Lightweight Industries

The development and use of lightweight construction solutions is an important requirement for the competitiveness of German industry. Lightweight construction is of great importance for a number of industries including, for example, the automotive construction and transportation, mechanical engineering, and production technology sectors as well as the construction industry. Lightweight construction will be decisive in determining whether German industry will also be successful in establishing itself as a lead provider of innovative energy and resource-efficient products in the future. Against the background of the fact that Germany is a worldwide leader in the production and production techniques of innovative materials, lightweight construction is a central industrial political issue.

Latest Publication

Industrie Overview: The Lightweight Industry in Germany [Issue 2018]

The development of lightweight construction, materials, and design has an important role to play in consolidating Germany’s role as an international industry leader.

Issues and Areas of Activity

Tradition provides the basics...

Ideas in lightweight design need demand from industry. Industrial production has been Germany’s USP ever since.
Lightweight construction represents not only weight savings for industry, but also the implementation of new applications as well as system properties. This leads ultimately to own-product cost reductions as well as the production of completely new products. Using lightweight construction, companies are able to strengthen their own competitive position.

Lightweight construction is reflected in three ways in Germany’s industrial and technological landscape:

- in the design and construction process
- in the mastery of production technologies
- in the selection of suitable materials

Germany means that you are in the center of future trends in lightweighting:

- Benefit from a dense network of centers of excellence which include producers and R&D players in new materials, automation and tooling, who continually expand their knowledge by learning from each other.

- Chose your material either from refined metal processing or be part of pushing the industrialization of carbon fiber into new uncharted applications.

- Join a lightweight community and benefit by a support structure, not only offering public aid for R&D and production but also market intelligence and community building in at least five main clusters.
**10 German Main Clusters**

Collaboration is pivotal: Clusters help to gain knowledge and to join forces. Germany has set up a diversified lightweight cluster structure that cover the whole value chain.

The 10 German main clusters represent:
- Total number of members: >2000
- Total number of R&D players: >260
- Foreign Partner Countries: >40
- Annual Public Funding: >60 Mill. Euros

For further information about the ten German main clusters, please click on the links below the grafic:

- Aachen Center for Integrative Lightweight Production (AZL)
- CFK Valley e.V., Stade
- Institute of Lightweight Engineering and Polymer Technology (ILK), Dresden
- Leichtbau BW, Stuttgart
- MAI Carbon, Augsburg
- The Institute of Plastics Processing (IKV) at RWTH Aachen University
- EcoMaT Bremen
- Cluster of Excellence ’MERGE’, Chemnitz
- Open Hybrid LabFactory, Wolfsburg
- Alliance of Textile Lightweighting, Chemnitz
LIGHTWEIGHT INDUSTRIES

- Allianz Textiler Leichtbau (ATL)
- CFK Valley e.V., Stade
- The EcoMaT research and technology centre
- Institute of Lightweight Engineering and Polymer Technology (ILK), Dresden
- Institute of Plastics Processing
- LeichtbauBW, Stuttgart
- MAI Carbon, Augsburg
- MERGE
- Open Hybrid Lab Factory (OHLF)

Fraunhofer - Global brand for industrial R&D
Fraunhofer is THE global brand for industrial R&D. Its Alliance for Lightweight Design is globally unprecedented.

Selected Fraunhofer Topics in Lightweight Design and Materials:

- High Speed Dynamics (EMI)
- Advanced Materials (IFAM)
- Integrated Circuits (IIS)
- Ceramic Technologies and Systems (IKTS)
- Laser Technology (ILT)
- Microstructures of Materials and Systems (IMWS)
- Silicate Research (ISC)
- Surface Engineering and Thin Films (IST)
- Industrial Mathematics (ITWM)
- Mechanics of Materials (IWM)
- Machine Tools and Forming Technologies (IWU)
- Material and Beam Technology (IWS)
- Nondestructive Testing (IZFP)
Lightweight Construction in Germany

Automation is the shining star...

Industrial automation is critical for minimizing costs in lightweighting. Engineering and tooling are Germany’s flagship industries.

- Sensors, actuators and Big Data processing facilitate lighter construction and allow unique functions based on new solutions in design and production.
- “Plattform Industrie 4.0” is a nation-wide infrastructure that supports also the lightweight industries. The platform sets standards & norms, creates a legal framework that ensures safety issues and solves skill mismatches.

Aerospace sets the pace...

Aerospace has been traditionally the catalyst for lightweight design. The R&D-driven German aerospace industry is continuously raising demand.
Automotive is the future promise …

Electric mobility desperately needs lightweight design to raise a car’s performance. With a total of 40 EV worldwide, 29 are from German OEM’s.

- Germany is a lead provider of E-Mobility with the widest range of EV
- German OEMs introduced 29 EV models
- Car models have different propulsion systems: BEV, REEV & PHEV

Relative importance of materials in structural relevant lightweight parts in EVs (5 years horizon, estimated by German industry players)

- BMW will produce a Plug-in-hybrid version of every major model
- Daimler will introduce 10 new PHEV by 2017
- Volkswagen plans to manufacture 20 new EV-models by 2020
- Porsche intends to add a 911 PHEV to its 3 existing EV-models

Source: NPE, Germany Trade and Invest Research (2016); ILK Dresden (FOREL Study)
List of car models is not intended to be exclusive

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New technologies will be core enablers...

The complexity of lightweight design needs new production technologies. Germany hosts more world market leaders in 3-D printing than any other.

- Industrial 3-D printing will enhance lightweight design to new levels.
- It will increase rapid response to markets, overcome design restrictions and increase construction complexity. Supply chains will be compressed producing a just-in-time quantity of parts by keeping the flexibility to change product design.
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✉️ Submit your question

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