Press release

Developing the Three-Liter Car: Intelligent Chemistry in Automotive Construction

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Alexandra Boy
Chemicals Spokesperson
Corporate Press
Phone: +49 201 177-3167
Fax: +49 201 177-3030
alexandra.boy@evonik.com

- Evonik generates sales of about €1.5 billion in the automotive market
- Creative solutions make important contributions to energy efficiency
- Comprehensive expertise in lightweight construction, fuel saving, reduction of emissions, and surface and lighting technologies

Experts estimate that up to 30 percent of today's car originates in the chemistry laboratories of development departments. This is why the automotive market is one of the most important for the Chemicals Business Area of Evonik Industries; already the third-largest market in terms of volume sales, the market continues to grow steadily. In fiscal 2006, the Essen group generated sales of €1.5 billion in the automotive area. "We add momentum in two directions," says Patrik Wohlhauser, member of the Management Board of Evonik Degussa GmbH with responsibility for the automotive industry: "On the one hand, we provide our chemical expertise to the automotive industry; on the other, we report back to our own research and development departments the ideas, goals, and wishes of car makers, with whom we're in constant contact." The manufacturers then draw even more heavily on Evonik's expertise as a supplier of materials and systems.

At this year's Hannover Messe, Evonik will illustrate this synergy with the example of a commercial Golf V. Together with other companies, the specialty chemicals group from Germany has succeeded in reducing the weight of the car, originally 1360 kilograms, by a phenomenal 371 kilos. With some positive and highly desirable side effects: CO_2 emissions have

Evonik Industries AG
Rellinghauser Strasse 1-11
45128 Essen
Germany
www.evonik.com

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Registered Office: Essen
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Commercial Registry B 19474

declined by 32 percent to 103 g/km, and gas consumption has fallen by about a third, from 5.7 liters to a mere 3.9 liters per 100 kilometers.

The expertise that went into the car is based on four overlapping areas of competence: lightweight construction, fuel saving and emission reduction, surface technology, and lighting technology. In principle, several possibilities exist to reduce energy consumption, and therefore emissions, in a car: a more efficient engine, reduced rolling resistance and drag, and reduction of the weight of the car. Specialists have great expectations for hybrid, and even fully electric, vehicles. Novel lithium-ion batteries play a special role here, being lighter, smaller, and more powerful than conventional batteries. And—as a result of technology from Evonik—also safer, thanks to SEPARION® ceramic membranes. As a collaborator with manufacturers of anodes and cathodes, and by way of a stake in a company producing battery cells, Evonik is a system supplier along the value chain.

In addition to novel battery cell technology, Evonik also has available other materials that help reduce fuel consumption and CO_2 emissions. These include materials for lightweight construction, such as the highly rigid, but light, ROHACELL® structural foam. This allows the manufacture of components such as engine hoods and spoilers in sandwich composite construction. The weight of the hood of a BMW X5 sports car is dramatically reduced in this way, from the original 20.3 kilos to just 5.9 kilos. Rear windows made from PLEXIGLAS® from Evonik provide further weight savings of up to 70 percent. Advanced lightweight construction is also necessitating the use of high-performance adhesives. The use of one kilogram of epoxy resin adhesive reduces the weight of a car by 25 kilos, and moreover increases the rigidity of the adhesive bonded bodywork. These examples underscore Evonik's claim of contributing sustainably to energy efficiency with innovative solutions in the automotive and other industries—and at the same time maintaining and consolidating its technological and market leadership. Evonik is the only producer worldwide of all the three reinforcing fillers that are important for tires: industrial blacks (carbon blacks), silica, and silanes. The group is the global market leader in rubber silica and organosilanes, and the world's second-largest producer of carbon blacks. All these components contribute to the performance profile of a tire. Rolling resistance is particularly important. The lower this is, the lower are fuel consumption and carbon dioxide emissions. Optimal

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Germany
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adjustment of these components allows rolling resistance to be reduced by up to 10 percent, which results in fuel savings of 3 to 8 percent.

Evonik achieves further savings of costly fuel through innovative lubricants. The additives contained in these lubricants for various functions are now high-chem products. VISCOPLEX® lubricants ensure better protection against wear and tear, improved temperature performance, and less sludge formation in the engine. This again results in a welcome reduction in driving costs through improved efficiency of the engine and gear unit, leading to reduced fuel consumption and CO_2 emissions. Laboratory and field tests indicate an efficiency enhancement of more than 18 percent, a result that's also brought a reward of another kind: The British trade publisher ICIS has awarded Evonik its prize for the innovation with the greatest positive impact on the environment.

But Evonik products do more than protect the environment; they also appeal to the senses. Our automotive construction coatings are among the best in their class, setting new standards in weathering, chemical, corrosion, and scratch resistance. A new dispersion under the AEROSIL® brand name allows the production of even more scratch-resistant and brilliant coating systems, thanks to a customized additive that optimizes the flow behavior of the coating and makes it possible to achieve the desired appearance of the final coating. Among its many components are matting agents, which ensure soft-feel coating films that beautify the interior of the car.

Entirely new design possibilities allow production of car parts from plastics that often integrate additional functions, have high-gloss surfaces, or, as in the case of PLEXIGLAS®, reduce coating costs. Special molding compounds of this type, as are used in the A-pillar cover of the Mini, are now in use in large-scale production, in more than 30 models from 13 well known car makers. In Europe alone, one out of two taillights is made from PLEXIGLAS® molding compounds.

The Chemicals Business Area of Evonik Industries is much in demand as a partner of the automotive industry—in established markets, such as tires and lubricant additives, as well as for its innovative products in new markets, such as plastic windshields and lithium-ion batteries. Experience for yourself the work of Evonik's automotive specialists in the field of energy efficiency, which is on display at the Hannover Messe: by

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way of a Golf V and numerous other exhibits, and through personal discussion.

Company information

Evonik Industries is the creative industrial group from Germany which operates in three business areas: Chemicals, Energy and Real Estate. Evonik is a global leader in specialty chemicals, an expert in power generation from hard coal and renewable energies, and one of the largest private residential real estate companies in Germany. Our strengths are creativity, specialization, continuous self-renewal, and reliability. Evonik is active in over 100 countries around the world. In its fiscal year 2007 about 43,000 employees generated sales of about €14.4 billion and an operating profit (EBIT) of more than €1.3 billion (preliminary figures).

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