

## **TENNECO INTRODUCES NEW ADAPTIVE DAMPING TECHNOLOGY ON THE FORD FOCUS RS HIGH PERFORMANCE ROAD CAR**

*Ford Motor Company chooses Tenneco's Dual Mode system to deliver drivers the choice between sport and track suspensions*

Frankfurt, Germany, September 16, 2015 – Tenneco (NYSE: TEN) announced today at the 2015 Frankfurt Motor Show that Ford has selected the company's Dual Mode technology for its 2016 Ford Focus RS.

Dual Mode, part of the Monroe® Intelligent Suspension portfolio, uses an intelligent valve in the shock absorber that opens or closes to provide firmer damping for increased road holding when desired. The driver can switch between standard or sport settings via a dashboard button depending on ride preference or driving situation. In addition to enhancing driving pleasure, Dual Mode provides an increased feeling of security in the sport setting under challenging road or driving conditions.

“We are delighted that Ford has chosen to debut our Dual Mode suspension on its first-ever RS model equipped with selectable drive modes,” said Sandro Paparelli, vice president and general manager, Tenneco Europe Ride Performance. “We are particularly proud to participate in the development of the Focus RS suspension as the exciting RS range is known for setting technology trends.”

Dual Mode offers an enhanced ride experience at minimal system cost, making dynamic suspension systems accessible to the small and mid-sized vehicle segment. “Ford's passion for innovation and its reputation for migrating advanced technologies to mainstream vehicles should help drive dynamic suspension into wider market segments as drivers increasingly desire more driving excitement and control,” Paparelli added.

Tenneco's Dual Mode technology will be installed on the front and rear dampers of the Focus RS, production of which is expected to start in late 2015. The high performance road car will be produced in Europe and be available worldwide.

Ford is the first of two global vehicle manufacturers who have chosen Tenneco's Dual Mode suspension.

Tenneco is displaying these and other ride performance technologies at its exhibit during the 2015 Frankfurt Motor Show, September 15-27, Hall 5.1, Stand A20.

**About Monroe® Intelligent Suspension:**

Dual Mode is part of the Monroe® Intelligent Suspension portfolio. This includes adaptive suspension solutions for compact cars (Dual Mode) and semi-active solutions with external valve (CVSAe), internal valve (CVSAi) and two independent valves (CVSA2) for mid-range and higher-end cars. The portfolio also includes CVSA2/Kinetic and ACOCAR active suspension solutions for premium luxury cars, high-end sports cars and SUVs with off-road capability. [Visit http://www.tenneco.com/original\\_equipment/ride\\_control/technology/advanced\\_damper/](http://www.tenneco.com/original_equipment/ride_control/technology/advanced_damper/) for more information.

**About Tenneco:**

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*and (vi) the company's ability to develop and profitably commercialize new products and technologies, and the acceptance of such new products and technologies by the company's customers. The company undertakes no obligation to update any forward-looking statement to reflect events or circumstances after the date of this press release. Additional information regarding risk factors and uncertainties is detailed from time to time in the company's SEC filings, including but not limited to its report on Form 10-K for the year ended December 31, 2013.*

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## **TENNECO LATEST GENERATION ELECTRONIC VALVE TECHNOLOGY DRIVING FUEL EFFICIENCY, PERFORMANCE**

Frankfurt, Germany, September 16, 2015 –Tenneco (NYSE: TEN) today unveiled its latest generation of electronically controlled valves at the 2015 Frankfurt Motor Show. The valves, which are designed to support low pressure exhaust gas recirculation (EGR) for diesel engines and acoustic tuning for gasoline engines, feature a unique new modular design which offers vehicle manufacturers custom flexibility and adaptability for any engine architecture.

“We’ve seen a dramatic shift with our valve technology since its introduction just three years ago,” said Tim Jackson, executive vice president and chief technology officer, Tenneco. “Tenneco’s latest generation valve has evolved to a modular, scalable design that is lightweight, can be easily packaged to fit within any engine architecture and offers on-demand customization, which provides significant cost and time savings for customers. Additionally, the valve can accommodate exhaust temperature specifications up to 750°C for EGR applications, which enables efficient NOx reduction - even with highly loaded engine conditions and high return flow rates.”

