



Dana Launches Spicer® Electrified™ with TM4® e-Hub Drive for Large Mining, Construction Vehicles at Bauma China 2018

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System Exemplifies Dana's Rapidly Expanding Portfolio of Market-Ready Electrification Technologies

SHANGHAI, Nov. 27, 2018 /PRNewswire/ -- Dana Incorporated (NYSE: DAN) today introduced the Spicer® Electrified™ with TM4® e-Hub Drive, a fully integrated electro-mechanical system for heavy-duty mining and construction applications that leverages Dana's leading portfolio of vehicle electrification technologies.



Designed for underground mining trucks, large wheel loaders, and reach stackers, this e-Hub drive integrates proven heavy-duty Spicer axle expertise, Brevini® planetary drive designs, TM4 electric motor technology, and Dana's advanced control expertise into a single package that delivers efficiency, reliability, and performance.

Currently in pre-production field testing with vehicle manufacturers, the e-Hub drive is scheduled to be ready for production by the end of next year.

"The ultimate measure of hybrid and electric technologies is their ability to meet the rigorous performance expectations of off-highway vehicles at the work site," said Christophe Dominiak, chief technology officer for Dana. "This e-Hub drive illustrates how rapidly and effectively Dana has capitalized on our strategy to produce hybrid and electric propulsion solutions that perform in the harshest work environments anywhere in the world."

Global Innovations, Local Market Expertise

As Dana's global center of excellence for designing axles used in mining and other heavy-duty applications, the Dana China Technical Center in Wuxi, Jiangsu province, is ideally suited to lead the development of the e-Hub drive. The facility also leads the development of heavy-duty Spicer planetary steering axles for rough-terrain cranes with lift capacities ranging from 30 to 110 tonnes (33 to 120 tons).

Dana's engineering resources in the U.S., Italy, and Canada participated in the co-development of the Spicer Electrified e-Hub Drive.

"With 23 worldwide technology centers strategically located near our customers, Dana has a distinct advantage in the development of propulsion systems for heavy-duty vehicles," said Aziz Aghili, executive vice president of Dana and president of Off-Highway Drive and Motion Technologies. "By combining our unmatched range of technologies with our regional expertise, Dana can precisely channel our engineering efforts toward highly tailored solutions on a market-by-market basis."

Dana's Comprehensive Capabilities for Electric and Hybrid Vehicles

Dana has emphasized engineering and development for hybridization and electrification as part of the company's enterprise strategy, which focuses on leveraging the company's decades of electric engineering expertise and product knowledge to offer an extensive portfolio of advanced hybrid and electric technologies that have been engineered for multiple vehicle markets.

Ranging from complete systems and modular solutions to individual sub-system components, Dana is able to support its customers in developing series and parallel hybrid configurations up to full battery-electric vehicles. Dana's electrified product offerings are able to meet the diverse architecture and platform requirements of its broad customer base by delivering enhanced performance, packaging optimization, and reduced system weight.

Dana has made a series of strategic moves to support electrification and hybridization, including the acquisition of the power-transmission and fluid power businesses of Brevini; a majority ownership of TM4 Inc, a motor and inverter manufacturer; and an agreement to purchase the Drive Systems segment of the Oerlikon Group. Combined with the company's core expertise in driveline technologies, sealing systems, and thermal management, these initiatives position Dana as the leading supplier of electrification solutions for the off-highway segment.

With the recent acquisition of TM4, Dana's electrification capabilities now include in-house design and manufacturing for electric motors, power inverters, and control systems. Dana also offers a wide selection of Brevini® motion products to support the unique power distribution requirements of hybrid and electric off-highway vehicles. These products include gear pumps, hydraulic power units, valves and controls, hydraulic axial piston motors

and pumps, orbital motors, control hardware and software, advanced sensor technologies, and operator-information displays.

Beyond the e-Hub drive, Dana is currently leveraging a wide portfolio of technologies for off-highway customers to offer dozens of successful electrified driveline applications now in production and pre-production testing.

Unparalleled Support for Chinese Vehicle Manufacturers

Dana's growing portfolio of electric and hybrid technologies is ideally positioned to support the Chinese Ministry of Industry and Information Technology's "Made in China 2025" initiative, and the company's expertise has been honored by leading organizations. For four consecutive years, Dana has been recognized by the China Decision Makers Consultancy for its electric and hybrid vehicle solutions. In 2017 and 2018, Dana was named the "Outstanding Power Electronics Solution Provider of the Year," while Dana earned the "Best Battery Solution Provider of the Year" award in 2015 and 2016. Additionally, Dana's two-sided chip cooling technology was a 2016 *Automotive News* PACE Award finalist.

Dana serves numerous off-highway manufacturers in China, including AGCO, CRCHI, Epiroc, John Deere, and SANY. The company currently operates 17 facilities in China with approximately 6,750 employees through both wholly owned and joint venture operations.

Visit Dana at Bauma China

Dana will showcase the Spicer Electrified e-Hub drive as part of a full portfolio of drive and motion products for the mining and construction industries at Bauma China, Nov. 27-30, 2018, in hall N5, stand 511 at the Shanghai New International Expo Centre. To learn more, visit

www.dana.com/offhighway.

About Dana Incorporated

Dana is a world leader in highly engineered solutions for improving the efficiency, performance, and sustainability of powered vehicles and machinery. Dana supports the passenger vehicle, commercial truck, and off-highway markets, as well as industrial and stationary equipment applications. Founded in 1904, Dana employs approximately 30,000 people in 33 countries on six continents who are committed to delivering long-term value to customers. The company reported sales of more than \$7.2 billion in 2017. Based in Maumee, Ohio, USA. Dana is ranked among the Drucker Institute's listing of the 250 most effectively managed companies. For more information, please visit dana.com.

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