News Release

BorgWarner's New High-Voltage Coolant Heaters are the First Choice of Global OEMs

- *Major OEMs on three continents choose leading edge heaters for future electric and hybrid vehicles*
- *First cars to pioneer high-voltage coolant heater technologies, production planned to begin in 2021*
- *High efficiency thick film element (TFE) systems offer solutions for battery conditioning and passenger cabin climate control*

Auburn Hills, Michigan, March 3, 2020 – BorgWarner´s state-of-the-art coolant heaters are expected to appear in 2021 on the next generation of passenger cars produced by global OEMs. The company has been chosen as a supplier for cabin heating and battery conditioning solutions for several high-volume vehicle programs. Its leading edge high-voltage heaters have changed the way automotive engineers think about thermal management requirements for the most advanced electric and plug-in hybrid passenger cars.

"Our Battery and Cabin Heater has become the technology of choice for some of the most important electric and hybrid vehicle manufacturers in Europe, North America and Asia, helping them to reduce battery consumption while increasing passenger comfort," said Joe Fadool, President and General Manager, BorgWarner Emissions, Thermal and Turbo Systems. "Our engineers have a deep system understanding of cabin heating and battery conditioning requirements and are supporting our customers as they prepare new vehicles for start of production."

The new technology was developed to meet the demand for fast-acting solutions as the heat management systems of vehicles increasingly become decoupled from the internal

combustion engine – permanently in the case of EVs and for longer parts of the drive cycle in hybrid electric vehicles.

BorgWarner's coolant heaters can be used for both passenger cabin heating and improving battery energy performance in electric and hybrid vehicles by offering consistent temperature distribution inside the battery pack and its cells. With high thermal power density and fast response time due to their low thermal mass, these heaters also extend pure electric driving range. The thick film heating element is compact and very flexible regarding sizes and shapes. BorgWarner has engineered two versions – single plate and dual plate. Single plate devices are responsible for either thermal management of the battery or cabin heating, while dual plate versions manage both tasks at the same time while providing up to 80 percent more heat transfer surface. Both versions are integrated into robust aluminum housings that provide excellent electromagnetic shielding. Battery and Cabin Heaters offer a power range of between 3 and 9 kW. They have been designed for input voltages between 250 and 500 V. If necessary, there is an 800 V alternative to enable faster battery charging.

Safety was also paramount in the design. The product development team devised a strategy for the high-voltage coolant heaters using intelligent and robust power electronics that enable the prevention of thermal events such as overheating. As soon as the system detects an error it switches off automatically.

About BorgWarner

BorgWarner Inc. (NYSE: BWA) is a global product leader in clean and efficient technology solutions for combustion, hybrid and electric vehicles. With manufacturing and technical facilities in 67 locations in 19 countries, the company employs approximately 29,000 worldwide. For more information, please visit borgwarner.com.

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Major OEMs on three continents choose BorgWarner’s leading-edge coolant heaters for the latest hybrid and electric cars.

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