

## TOPIC AREA "HYBRID CASTING"

### Creating Connections and Increasing Strengths

The topic area "Hybrid Casting" within the Casting Technology and Lightweight Construction department at Fraunhofer IFAM focuses on the combination of casting with integrated structures for **joining** dissimilar materials, such as fiber composites or sheet metal and profile structures, or with the **local strengthening** of cast components.

The possibility to create a **hybrid structure** is hereby offered directly during the casting process. This enables innovative components to be realized with a **reduction in manufacturing steps**. Furthermore, through this technological approach, a **high potential for lightweight construction** and the possibility for the implementation of **multi-material systems designed to meet the specific requirements** are facilitated through this innovative approach during the initial casting process.

Through the combination with the simulation for these innovative multi-material systems, **simulation models** and **interface modelling** can be set up parallel to their development. This will provide a comprehensive consideration of these innovative and future-oriented material systems.

## CONTACT

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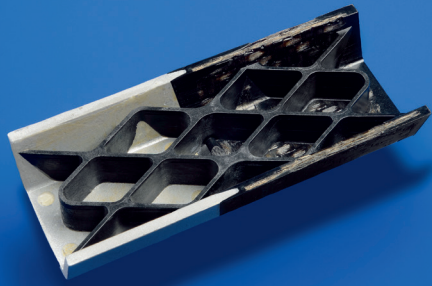
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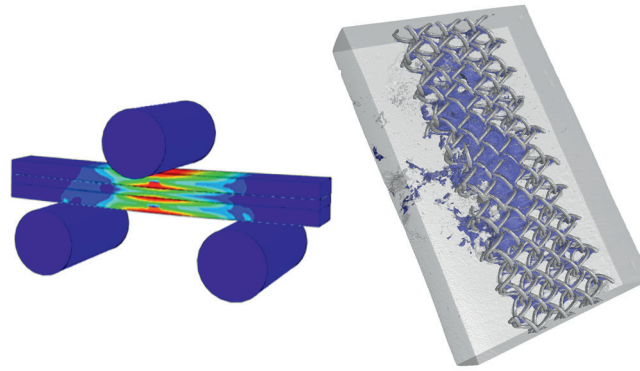
CASTING TECHNOLOGY AND LIGHTWEIGHT CONSTRUCTION

## TOPIC AREA "HYBRID CASTING"





**OHLF** OPEN HYBRID  
LABFACTORY  
Der LeichtbauCampus.



## Focus Points in the Topic Area “Hybrid Casting”

### Metal-to-metal compound casting

- Metal-to-metal joints implemented during the casting process to reduce the number of joining process steps

### CFRP-aluminum hybrid casting

- Fiber and load-appropriate metal-fiber composite connections created during the casting process

### Additive manufacturing and casting

- Combination of additive manufacturing and casting to exploit the respective process-related advantages

### Numerical simulation

- Simulation of tool design from the first description of the interface to new material models

### Nondestructive testing for hybrid casting

- Series-suitable, nondestructive testing methods for hybrid multi-material systems

### Infiltrated graphite

- Infiltration of porous structures with metal for the realization of novel materials

## From the concept to the product...

With our competencies in Casting Technology, Fraunhofer IFAM accompanies our industrial customers throughout the casting technology implementation of an idea from the concept to the first prototype to the final series-ready product. We have various casting processes and materials ready to address any query.

## ... in our one-stop shop!

The Casting Technology and Lightweight Construction department can illustrate the entire process chain from the concept phase via the casting design to the tool construction and the casting technological manufacture to the final metallographical and nondestructive testing.

## Novel technology combinations

In addition to the conventional casting technological queries we also support our customers when it comes to reaching across technologies into manufacturing and materials technology. For this, project teams from various departments at Fraunhofer IFAM as well as other institutes of the Fraunhofer-Gesellschaft will come together to combine their expertise. Such topics as corrosion, surface treatment, paint and lacquer technology or adhesive bonding technology can be scientifically and practically addressed through our comprehensive network of research and development staff.

## An overview of our services

- Technology consulting for the processes of high-pressure die-casting, low-pressure die-casting, lost foam casting and investment casting
- Experimental research and development
- Feasibility studies and market analyses
- Error and process analyses
- Quality testing and analytics

## Our research topics

- Complex castings
- Castings for electric drives
- Hybrid casting and fiber integration
- Digitalization of castings through the integration of RFID transponders and sensors

## Technological equipment

- HPDC: 660t BÜHLER SC/N 66 + 250t FRECH DAK 250-34
- LPDC: TEGISA I (50 liters melt volume)
- LPDC: TEGISA II (110 liters melt volume)
- Investment casting: INDUTHERM VC 650 + INDUTHERM VC 3000 D
- Wax injection casting: ModTech C20
- Lost foam casting: VULCAN compaction unit Vector-Flo

## Analytics

- X-ray and computer tomography: YXLON MU-2000
- Optical measurement system: GOM ATOS 3 TripleScan
- Complete range of metallographical testing at Fraunhofer IFAM