



Two speed ahead. ZF Marine launches industry-first 2-speed transmission for outboards

- **The powerful 600hp Verado engine, the most innovative in the industry, is the result of a 4-year collaboration with Mercury Marine**
- **ZF brings first-ever 2-speed application to an outboard application**

Padova, Italy. ZF Marine presents its new 2-speed transmission, an industry-first, as part of the new V12 Verado Outboard engine developed by Mercury Marine. After four years of partnership and collaboration, the new engine was recently officially launched.

As a result of a 4-years collaboration with Mercury Marine, ZF is now presenting the industry first 2-speed transmission for outboards. Production already started at ZF's factory in Padua, the marine production facility for pleasure craft applications.

"This project emphasizes our leading position in propulsion technology and successful collaboration with our long-standing partner Mercury Marine" said Federico Decio, Vice President Industrial Technology, Pleasure Craft Business." The collaboration was defined with the objective of developing the most powerful and innovative engine in the market, and the trust in ZF Marine as the right partner".

The result of the partnership is the powerful 7.6 V12 600hp Verado engine, first in the industry, and already expected to be a "game changer" in the marine market. It includes several innovative solutions, including the first automatic 2-speed hydraulic transmission. The maximum torque design is 724 Nm, maximum 7,000 RPM and its weight is just 55 kgs.

Well-known Concept for a New Application

The 2-speed technology for marine applications is a concept well-known by ZF from the past, but never applied to Outboard applications before.



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Page 1/1, 2021-03-25

This solution allows to perfectly match engine characteristics to different operative modes. In this particular case, the 2-speed transmission delivers maximum torque and acceleration in the first gear, and then silently shifts to the second gear for cruising efficiency and thrilling top speed. Shifting is almost imperceptible.

The transmission includes a 3-vertical wet clutch layout and shifting is driven by proportional valves in order to grant unmatched trolling capabilities at low speed, as well as granting an almost unperceptible shifting between the two gears. These proportional valves also optimize vessels' performance during docking and maneuvering, making every movement absolutely precise and smooth, especially in combination with a joystick control system.

Every marine application, regardless of the operative mode, could benefit from a 2-speed transmission, as it allows to improve the propulsion performance by appropriately matching the engine power and the vessel (or propeller) power demand. The two-speed transmission allows ease in the transfer of power to the gearcase. This means that both first and second gears could be properly design to enhance any vessel design target.

More acceleration and efficiency, less noise and more thrust for towing activities could be achieved by selecting the proper reduction ratio for each gear. "First gear is 20% lower than second gear, which generates high propeller torque, and the ability to accelerate the boat and get it on plane quickly. The engine continues to deliver power and accelerations through its power shift, all the way to rated speed" mentioned Tim Reid, VP of Product Development and Engineering at Mercury Marine.

Caption:

ZF presents the first automatic 2-speed hydraulic transmission with a weight of just 55 kgs.

Image: ZF



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Page 1/1, 2021-03-25

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About ZF

ZF is a global technology company supplying systems for passenger cars, commercial vehicles and industrial technology, enabling the next generation of mobility. ZF allows vehicles to see, think and act. In the four technology domains of Vehicle Motion Control, Integrated Safety, Automated Driving, and Electric Mobility, ZF offers comprehensive product and software solutions for established vehicle manufacturers and newly emerging transport and mobility service providers. ZF electrifies a wide range of vehicle types. With its products, the company contributes to reducing emissions, protecting the climate and enhancing safe mobility.

In fiscal year 2020 ZF reported sales of €32.6 billion. The company employs more than 150,000 associates at approximately 270 locations in 42 countries.

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