

Application Note

Heat a Block of Haynes Nickel Alloy to Test the Crack Growth Rate

- Objective:** To heat a block of Haynes nickel alloy from 600 °F (316 °C) to 1600 °F (871 °C) to collect data on the crack growth rate for an aerospace application.
- Equipment:** Ambrell EASYHEAT™ 2 kW, 150-400 kHz solid state induction heating power supply with a workhead and coil specifically designed for this application.
- Frequency:** 196 kHz
- Material:** Hanes Nickel Alloy block (3" x 5/16" / 76mm x 8mm)
- Temperature:** 1600 °F (871 °C)
- Testing:** Testing was conducted to optimize the power delivered to the part. The coil was designed to minimize the voltage potential over the length of the part. The part was placed into the coil and a multimeter was connected to it to measure the voltage potential over the length of the part. The heat was turned on and the part was heated to 1600 °F (871 °C) within 90 seconds.
- Benefits:**
- **Versatility:** The client had purchased an EASYHEAT for a different purpose, but it was also able to perform the desired material testing with the new coil
 - **Coil Design:** The client needed a coil tuned to their EASYHEAT, and it had to meet their heating requirements while leaving the center horizontal plane open for visual inspection, which this design achieved
 - **Responsiveness:** Ambrell was able to perform a free laboratory test and design a coil that would meet their needs when it comes to material testing



The Hanes nickel alloy block inside the specially designed coil