

High vacuum heat treatment

Treatment of nickel-based alloy (e.g. Alloy 718) and zirconium alloys with the highest purities

ANF (Advanced Nuclear Fuel*) Karlstein has expert knowledge in the field of heat treatment with full traceability and documentation according to ANSI and AMS standards.

Challenge

It is difficult to heat treat nickel based and zirconium alloys without any discoloration. This requires choosing the correct furnace cycle and the parameters to achieve the best results.

In addition in some industries', customer and regulatory requirements, demand a total traceability of materials steps due to achieve the required safety level. This challenge to identify any given material at any time during the production process can only be met with a sophisticated traceability system, like the one is in place at Karlstein.

Solution

At ANF Karlstein we specialize in developing and meticulously observing production processes that will guarantee to deliver the desired results. Moreover, we are equipped to demonstrate total adherence to the production processes since our furnace and thermocouples are expertly calibrated.

Our integrated management system enables us to ensure and document traceability of materials throughout the production route.



Customer benefits

All heat treatment cycles are programmed by our experts and are qualified per the given customer requirements. The most important benefits:

- Secured documentation – redundant furnace reports
- High vacuum and high purity – most reliable processing
- Calibrated furnace and thermocouples – for best quality standards
- 4 furnaces, 3 with metal heating and one with graphite heating elements – meeting highest throughput rates

To conclude: If you require high quality heat treatment with over 50 years expert experience manufacturing components for fuel assemblies, ANF Karlstein is your first choice.

Key figures

1200°C the maximum **temperature** at which heat treatment can be conducted

600 x 900 x 600mm³ the maximum **dimensions** for a horizontal heat treatment

5315 x 200 x 600mm³ the maximum **dimensions** for a vertical heat treatment

15 number of **thermocouples** that can be placed at the product

35 °C/min maximum **heating** rate

30 °C/min maximum **cooling** rate in argon atmosphere

**Your performance
is our everyday commitment**

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:

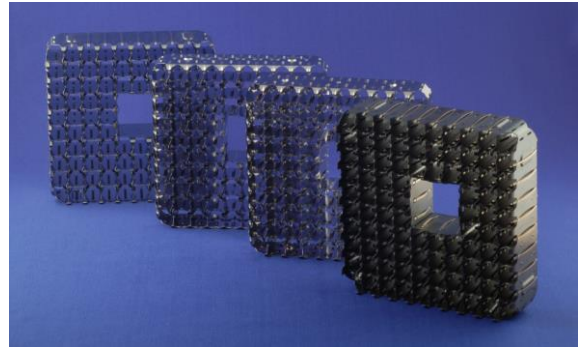
- spacers
- cages
- upper and lower tie plates
- lathe components

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

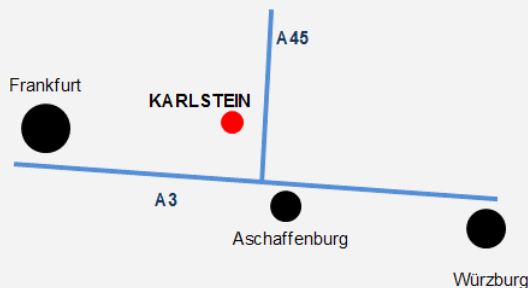
Performance delivered to our customers

Integrity & transparency to all our stakeholders

Passion for what we do

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