



Continuously Variable Transmission for Material Handling Reduces Fuel Consumption by 25 %

- **Technological leap for the construction machinery sector thanks to ZF's fully power-split CVT transmissions**
- **Significant increases in productivity**

With its cPOWER drive (image 8) ZF has advanced its hydrostatic-mechanical power-split continuously variable technology, well-known from agricultural machinery specifically for load-sensitive applications. The improved technology integrates the features of the ERGOPOWER transmission (image 6), which are appreciated by many industries. In addition to lead applications such as forestry machinery and wheel loaders, the transmission is also perfect for the material handling sector due to significant improvements in consumption and productivity.

Due to rising fuel prices and a growing awareness of CO₂ emissions, the market demand for more efficient drive systems is growing. Emission guidelines (USA's EPA and EU directives) place technological restrictions and constraints on diesel engines, and it is difficult to comply with these using conventional drives.

High loads at low speeds in combination with high dynamics are the particular requirements for construction machinery. The new ZF CVT transmission technology fulfils those exact criteria perfectly and with a degree of efficiency that has been inconceivable up until now.

The rising demands for reduction of fuel consumption and increased productivity expedite the implementation of new technologies, such as CVT, for industrial trucks. A trend towards lower engine speeds and the demand for engine stabilization achieved by a lack of dependence on the motor speed and driving speed represent future challenges for the diesel engine lift truck market. ZF's continuously variable cPOWER meets both requirements.



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Hydrostatic-mechanical power-split transmissions ensure significant benefits for these applications in terms of consumption compared to hydrodynamic transmissions and purely hydrostatic designs.

The benefits of continuously variable transmissions are clear across all speed ranges of the typical fork lift operating cycle, during the controlled manoeuvring of the load, the positioning of transported material and transport itself. During this process, the percentage of hydrostatic power is kept low, which means that an optimal degree of efficiency can be achieved.

From the start-up process onwards, the majority of drive power comes from the mechanical part of the transmission. This means that the benefits of CVT technology in terms of fuel consumption can be observed, even in very short loading cycles.

The application of an elaborate hydraulic transmission-control unit and transmission-integrated on-board electronic unit optimally completes driving functions. This is done in terms of sensitivity and driving comfort and creates an aligned power management.

The cPower transmission series deploys well-known and proven construction kit modules and benefits from ZF's competence in transmission and vehicle system engineering.

Main features of the new ZF cPOWER:

- Continuously variable across the whole driving range, forwards and in reverse
- Hydrostatic-mechanical power splitting in all driving ranges, including the frequently used range of up to up to 10 km/h
- Reduction of diesel motor speed independent of driving speed
- Up to 25% less consumption
- Up to 20% more efficiency
- Compatible for installation with ZF ERGOPOWER



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Captions:

6) ZF ERGOPOWER transmissions for forklift systems, reach stackers, straddle carriers and container handling vehicles enable smooth switching transitions.

8) Continuously variable transmissions for material handling vehicles provide fuel savings of up to 25%.

Images: ZF

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ZF Friedrichshafen AG

ZF is a global leader in driveline and chassis technology as well as active and passive safety technology. The company has a global workforce of 146,000 with approximately 230 locations in some 40 countries. In 2017, ZF achieved sales of €36.4 billion. ZF is one of the largest automotive suppliers worldwide.

ZF allows vehicles to see, think and act. The company invests more than six percent of its sales in research and development annually – in particular for the development of efficient and electric drivelines and also in striving for a world without accidents. With its broad portfolio, ZF is advancing mobility and services in the automobile, truck and industrial technology sectors.

For further press information and photos please visit: www.zf.com