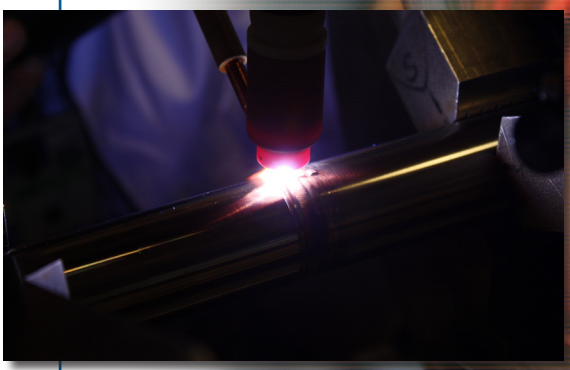
Timeless Experiments



An irradiation experiment assembled using welding and brazing methods.

Test Train Assembly Facility (TTAF)

The Test Train Assembly Facility (TTAF) is located near the Advanced Test Reactor (ATR) at Idaho National Laboratory and is used for final assembly of experiments to be installed at the ATR. The TTAF was designed and furnished with the equipment necessary to support the assembly of various configurations and design of test train experiments. The TTAF's staff is assigned to support engineering and perform the experiment assemblies.

Facility Capabilities

Welding

The TTAF has varied welding capabilities, including automated lathe and automated orbital Gas Tungsten Arc Welding (GTAW), micro spot welding, and manual welding as required to assemble the various test train experiments.

The automated lathe GTAW systems used in the TTAF are precision lathes built by AMET Inc. The automated welding lathes are currently used for circumferential welds to assemble capsules and various sections of the test train experiments.

These lathes allow for extremely high accuracy with the benefit of repeatability. Their capabilities include precision current control with pulsing capability up to 500 Hz, Automatic Voltage Control (AVC) to control welding voltage and the vertical stand-off from the work piece, and high-precision servo control to facilitate the movement of the torch to the work piece.

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The automated orbital GTAW system used in the TTAF was built by Arc Machines Inc. (AMI). This system provides the capability to perform high-precision welds on small-diameter tubes and to encapsulate materials in small-diameter capsules. This welder also provides precision current control with pulsing capability, and precision rotation of the tungsten around the work piece by means of a tachometer feedback loop.

Micro spot welding and manual welding are also performed in the TTAF based on specific needs of the current experiment. Micro spot welding is used regularly for connecting small thermocouple wires and for manufacturing thin heat shields used in the experiments.

Induction Brazing

The TTAF also has the ability to perform induction brazes, an integral component in the assembly of test train experiments. Brazing joins two pieces of metal with a solder that has a high melting point. The TTAF contains two induction brazing systems, one built by Westinghouse and the other by Superior Induction, which allow brazing of critical components on the test train experiments. This is accomplished by providing a stable fixture to hold the components to be brazed and a chamber for brazing in an inert atmosphere to avoid contamination and oxidation of the brazed components. The expertise and knowledge of the TTAF staff allows the facility to perform induction brazes on a wide range of mechanical designs and alloys.

Machining

TTAF capabilities have been expanded recently to include machining operations. A Bridgeport Mill and a Colchester Lathe have been installed to further assist in the assembly of test train experiments. The mill and lathe are used to manufacture parts or other tools and fixtures, and to perform small modifications to test train experiment components.

Fitting and assembly of the brazing material.

For more information

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