### About this organisation

#### **Machine translation**

This profile has been machine-translated based on data provided in German.

Research at the Fraunhofer Centre for High Temperature Lightweight Construction HTL focuses on sustainable heating processes. Sustainability is achieved through high quality as well as energy and cost efficiency of the processes. With this goal in mind, the HTL develops materials and components, measurement and simulation methods for high-temperature applications. Important applications are in heat, drive and energy technology.

At the Fraunhofer HTL Centre, ceramic and metallic components as well as composites are developed in a closed process chain from component design and material design to production on a pilot plant scale and testing of the application behaviour. The technological focus is on the production of lightweight components from ceramic matrix composites (CMC). The entire process chain is covered, from the development of ceramic fibres and their coating to textile fibre processing, matrix construction, thermal processing and joining through to final processing. In addition, processes such as 3D printing are also available for the production of metal and ceramic components with complex geometries. Thermo-optical measuring furnaces (TOM) are developed at the HTL to test high-temperature materials and optimise their manufacturing processes.

Gottlieb-Keim-Straße 62 95448 Bayreuth Bavaria Germany 🛙 www.htl.fraunhofer.de





**Organisation type** Non-university research institution



Employees 50 up to 249

**Turnover** €2m - €10m

Funding n/a

| About this org        | ganisation   |
|-----------------------|--|
| Main areas<br>covered | Ceramic fibre development, CMC components, Non-destructive testing, FE simulation, Component modelling                             |
| Infrastructure        | Fibre spinning plant, Coating system, Computer tomography, Technical centre for prototype production                               |
| Certifications        | ISO 9001:2015  |
| Keywords              | High-temperature lightweight construction, Ceramic fibres, Simulation,<br>ThermoOptical Measuring Systems TOM, CMC, Ox/Ox, SiC/SiC |
| Memberships           |  |

## Overview of lightweighting expertise

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|  | Research     | N<br>Development | Aanufacturing<br>& Supply |
|--|--------------|------------------|---------------------------|
| Offer  |              |                  |                           |
| <b>Products</b><br>Parts and components, Semi-finished parts,<br>Machines and plants, Software & databases,<br>Materials   | $\checkmark$ | $\checkmark$     | ~                         |
| <b>Services &amp; consulting</b><br>Consulting, Testing and trials, Engineering,<br>Standardisation, Prototyping, Validation,<br>Simulation, Technology transfer | $\checkmark$ | ~                | $\checkmark$              |

| Overview of lightweighting expertise   |                 |              |                           |
|--|-----------------|--------------|---------------------------|
| Machine translation  |                 |              |                           |
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|  | Research        | Development  | Manufacturing<br>& Supply |
| Field of technology  |                 |              |                           |
| <b>Design &amp; layout</b><br>Others: null   | $\checkmark$    | $\checkmark$ | $\checkmark$              |
| Functional integration   |                 |              |                           |
| <b>Measuring and testing technology</b><br>Component and part analysis, Visual analysis<br>(e.g. microscopy, metallography), System<br>analysis, Materials analysis, Destructive analysis,<br>Non-destructive analysis | ~               | $\checkmark$ |                           |
| <b>Modelling and simulation</b><br>Loads & stress, Optimisation, Processes,<br>Structural mechanics, Materials   | $\checkmark$    | $\checkmark$ | $\checkmark$              |
| <b>Plant construction &amp; factory automation</b><br>Plant construction   | $\checkmark$    | $\checkmark$ | $\checkmark$              |
| <b>Recycling technologies</b><br>Upcycling   | $\checkmark$    | $\checkmark$ |                           |

| Overview of lightweighting expertise  |                 |                  |                           |
|---|-----------------|------------------|---------------------------|
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|   | Research        | N<br>Development | Aanufacturing<br>& Supply |
| Manufacturing process   |                 |                  |                           |
| Additive manufacturing<br>3D printing, Selective laser melting (SLM,<br>LPBF,), Selective laser sintering (SLS),<br>Stereolithography   | ~               | $\checkmark$     | $\checkmark$              |
| <b>Coating (surface engineering)</b><br>Painting, Powder coating  | $\checkmark$    | $\checkmark$     |                           |
| <b>Fibre composite technology</b><br>Filament winding, Casting (concrete), Manual<br>lamination, Resin infusion process, Pre-preg<br>processing   | $\checkmark$    | ~                | $\checkmark$              |
| Forming   |                 |                  |                           |
| <b>Joining</b><br>Adhesive bonding, Soldering   | $\checkmark$    | $\checkmark$     |                           |
| Material property alteration<br>Heat treatment  | $\checkmark$    | $\checkmark$     |                           |
| Primary forming   |                 |                  |                           |
| <b>Processing and separating</b><br>Drilling, Turning, Milling, Sawing, Grinding,<br>Cutting  |                 |                  | $\checkmark$              |
| <b>Textile technology</b><br>Fibre manufacturing, Braiding, Yarn & roving<br>production, Preforming, Knitting, Textile<br>surface treatment and finishing, Nonwoven &<br>mats production, Weaving, Knitting, laid web<br>production | ~               | ~                | ~                         |

| Overview of lightweighting expertise  | verview of lightweighting expertise |                  |                          |  |
|---|-------------------------------------|------------------|--------------------------|--|
| Nachine translation   |                                     |                  |                          |  |
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|   | Research                            | N<br>Development | Aanufacturir<br>& Supply |  |
| Material  |                                     |                  |                          |  |
| Biogenic materials  |                                     |                  |                          |  |
| <b>Cellular materials (foam materials)</b><br>Closed-pore, Open-pore  | $\checkmark$                        | $\checkmark$     | $\checkmark$             |  |
| <b>Composites</b><br>Glass-fiber reinforced plastics (GFRP),<br>Ceramic matrix composite (CMC), Carbon-<br>fiber reinforced plastics (CFRP), Short fibre-<br>reinforced concrete, Metal-ceramic composite,<br>Metal matrix composite, Laminates, Particulate<br>composites, Textile-reinforced concrete | ~                                   | ~                | ~                        |  |
| <b>Fibres</b><br>Basalt fibres, Glass fibres, Ceramic fibres,<br>Carbon fibres  | $\checkmark$                        | ~                | $\checkmark$             |  |
| Functional materials  |                                     |                  |                          |  |
| Metals  |                                     |                  |                          |  |
| <b>Plastics</b><br>Thermoplastics   |                                     |                  | $\checkmark$             |  |
| <b>Structural ceramics</b><br>Monolithic ceramics, Non-oxidic ceramics,<br>Oxidic ceramics, Ultra-high-temperature<br>ceramics  | $\checkmark$                        | $\checkmark$     | $\checkmark$             |  |
| <b>(Technical) textiles</b><br>Yarns, rovings, Meshes, Laid webs, Crocheted<br>fabrics, Woven fabrics, Knitted fabrics,<br>Nonwovens, mats  | $\checkmark$                        | ~                | $\checkmark$             |  |

### Contacts

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