

FutureDrive

Oil-free running high-speed gearboxes of e-vehicles – validation of a holistic approach with maximum lightweight potential and high resource efficiency

As part of the FutureDrive project funded by the BMBF, an innovative transmission concept for next-generation electric vehicles is being validated. The clear focus here is on the aspect of reducing environmental impact. Important criteria of this new holistic approach are oil-free and thus nearly maintenance-free operation, range increase through lightweight design, less chip volume due to gear rolling, and a maximally resource-efficient overall production chain.

Lightweight gearbox housing

In order to achieve the required weight saving of 15% compared to the reference drive, the housing was developed as a highly stiff skeleton structure. In addition to the lightweight aspect, the acoustic properties of the skeleton housing were optimized by using elastomers, metal and polymer foams as part of the housing to reduce the resulting noise emissions. The demonstrator realized in the project was manufactured using the prepreg autoclave process and achieved a weight reduction of 29% compared to the reference.

The gears were designed as low-loss gearing with a friction-reducing amorphous carbon coating.

The project is being worked on in close cooperation with the competences in the areas of gear and transmission technology (Fraunhofer IWU), surface technology (Fraunhofer IWS) and lightweight technologies (Fraunhofer ICT).



Fast Facts

- 100 percent lubricant free operation
- Low-loss gears manufactured by rolling process
- Carbon coating to reduce friction
- Lightweight gear housing made of carbon fiber reinforced plastic (CFRP)

Funded by



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