framatome

Laser welding

Highly precise and penetrative welding of nickel-based and zirconium alloys and stainless steel

The site of Advanced Nuclear Fuels GmbH* in Karlstein has been manufacturing components for fuel assemblies for over 50 years. During this time we have acquired an expert knowledge in the area of laser welding.

Challenge

Welding nickel-based and zirconium alloys is challenging. This is especially the case when thin sections must be welded to very precise dimensions without discoloration or corrosion. The equipment and the fixtures must to be customised and to adapt to requirements of weld off-gassing, shrinkage and inner material structure, amongst others.

A high traceability is required for products regulated by the government, as well as for those which could harm human wellbeing in case of a failure. In addition, the processes must be qualified and controlled and the manufacturing process must adhere to strict guidelines.

Solution

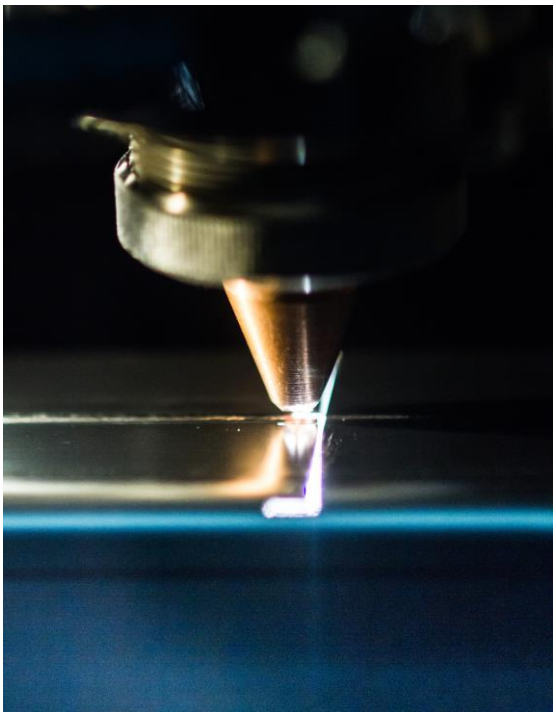
The Karlstein site is equipped with 10 different lasers containing the latest, state of the art technology. The capabilities of our machines and the development of our fixtures, chambers and welding gas guiding systems showcases our 20+ years of experience in laser welding. Our fully automated welding centres in particular display our expertise in this domain. Welding in chambers or boxes with oxygen monitoring in an ultra pure argon atmosphere (shielding gas) is one of our specialities.

Customer benefits

The Karlstein site offers a complete package from the preparation of your workpiece including the design and manufacturing of fixtures and shielding gas delivery systems with:

- Full traceability for the parts with documentation
- Qualified processes validated with a 3.1 certificate according to DIN EN ISO 10204
- Welding of materials which are highly resistant to corrosion, such as nickel-based and zirconium alloys and stainless steel

Your performance
is **our** everyday **commitment**



Key figures

10 types **laser welding** equipment

5 **axis** welding and cutting machines

6000 x 1500 x 750mm³
maximum workspace **dimensions**

400mm/sec maximum **feed rate** for welding with programmable focusing optic

300 x 300 x 300mm³ workspace of the **fully automated welding centres**

200 – 6.000W **power range** of continuous wave and pulsed laser sources

Site information

Karlstein site is manufacturing components for fuel assemblies for boiling and pressurised water reactors. Founded in 1965 the site was involved in the establishment of the Nuclear industry in Germany. After production of Fuel elements, the site concentrated its activities in 1995 to the manufacturing of mechanical components for fuel assemblies and is established as a centre of excellence for:

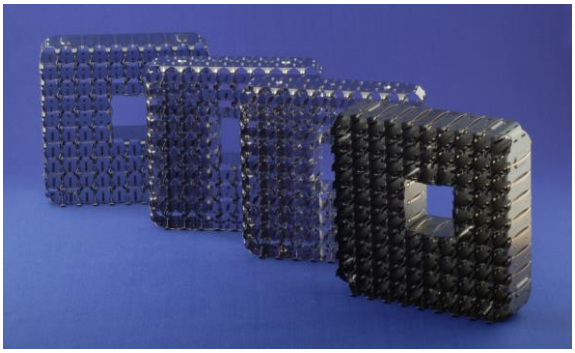
- spacers
- cages
- upper and lower tie plates
- lathe components

Karlstein has a vast experience in laser welding and heat treatment, especially of nickel based and zirconium alloys. Its machine shop includes:

- 10 laser welding equipment of which 2 are fully automated welding centres and one equipment that can weld dimensions of up to 6m length
- 8 lathes
- 4 milling machines
- 4 furnaces
- Special bending equipment

Being a compact site with about 150 people, Karlstein is very agile and is able to manufacture small series to very high standards. In addition the site has a successful apprentice training program which is now in place for over 20 years to assure a sustainable workforce of specialists.

Karlstein is very well situated in the Rhein-Main region with good motorway access less than one hour from Frankfurt airport.



Pictures top: flow restrictor; above: spacers

Our Values

Safety is our highest value, without compromise

Future long term relationships with our partners

Performance delivered to our customers

Integrity & transparency to all our stakeholders

Passion for what we do

Address - Location

Advanced Nuclear Fuels GmbH
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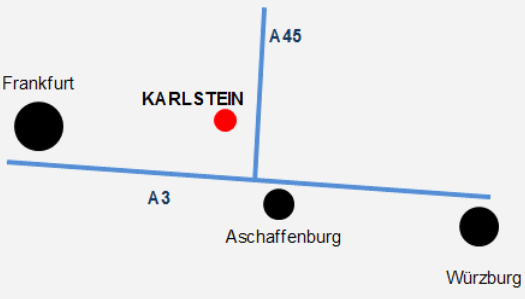
63791 Karlstein



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