



Dana Readies Spicer® PowerBoost® Hydraulic-Hybrid Program for Manufacturer Field Testing

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PARIS, Jan. 23, 2015 /PRNewswire/ -- Dana Holding Corporation (NYSE: DAN) today announced that the company is now offering its Spicer® PowerBoost® hydraulic-hybrid system for field testing by off-highway original-equipment manufacturers (OEMs).

Dana engineers have conducted extensive field tests of the Spicer PowerBoost system integrated with a dual-motor hydrostatic transmission in a series configuration. These functional evaluations include more than 1,000 hours on a 16-tonne (17.5-ton) front-end loader and more than 500 hours on a telescopic boom handler powered by an 83 kW (111 hp) engine.

These tests of typical duty cycles have verified fuel savings of over 20 percent for the front-end loader and over 25 percent on the telescopic boom handler, with an expected payback in under 18 months for both applications.

Spicer PowerBoost hydraulic-hybrid technology is ideally suited for hydrostatically driven drivetrains, which is why Dana will feature it at Intermat as part of a complete drivetrain system for a compact telescopic boom handler with 2.7- to 3.6-tonne (6k to 8k) lifting capacity. This system includes a next-generation, two-speed Spicer Model 367 shift-on-fly hydrostatic transmission with new power takeoff (PTO) disconnect functionality, Spicer Model 211 planetary steer axles, and a Spicer® 10 Series® driveshaft.

This configuration demonstrates how off-highway manufacturers can potentially reduce the engine size for applications that currently require an engine at or slightly above the U.S. EPA's Tier 4 or Euro 5/6 emissions threshold of 75 hp (56 kW). The Spicer PowerBoost system allows manufacturers to select a smaller engine that does not require exhaust after treatment systems that are costly, consume added space, and increase the operating temperature of the powertrain system.

"Despite the recent downturn in diesel prices, off-highway equipment buyers are still actively pursuing technologies that can reduce overall vehicle operating expenses," said Aziz Aghili, president of Dana Off-Highway Driveline Technologies. "The financial benefits of the Spicer PowerBoost system have been clearly demonstrated in real-world field tests on multiple applications and include significant machine productivity enhancements as well as reduced maintenance."

Spicer PowerBoost technology uses an advanced energy-management system to evaluate the levels of power needed in the entire vehicle, predict operating demands, and determine the most efficient means of operation. This system features a modular design that offers OEMs flexibility in hybrid control performance, which can include hydraulic start/stop functionality for use with electronically controlled powertrains, integration with hydraulic work circuits, and other options depending on customer powertrain configuration.

The Spicer PowerBoost system works by capturing hydrostatic energy in an accumulator from the powertrain during low-power operation of the engine and when recuperated from braking.

Deployed through series or parallel hybrid configurations that fit into existing vehicle designs with minimal adaptation, the Spicer PowerBoost system supplements all types of transmission architectures.

It captures kinetic energy otherwise wasted throughout the drivetrain and working hydraulics and then uses this recuperated energy to help power the vehicle, which can reduce fuel consumption by 20 to 40 percent compared with conventional drivetrain concepts, depending on vocational application and duty cycle.

Spicer PowerBoost technology can also reduce total ownership and operating costs by increasing productivity, reducing maintenance, and allowing for the use of a downsized engine.

When additional power is required, such as accelerating from a full stop, lifting a load, or driving into the pile, the advanced energy-management system uses the stored energy in the accumulator to provide an additional source of power for improving performance, increasing productivity, and reducing fuel consumption.

The Spicer PowerBoost system can also be configured to minimize engine idling by shutting off the diesel engine and accessing power captured in the accumulator for vehicle operations that consume low amounts of energy, such as inching, light working conditions, and low travel speeds.

Spicer PowerBoost solutions are ideal for applications with frequent, intense bursts of acceleration, deceleration, lifting, and lowering during cyclic maneuvering that support the recuperation of working and braking energy. Construction equipment, material-handling machines, and on-highway vocational vehicles are the optimal targets for the Spicer PowerBoost system.

Depending on the specific setup and control strategy, Spicer PowerBoost solutions can also help to improve productivity by shortening the length of time to complete a Y-cycle, reducing the number of fuel stops and extending the period for brake maintenance.

Dana has supported the development of the Spicer PowerBoost system over the past five years at the company's advanced technology centers in Belgium, Italy, and the United States. Dana has applied for 16 patents stemming from development activities for Spicer PowerBoost technology.

Dana will present the Spicer PowerBoost concept at Intermat in stand 5A K 064. To learn more, visit www.dana.com/offhighway.

About Dana Holding Corporation

Dana is a global leader in the supply of highly engineered driveline, sealing, and thermal-management technologies that improve the efficiency and performance of vehicles with both conventional and alternative-energy powertrains. Serving three primary markets – passenger vehicle, commercial

truck, and off-highway equipment – Dana provides the world's original-equipment manufacturers and the aftermarket with local product and service support through a network of nearly 100 engineering, manufacturing, and distribution facilities. Founded in 1904 and based in Maumee, Ohio, the company employs 23,000 people in 26 countries on six continents. Dana announced preliminary sales of \$6.6 billion in 2014. *Forbes* magazine selected Dana as one of America's 100 Most Trustworthy Companies in 2014. For more information, please visit dana.com.

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