower for better visibility out of the rear."

Doosan also added a mass airflow sensor and exhaust brake. "The mass airflow sensor reads the amount of airflow coming in and relays that information back to the engine control unit (ECU). It matches the amount of fuel that gets injected with the right amount of airflow," Reardon said. "That gives it a cleaner burn, resulting in reduced particulate matter and oxides."

The exhaust brake helps maintain consistent engine temperatures at lower speeds to improve efficiency, Doosan said, as consistent engine temperatures reduce emission levels when the engine is running at a lower rpm. Under normal operation, the exhaust brake is inactive. This also generates higher torque levels and faster engine response even at low rpm, the company said, while saving fuel.

Inside the cab, a 7 in. LCD display helps operators monitor machine data while viewing the rearview and

sideview camera images. Additions to the monitor include a diesel exhaust fluid (DEF) gauge.

An auto-shutdown function helps owners save fuel during nonworking conditions. Operators can configure the idle time from three to 60 minutes. This is particularly helpful in California, where state regulations limit idling to five minutes, the company said.

The excavators are equipped with selectable Smart Power Control (SPC), which is two systems — Variable Speed Control and Pump Torque Control — that work together to improve machine efficiency. The ECU automatically manages SPC when it is turned on by the operator.

The new Tier 4 final Doosan DL350-5 uses a Scania DC9 diesel engine rated 271 hp.

Variable Speed Control reduces engine rpm during low workload requirements, such as the swing portion of a dig cycle. This reduces the total energy required to perform a task and improves fuel efficiency by up to 5%, Doosan said, while Pump Torque Control matches hydraulic pump torque and engine response to the task, preventing engine overload and excess fuel consumption.

"SPC can be turned on and off within the cab," Reardon said. "We recommend that operators leave it on. Tests have shown production is the same whether it's on or off, but the fuel savings averages 3 to 7%. Some operators prefer to run the machine at full power all the time, and they can shut it off."

Doosan's first Tier 4 final-compliant wheel loaders, the DL300-5 and DL350-5, use Scania DC9 engines, while the DL420-5, DL450-5 and DL550-5 use Scania DC13 engines. Each has the same aftertreatment as the excavators, including the mass

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airflow sensor and exhaust brake. The wheel loaders have a power range from 271 hp in the DL300-5 to 380 hp in the DL550-5.

Cab enhancements include an improved adjustable steering column to provide more legroom, ease of operation and more floor space, the company said. A new fuel consumption gauge shows operators how much fuel the machine is using in real time. Updates to the dashboard keypad make it easier for operators to review and adjust settings as well as clean and maintain it.

All five new Doosan wheel loaders have an auto-shutdown system to help reduce fuel consumption when the machine is sitting idle, as well.

Serviceability has been improved with an air cleaner that has longer replacement intervals. Oil sampling ports improve predictive maintenance procedures, and various fluid pressures are now viewable on the dash panel. An auto-greasing system, available as a factory-installed option, replaces manual greasing and helps extend component life.

For applications such as mining, Doosan offers a high-lift configuration for all five new wheel loaders, providing additional dump height.

The DL300-5 through DL550-5 wheel loaders have three selectable work modes — economy, standard and power — to balance fuel consumption and power with working conditions.

Doosan has also introduced two new articulated dump trucks (ADTs) in the 28 and 40 metric ton weight class, which continue their use of Scania engines into Tier 4 final. The drivetrain has also been updated.

The 362 hp DA30-5 and 483 hp DA40-5 ADTs are powered by Scania DC9 and DC13 diesel engines, respectively. The engines use EGR, SCR and a DOC to meet the latest emissions regulations. The trucks also get a mass airflow sensor, and an existing exhaust brake is now used to further reduce emissions by keeping exhaust temperatures up, in addition to slowing the engine.

The new Doosan DA40-5 ADT uses an inline six-cylinder Scania DC13 diesel engine that drives an updated drivetrain.

DA30-5 and DA40-5 ADTs have an external engine intake air grille located on the truck hood's right side, providing cool air to the engine intake to help improving engine efficiency. A new air vent on the left side helps prevent overpressurization in the engine compartment.

The DA40-5 has a new larger rear differential design with new gear ratios that, by reducing axle speed, help improve component life, reduce shaft vibration and lower fuel consumption, Doosan said.

"The previous unit was one cast piece, which was the entire axle in addition to the differential housing," said Brian Bereika, product specialist, Doosan Infracore. "To maintain quality standards on such a large casting, we went to a three-piece unit on the new ADT. The housing and axles are individually cast pieces. That design allowed us to install a larger rear differential that will be stronger and more durable."

The trucks use a ZF differential with axle castings from Doosan. The front differential and transmission in both ADTs is from ZF, as well.

"The DA40-5 driveline ratios were also changed," Bereika said. "That allows the driveshaft to turn about 10% slower than before, which accomplished a couple of different things. It extended the life of the driveshaft as well as the bearings, and at a higher rpm you can pick up some vibration, so it reduced that, too."

The ADTs continue to have a front-mounted turning ring; a sloping rear frame; all-gear, oil-bathed tandem rear bogie; and independent front suspension. The turning location keeps equal weight on the front tires while loaded, even at a maximum turning angle, the company said.

A sloping rear frame lowers the center of gravity and improves stability and safety when fully loaded. Equal power and weight distribution at each wheel improves tractive effort, helps to minimize tire wear and lowers ground-bearing pressure. The independent front suspension improves operator comfort in rough terrain and assists in maintaining ground contact.

The tandem rear bogies, with a total up-and-down oscillation of 40%, delivers optimal traction with maximum ground contact in uneven terrain, Doosan said. Due to the tandem design, fewer points of power transfer mean less power loss and a more efficient driveline, the company said.

A tilting cab gives service technicians access to major components, and it can be tilted back in less than five minutes to expedite routine maintenance and repairs. **dp**

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