

Prototyping & Labs

Engineering, Mechanical Lab, Laser Lab, Measurement Lab, 3D Printing Lab

Prototyping & Labs manufactures, inspects, and tests components and fuel assemblies

Challenge

Operating nuclear power plants is increasingly demanding in today's world. Rising economical pressure, new requirements by authorities as well as the need for technical improvements makes innovational progress crucial.

At the same time, the number of qualified nuclear suppliers is very limited, making a continuous improvement even more challenging.

Solution

Prototyping & Labs is the only complete, mechanical FUEL related workshop on site in Western Europe that offers a complete spectrum for building new fuel assembly designs. It consists of an engineering unit, a mechanical lab, a laser lab, a measurement lab, and a 3D printing lab.

Prototyping & Labs supports local and global development projects of FUEL by manufacturing:

- Prototypical fuel assemblies (FAs) and components
- Test parts, FA components, and test FAs
- Material test rods for nuclear applications
- FA components for lead FAs and reloads

Along with manufacturing and inspecting components and test FAs for mechanical tests, we also perform quality assured mechanical design tests.

We use the latest technologies such as Additive Manufacturing, 3D-photogrammetry, and robotics. We are able to manufacture all kinds of components in certified quality for other uses as well.

Customer benefits

- One source for everything from conception to finished product
- Time-saving due to fast completion of manufacturing orders, easy ordering processes via charge code, and simple checking in on progress of project
- DIN, ASME, and KTA certified processes for high-quality products

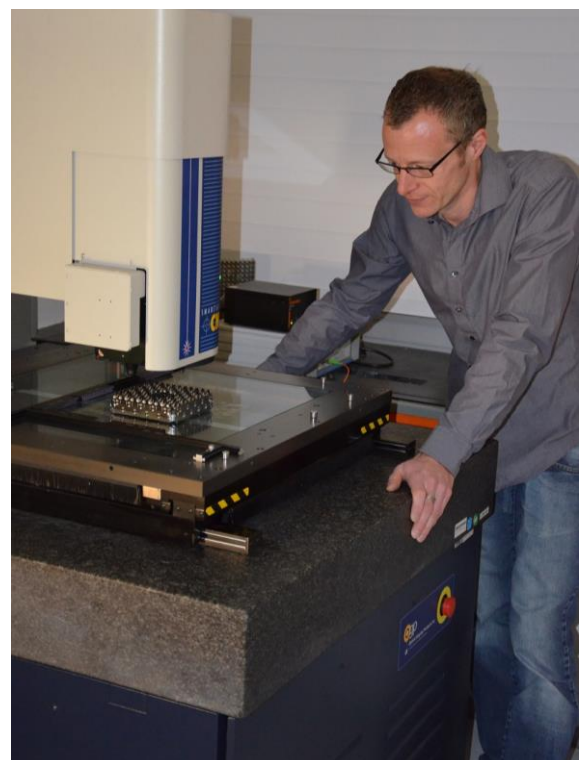


Fig 1: Optical measurement of components

**Your performance
is our everyday commitment**

Technical information

Engineering

- Project monitoring and documentation
- Supplier monitoring
- Fixture and tool design

Mechanical Lab

- Manufacturing of prototypes, reactor components, fixtures, and tools
- 5-axis 3D CNC milling, turning, and grinding
- 3D EDM eroding
- Material forming (stamping, bending), robot stamping center

Laser Lab

- Material laser treatment from micro to macro:
 - Materials: Zr alloys, nickel-based alloys, and stainless steel
 - Laser cutting of sheets
 - Laser welding
 - Laser marking (alphanumeric data, machine readable codes, and pictures) with a collaborating handling robot

Measurement Lab

- Performance of quality-assured mechanical design tests of components and FAs
- Optical and tactile dimensional measurements (Photogrammetry - 3D measurement of large objects)
- Scanning electron microscopy



Fig 2: CNC-milling of components

- Stress analysis with resistance strain gauges
- Corrosion tests (autoclaves)
- Heat treatment (vacuum furnaces)
- Hydrogen charging of long tubes

3D Printing Lab / Additive Manufacturing

- Rapid Prototyping:
 - 3D printing of prototypes and handling samples
 - 3D high-resolution plastic print

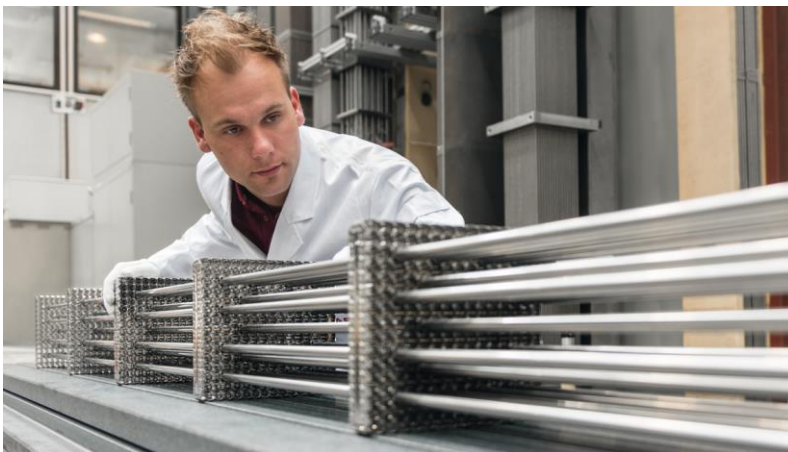


Fig 3: Test FA preparation

References

- Development and testing of components for our latest products: **ATRIUM 11 + GAIA**
- Fuel service tools
- Nuclear heater tube repair plugs (KTA/ASME)
- Test components for international customers

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