A new generation – ZF’s new EcoLife Offroad automatic transmission for medium to heavy-duty off-road vehicles

- ZF presents advanced automatic 7-speed transmission system for medium and heavy-duty special vehicles
- Higher gear ratio spread bolsters climbing capability
- ZF-EcoLife Offroad is more powerful, more economical and quieter than rival products

Reliable off-road vehicles require robust, individually adapted transmission technology. The new 7-speed ZF-EcoLife Offroad automatic transmission has been further developed and optimized for off-road applications in medium to heavy-duty special vehicles. It makes vehicle operation very cost-effective, handles up to 2,600 newton meters of torque, improves acceleration and changes gear depending on topography. Thus, drivers can concentrate entirely on challenging maneuvering. It is the performance-enhanced successor generation of the ZF-Ecomat family which has been successfully used in this area for several decades worldwide.

ZF has developed a transmission system in the shape of the EcoLife Offroad, which is designed for current and future requirements placed on off-road, multi-axle or all-wheel-drive special vehicles as well as heavy, off-road vehicles. Tailored exactly to the particular vehicle, it relieves the driver from having to operate the clutch and gear lever – thus preventing any incorrect operation. EcoLife Offroad measurably improves acceleration, shifts gear depending on topography and handles up to 2,600 newton meters of input torque which are transmitted without tractive force interruption during gear changes. With this transmission system, one is perfectly equipped for the new high-performance engine generation.
The new ZF transmission also offers clear advantages over comparable competitor products in many other important criteria. The high spread of ratios of 9.1 facilitates high speeds, while significantly improving the respective vehicle's climbing ability and considerably reducing fuel consumption at the same time. In conjunction with the new torque converter, which features an integrated torsional damper, this guarantees smooth starting, good acceleration figures and pronounced smoothness even at low engine speeds – on extreme off-road inclines as well as on the road.

The power-to-weight ratio of a transmission is relevant when it comes to optimizing the payload of off-road vehicles: It not only has to be able to transmit very high torque in absolute terms, but also be as light as possible itself. The dry weight of the EcoLife Offroad basic transmission – despite all the usage-relevant reinforcements – is just 450 kilograms. It is also very compact, just approximately 900 millimeters long, which saves valuable installation space. Thanks to the helical toothed planetary gearsets, the automatic transmission operates remarkably quietly – another advantage particularly for off-road applications.

The ZF retarder, which is integrated directly into the transmission, proves its worth particularly on long downhill gradients. This hydrodynamic, wear-free continuous service brake effectively slows down the vehicle thanks to a maximum 1,900 newton meters of braking torque and relieves the strain on the service brakes, thus reducing wear by up to 90 percent. The entire retarder effect is also retained during gearshifts. EcoLife Offroad is also prepared for potential auxiliary power units: In future two power take-offs will be available with a maximum 1,000 newton meters of torque.

**Durable and future-proof**
With EcoLife Offroad, the successful concept of the ZF-EcoLife for city buses was further developed and adapted to the tough use in off-road vehicles. EcoLife Offroad does not only use the
advantages of the economical and efficient basic transmission, but is also equipped with reinforced components. Compared with comparable, current competitor products it can actually intelligently and reliably handle demanding off-road applications and offers a longer service life. Even the service portfolio of the transmissions from the ZF-Ecomat family used worldwide to date in this area could be improved further.

EcoLife Offroad also comes with a dual cooling system which comprises an integrated oil cooler and a separate retarder heat exchanger. This makes the ZF automatic transmission future-proof from another important aspect: It has been designed from the ground up for the kinds of higher temperatures which new engines need in order to fulfill increasingly stringent exhaust emission standards such as Euro 6, EEV, or EPA 10. Not least, EcoLife Offroad thus provides an important contribution to making heavy trucks as well as off-road wheeled vehicles more economical and hence environmentally friendlier.

**Tailor-made electronics**

An electronic control unit forms the brains of the ZF-EcoLife Offroad. To minimize necessary wiring, this control unit is directly mounted onto the transmission. Programmed specifically to each particular vehicle, it communicates via a standardized CAN bus interface (CAN SAE J1939) with other vehicle components.

**Tried-and-tested base saves costs**

In order to equip the EcoLife Offroad for extreme loads, ZF has pushed the technology to new heights. Nonetheless it remains economical for the customer, as this specific transmission is also based, like many others at ZF, on a sought-after volume-production product: Its technical base, the 6-speed automatic transmission ZF-EcoLife, is fitted to city buses around the globe. With EcoLife Offroad, ZF consistently expands its existing transmission portfolio for medium and heavy-duty off-road vehicles, making it fit for the future.
Caption:
Powerful, compact and economical: The advanced 7-speed ZF-EcoLife Offroad sets new standards for automatic transmissions in medium and heavy-duty off-road vehicles.

Photo: ZF

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ZF is a global leader in driveline and chassis technology as well as active and passive safety technology. The company acquired TRW Automotive on May 15, 2015 which was integrated into the organizational structure as the Active & Passive Safety Technology Division. The combined company has a global workforce of around 138,300 at about 230 locations in some 40 countries and reported sales of €29.2 billion in 2015. ZF annually invests approximately five percent of its sales in Research & Development (€1.4 billion in 2015) ensuring continued success through the design and engineering of innovative technologies. ZF is one of the largest automotive suppliers worldwide.

In the Industrial Technology Division, ZF pools its activities for off-road applications. These comprise the development and production of transmissions and axles for agricultural and construction machinery as well as driveline technology for forklift trucks, rail and special vehicles. The division is also responsible for the worldwide business of marine propulsion systems, aviation technology as well as the development and production of gearboxes for wind turbines and industrial applications. Test systems for all kinds of applications in driveline and chassis technology are also included in the division’s portfolio.

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