

# Fraunhofer Institute for Machine Tools and Forming Technology

## About this organisation

Fraunhofer Institute for Machine Tools and Forming Technology IWU is a driver for innovations in the field of production research and development. Lightweight structures are essential success factors in this context. The focus lies on metal foams, hybrid materials, pultruded and printed fiber-plastic composites.

We develop, design and manufacture entire assembly groups using these materials. If requested, we optimize the functions and properties of the assembly groups by simulation before their manufacturing and verify these characteristics after the completed production by conducting property analyses. Additive manufacturing processes open up new possibilities regarding component design, material utilization and individual number of pieces: laser beam melting is used for tool-free manufacturing of geometrically complex metal components. Such components include tools with integrated tempering channels and medical titanium implants with patient-specific geometry or internal functional structures for higher patient comfort. High functional integration is achieved by integrating sensors and actuators into the components. The research activities in additive manufacturing of plastic components focus on material development, increase in efficiency and resource efficiency.

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### Organisation type

Non-university research institution

### Sectors



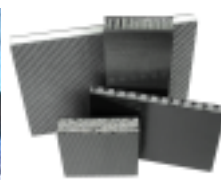
### Employees

500 and more

### Turnover

€10m - €50m

### Funding



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## About this organisation

**Main areas covered** metal foam, fibre-reinforced plastics, metallic lightweighting, topology optimization, prototype construction

### Infrastructure

**Certifications** ISO 9001

**Keywords** E3 Research Factory, Metal Foam Center

### Memberships

## Overview of lightweighting expertise

	Research	Development	Manufacturing & Supply
<b>Offer</b>			
<b>Products</b> Parts and components, Semi-finished parts, Machines and plants, Software & databases, Materials, Tools and moulds	✓	✓	
<b>Services &amp; consulting</b> Consulting, Testing and trials, Funding, Engineering, Prototyping, Simulation, Technology transfer	✓	✓	

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## Overview of lightweighting expertise

	Research	Development	Manufacturing & Supply
<b>Field of technology</b>			
<b>Design &amp; layout</b> Lightweight manufacturing, Lightweight design, Hybrid structures, Lightweight construction concepts, Lightweight material construction	✓	✓	
<b>Functional integration</b> Actuator technology, Sensor technology	✓	✓	
<b>Measuring and testing technology</b> Component and part analysis, Visual analysis (e.g. microscopy, metallography), Materials analysis, Destructive analysis, Non-destructive analysis	✓	✓	
<b>Modelling and simulation</b> Loads & stress, Optimisation, Structural mechanics, Materials	✓	✓	
<b>Plant construction &amp; automation</b> Plant construction, Automation technology, Handling technology, Robotics	✓	✓	
<i>Recycling technologies</i>			

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## Overview of lightweighting expertise

	Research	Development	Manufacturing & Supply
<b>Manufacturing process</b>			
<b>Additive manufacturing</b> 3D printing, Selective laser melting (SLM, LPBF, ...), Selective laser sintering (SLS)	✓	✓	
<i>Coating (surface engineering)</i>			
<b>Fibre composite technology</b> Resin infusion process, Resin transfer moulding, Pre-preg processing	✓	✓	
<b>Forming</b> Impact extrusion, Compression moulding, Thermal converting, Deep-drawing, Fluid active media based forming, Rolling	✓	✓	
<b>Joining</b> Clinching, Hybrid joining, Adhesive bonding, Sewing, Riveting	✓	✓	
<i>Material property alteration</i>			
<b>Primary forming</b> Pultrusion, Sintering, Injection moulding	✓	✓	
<i>Processing and separating</i>			
<b>Textile technology</b> Preforming	✓	✓	

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## Overview of lightweighting expertise

	Research	Development	Manufacturing & Supply
<b>Material</b>			
<i>Biogenic materials</i>			
<b>Cellular materials (foam materials)</b> Closed-pore, Open-pore	✓	✓	
<b>Composites</b> Glass-fiber reinforced plastics (GFRP), Carbon-fiber reinforced plastics (CFRP)	✓	✓	
<b>Fibres</b> Aramid fibres, Glass fibres, Carbon fibres	✓	✓	
<b>Functional materials</b> Shape memory materials, Piezoelectric materials	✓	✓	
<b>Metals</b> Aluminium, Magnesium, Steel, Titanium	✓	✓	
<b>Plastics</b> Thermoset plastics, Elastomers, Thermoplastics	✓	✓	
<i>Structural ceramics</i>			
<b>(Technical) textiles</b> Meshes, Laid webs, Woven fabrics, Knitted fabrics, Nonwovens, mats	✓	✓	

## Contacts

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