Tenneco’s latest generation valve features a dynamic flap control designed to generate optimal pressure conditions for efficient EGR and also provides fail-safe operation. The actuator is interchangeable using a simple mounting concept without any loose interface components and the valve’s flexible actuator orientation allows for simple installation in any engine control environment, without the need to change parts.

The valve delivers important acoustical benefits as well. Whether during engine start or while idling, the flap minimizes internal leakage, which helps to optimize sound quality. The electronically controlled variable flap remains closed during normal driving conditions for a quieter ride and opens during harder acceleration, creating lower backpressure, higher attenuation and more engine power for maximum efficiency.

“Tenneco’s new valve design serves as another important example of how our emissions technologies serve as enablers for improving fuel efficiency and helping customers meet important emissions regulations like EU6c, while maximizing engine performance,” Jackson said. “In the future, we’ll continue to see valve technology evolve into hotter areas of the vehicle and we are already in development with valves that provide exhaust heat recovery solutions to address that need.”

Tenneco is displaying these and other clean air and ride performance technologies at its exhibit during the 2015 Frankfurt Motor Show, September 15-27, Hall 5.1, Stand A20.

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**TENNECO SHOWCASES LATEST MIXING SOLUTIONS FOR DIESEL  
AFTERTREATMENT AT 2015 IAA**

*Mixer designs offer customized solutions for customers,  
while supporting critical emissions regulations*

Frankfurt, Germany, September 16, 2015 – Responding to the needs of global engine manufacturers for aftertreatment solutions that help to meet stringent emissions regulations, including EU6c, as well as the need for increased fuel efficiency, which also provides for lower CO<sub>2</sub> emissions, Tenneco today showcased its latest mixing technologies for light duty diesel engines at the 2015 Frankfurt Motor Show. The company’s mixers are flexible enough to accommodate the reduced packaging requirements of advanced catalyst systems, including SCR-coated diesel particulate filter (SDPF) applications, while enabling flow uniformity of 95 percent or higher.

“Today’s diesel engines are calibrated to achieve increasingly stringent fuel economy targets and as a result, generally more engine-out NO<sub>x</sub> is being generated. One solution combines the SCR and DPF on a single substrate to reduce volume and light-off timing of the catalyst. This combination reduces the overall size of the aftertreatment, which presents new challenges when converting urea (AUS32) to ammonia,” said Tim Jackson, executive vice president and chief technology officer, Tenneco. “Tenneco’s industry leadership in diesel aftertreatment allows us to develop more efficient and effective solutions – mixers that are adaptable to any catalyst design, are packaging flexible and can accommodate any injector –while providing rapid and complete conversion of urea to ammonia gas, thereby avoiding deposits, and greater than 95 percent utilization of the catalyst.”

Urea mixers are the key functional element that enables the processing of liquid urea into gaseous ammonia and allow it to be effectively distributed across the NO<sub>x</sub> abatement catalyst. Tenneco’s family of mixing solutions ensures flexibility and consistent urea conversion, while decreasing the risk of urea deposits in the system.

Tenneco’s *new double swirl* mixer efficiently processes the injected urea into ammonia, even in extremely compact mixing zones, such as SDPF applications. The flow is forced into a mixing passage where the urea spray is injected and evaporated on the hot surfaces, minimizing undesired droplet slip to the SCR catalyst. The exhaust gas / ammonia mixture then exits the mixer passage, forming two macroscopic swirls that homogeneously distribute over the surface of the SCR or SDPF substrate.

Tenneco's mixers are currently in series development with global vehicle manufacturers in Europe, North America, China and Japan.

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## **TENNECO TO LAUNCH TWO NEW TECHNOLOGIES FROM MONROE<sup>®</sup> INTELLIGENT SUSPENSION PORTFOLIO IN SERIES PRODUCTION**

*Company chosen for prestigious new vehicle platforms. Grows penetration of innovative and advanced suspension technologies. Increases content per vehicle*

Frankfurt, Germany, September 16, 2015 – Tenneco (NYSE: TEN) announced today that two new advanced suspension technologies in its Monroe<sup>®</sup> Intelligent Suspension portfolio will be launched in series production by the end of 2015. CVSA2, the newest generation of Tenneco’s continuously variable semi-active suspension, will be launched on a luxury supercar, while Dual Mode adaptive shock absorbers will debut on a mid-sized performance road car.

