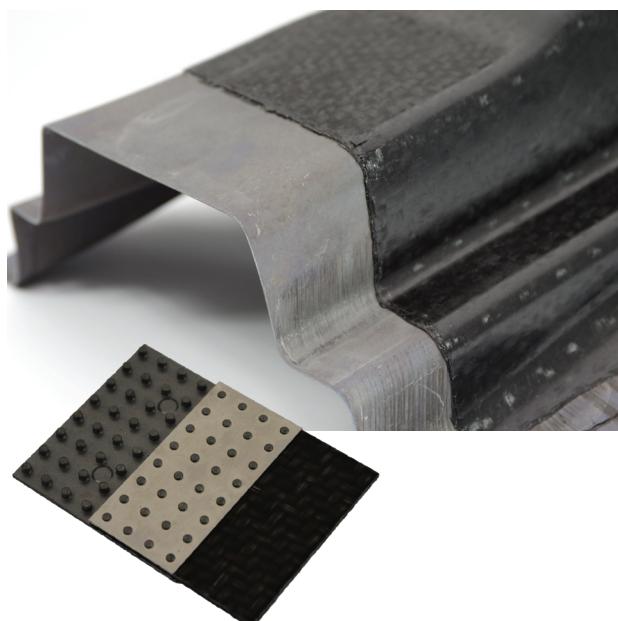
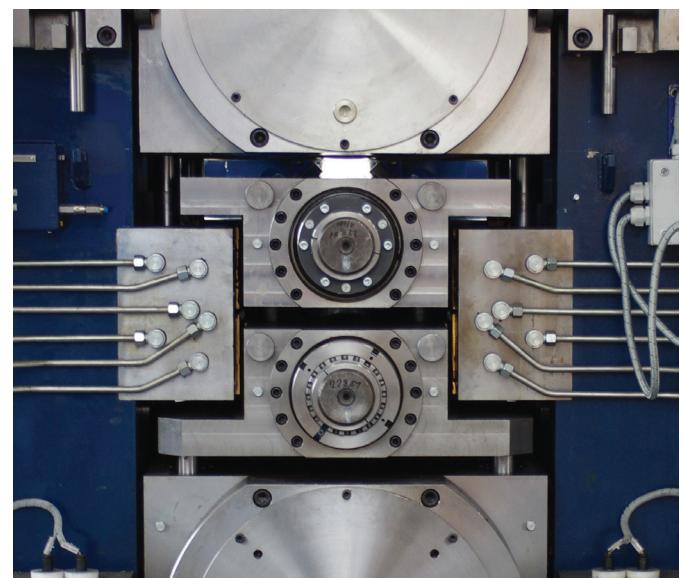


Future-oriented forming technologies for lightweight construction

The core competence of the Lightweight Design by Sheet Metal Forming division of Neue Materialien Fürth GmbH is the development and implementation of the whole process route for the production of tailored semi-finished sheet metals with optimized properties as well as the production of metal and hybrid components for lightweight construction applying sheet metal forming, bulk and sheet-bulk metal forming. In addition to the major machines CO₂ cutting laser, four-high rolling machine, hydraulic and servo-hydraulic presses, different heat treatment furnaces, testing machines with the associated optical measuring systems, a metallographic laboratory and various tools for the numerical analysis are available. We are partners of the supplier industry and automotive manufacturers for the development of new materials and innovative processing technologies.

TAILORED PRODUCTS

We produce tailored multi-layered aluminum sheet metals using our four-high rolling machine. Amongst others, the Accumulative Roll Bonding process is used for the production of sheets with, for example, 256 layers and a significantly enhanced mechanical strength. Furthermore, this process enables the combination of different metals and alloys and thus the production of sheet metals with tailored property gradients. In addition, hybrid sheet materials with internal polymer layers are produced by means of warm rolling. The combination with the Tailor Heat Treated Blanks technology enables the enhancement of the formability of these materials applying a local short-term heat treatment using laser radiation.



HYBRID COMPONENTS

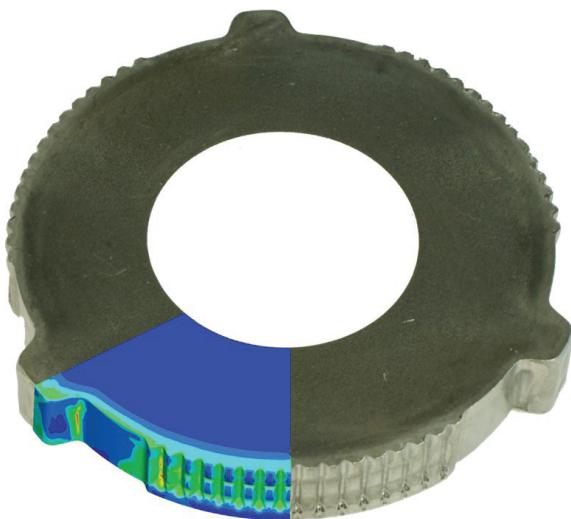
For the fullest exploitation of the potential for lightweight construction, various materials are combined to hybrid components. Besides mastering the processing of the individual materials, such as steel and aluminum sheet metal, cast magnesium and fiber-reinforced plastics, this requires the development of innovative manufacturing strategies and joining technologies. These enable the realization of hybrid components with optimized process- and application-adapted property distributions.

In addition, we focus the testing and quality assurance of the produced components. We are able to evaluate the geometric, mechanical and microstructural properties with various measuring systems and analytical methods.



MATERIAL CHARACTERIZATION

Mechanical properties and the associated material models are the fundamental basis for an efficient design of processes, tools and components using numerical methods. The quality of the input data determines the quality and effectiveness of a numerical analysis. For the mechanical characterization of semi-finished products and components at different stress states, various testing machines and optical measuring systems are available. This includes static and cyclic loading and testing at high strain rates to assess the crash behavior. In addition, we analyze the mechanical properties at elevated temperatures and are able to simulate heat-treatment cycles using a thermal-mechanical testing machine.



FURTHER EQUIPMENT

For the production of components according to customer requirements by means of laser cutting a CO₂ laser is available. In addition to small and medium series also individual pieces can be cut cost efficient. On a hydraulic press with integrated orbital forming function and with a servo press small series and demonstrator components can be manufactured and the flexible start-up of new tools is possible. For the numerical design of processes and tools, i.a. Simufact.forming, AutoForm and LS-DYNA are available.



Prof. Dr.-Ing. habil. M. Merklein
Friedrich-Alexander-Universität Erlangen-Nürnberg
Egerlandstraße 13
D-91058 Erlangen

Institutional funded by

Bayerisches Staatsministerium für
Wirtschaft, Landesentwicklung und Energie



Europäische Union

Europäischer Fonds für
regionale Entwicklung

Contact

www.nmfgmbh.de

Neue Materialien Fürth GmbH
Dr.-Mack-Straße 81
D-90762 Fürth

E-Mail: blechleichtbau@nmfgmbh.de