NEWSLETTER

BENTELER – Your System Supplier in E-Mobility

October 08th, 2020

SOLVING THE CHALLENGE OF COMPACT DESIGN, NVH AND DRIVING PERFORMANCE: THE NEW BENTELER INTEGRATED E-CHASSIS MODULE (IEM)

The integration of an electric powertrain in the chassis brings with it a significant increase in engineering complexity. BENTELER, with its Integrated E-Chassis Module (IEM), offers chassis system solutions for several vehicle platforms from B up to E segment for front and rear suspension. The key is scalability and modularity of the chassis.

In a close development partnership with Bosch and Vibracoustic, we have achieved excellent success within the challenge of compact design, best-in-class noise, vibration and harshness (NVH) and driving performance. As well as integrating the Bosch e-axle and steering system the new IEM also contains the driveshafts and the brake foundation (for 5-link rear suspensions, an active steering is available on demand). This leads to compact electrified chassis modules with an increased number of mechanical, electrical and functional interfaces to the vehicle body.

Besides the driving performance, one of the most important vehicle comfort criteria is the NVH behavior. BENTELER and Vibracoustic are working hand-in-hand along the development chain from component analysis up to vehicle level. In the first stage, at component and sub-system level, the behavior of the powertrain in relation to the chassis, and the chassis properties themselves were investigated, bench-tested and optimized. At this early stage, a simulation tool was already developed to compare the results tested with latest NVH simulation methods. This allows an optimized prediction of NVH properties in powertrain and chassis – especially relevant for future projects. BENTELER and Vibracoustic have jointly tested at the vehicle level and benchmarked to other electric vehicles. This test series was split into several bench tests and subjective ride evaluation.

During chassis development, NVH and driving performance always seem to be in a certain conflict. With the BENTELER IEM development, both workstreams were engineered simultaneously, with continuous alignment of the simulation and physical test results. First physical ride performance evaluation on full vehicle level has shown very good results. For further optimization and especially achievement of customer requirements, standard tuning options (e.g. optimization of elasto-kinematics) have already been considered and are waiting for application. This allows the same e-chassis-hardware to be used in several vehicle variants.

Dear all,

I often hear or read that an electrified chassis has no special challenges, just package the e-motor and it's done! With BENTELER being a long-term chassis specialist, I strongly disagree. An e-chassis has more demanding requirements. On the NVH, on the drivability and, of course, on packaging an e-motor with up to 300KW of power. It's sometimes more than a tight challenge. That's why we've developed our integrated solutions, solving all the chassis and powertrain interfaces. By ~~e~~ setting this up modularly, we achieve scale effects in engineering and piece costs. No starting from scratch, no reinventing the wheel.

Regards,
Marco Kollmeier

For further background about our e-mobility solutions please visit our website**:** **www.benteler-automotive.com/e-mobility**

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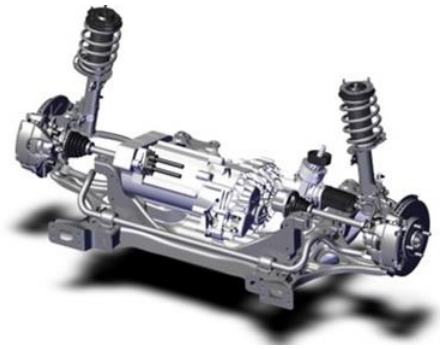
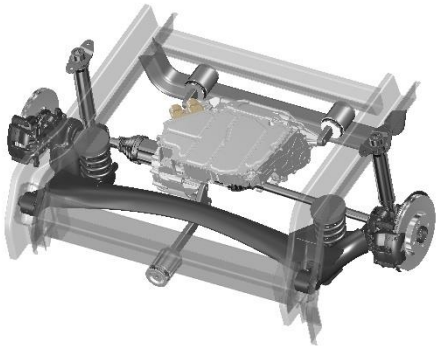
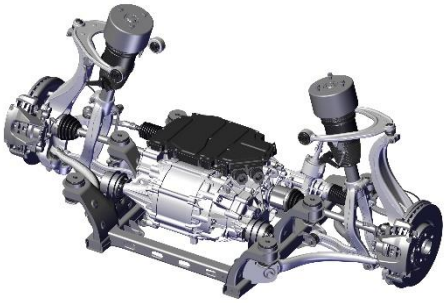
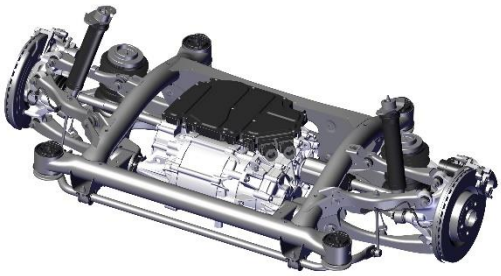
B / C Segment





D / E Segment





THE RIGHT SOLUTION FOR EVERY APPLICATION: THE NEW BENTELER INTEGRATED E-CHASSIS MODULE: FROM B TO E SEGMENT, 2 WD TO 4 WD.

Based on the Integrated E-Chassis Module (IEM) technology, BENTELER has already launched a full portfolio of e-chassis modules. This is the perfect solution for various vehicle segments with their different requirements. For the often cost-driven segments B and C, BENTELER offers an electrically driven McPherson module on the front chassis and an electrically driven twist-beam or a tieblade e-chassis on the rear. For the D/E/F segments, the IECM provides a double control arm e-chassis for the front chassis and a 5-Link e-chassis for the rear.

In addition to its performance, the IEM also perfectly meets vehicle crash requirements, thanks to its lower crash path. The e-motor bearing concept with its double insulation meets the high NVH expectations for electric vehicles. A spring suspension system with either coil springs or air springs can be installed. The bushings are designed together with our cooperation partner Vibracoustic. The position, rigidity and damping effect are based on a detailed frequency analysis and avoid unfavorable resonance ranges.

With the new BENTELER IEM portfolio, customers can easily decide for themselves if two-wheel drive or all-wheel-drive should be implemented. All solutions achieve a high level of ride performance thanks to BENTELER's long experience in the development of suspension systems.

BENTELER makes it happen

As a leading global partner in the automotive industry, we enable car manufacturers to make their e-mobility solutions happen. Our competence includes a deep understanding of a full platform and its derived subsystems for electric vehicles. With our modular pre-integrated systems we cover every aspect of customer demand in the field of chassis, body-in-white and electric powertrain. In collaboration with a broad network of strategic partners, we provide our customers with the expertise they need to develop the safe and eco-friendly mobility solutions that accelerate their business.

Find out more on **www.benteler-automotive.com/e-mobility**

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