“Monroe<sup>®</sup> Intelligent Suspension is the key to a differentiated driving experience, said Enrique Orta, executive vice president, Tenneco Ride Performance. “We are delighted to work with our original equipment (OE) customers to help deliver the driving experiences that precisely reflect the specific brand characteristics of the vehicles concerned.”

The Monroe<sup>®</sup> Intelligent Suspension portfolio offers a range of systems that can be tailored to very specific OE customer requirements for ride, handling and comfort. It provides dynamic driving solutions for all vehicle segments from compact cars to supercars. Common to all technologies in the Monroe<sup>®</sup> Intelligent Suspension portfolio are the intelligent shock absorbers. These act as a sixth sense, working constantly with the driver and the vehicle to adapt to the desired driving experience and road conditions to enhance driving pleasure and increase the feeling of security.

CVSA2 is Tenneco’s newest generation of lightweight semi-active dampers. It offers significant improvements in ride performance from single valve technology as each damper features two independent electro-hydraulic valves for the rebound and compression motions to provide an increased tuning range for even greater vehicle dynamics and higher comfort levels.

Dual Mode is an adaptive suspension solution for the small and medium vehicle segments, offering drivers the choice of different suspension modes, a feature previously only available to the large and luxury vehicle segments. The



switchable shock absorbers offer drivers a choice of suspension modes by using an intelligent valve that opens or closes to provide softer damping for improved comfort, or firmer damping for a more muscular ride.

The success of CVSAe, Tenneco's first-generation semi-active suspension system has been launched on 37 vehicle models, which has provided the foundation for further growth in advanced suspension technologies. Tenneco is currently quoting applications for Dual Mode on four new compact and mid-sized vehicle platforms and a further five new applications for CVSA2 on luxury vehicles.

"We see a significant increase in interest for Monroe® Intelligent Suspension as consumers demand a more interactive and dynamic driving experience," Orta said. "We are confident that our significant experience in intelligent suspension technologies and the strength of our Monroe® brand position us for continued growth."

Tenneco is displaying these and other ride performance technologies at its exhibit during the 2015 Frankfurt Motor, September 15-27, Hall 5.1, Stand A20.

#### **About Monroe® Intelligent Suspension:**

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## **TENNECO'S GASOLINE PARTICULATE FILTER TECHNOLOGY READY TO MEET EURO 6C EMISSIONS REGULATIONS**

### *Company to launch oval-shaped design at 2015 Frankfurt Motor Show*

Frankfurt, Germany, September 16, 2015 – Tenneco (NYSE: TEN) today introduced its oval-shaped gasoline particulate filter design at the 2015 Frankfurt Motor Show (Hall 5.1 booth A20). The filters are designed for gasoline direct injection (GDI) engines to reduce particulate emissions in compliance with the Euro 6c emissions regulations, which take effect on September 1, 2017.

GDI engines help improve fuel economy and therefore reduce CO<sub>2</sub> emissions; however, they can have higher particulate emissions due to shorter in-cylinder fuel/air mixing times compared with multiport fuel injection engines. Advanced fuel injection strategies are currently used to control gasoline particulate emissions in-cylinder but they are designed for a particular emission test cycle and may be less effective under real driving conditions. Gasoline particulate filters effectively control particulate emissions under all operating conditions.

GPFs use the same type of wall-flow substrates as diesel particulate filters and can be included in the exhaust system in addition to the series three-way catalyst, or the catalyst coating can be directly applied to the filter substrate to form a four-way catalyst. Tenneco has successfully adapted its canning technology to accommodate these highly porous, fragile substrates.

“At Tenneco, we understand the functional requirements for gasoline particulate filters based on our experience as one of the first global suppliers to offer diesel particulate filter technologies in serial production,” said Tim Jackson, executive vice president and chief technology officer, Tenneco. “With our design, engineering, systems integration and advanced manufacturing capabilities, we provide customers flexible solutions for any powertrain to meet future emissions regulations without compromising vehicle performance or durability.”

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