

## Preheating steel rods for forging in a fastener manufacturing process

**Objective** Heat steel rods to 2100 °F (1149 °C) while achieving a cycle time of 25 seconds

**Material**

- Steel rods ranging from 0.75" (19 mm) to 3" (76 mm) in diameter

**Temperature** 2100 °F (1149 °C)

**Frequency** 4 kHz

**Equipment**

- Ambrell EKOHEAT 375, 250 kW induction heating system, equipped with a remote workhead containing four 40 µF capacitors
- Eight multiple position, multiple turn helical coils designed and developed specifically for this application
- Dual color optical pyrometer

**Process** Initially, tests were conducted to determine the optimal way to heat steel rods evenly across the length of the rod. Once the coil design was determined, the process was designed.

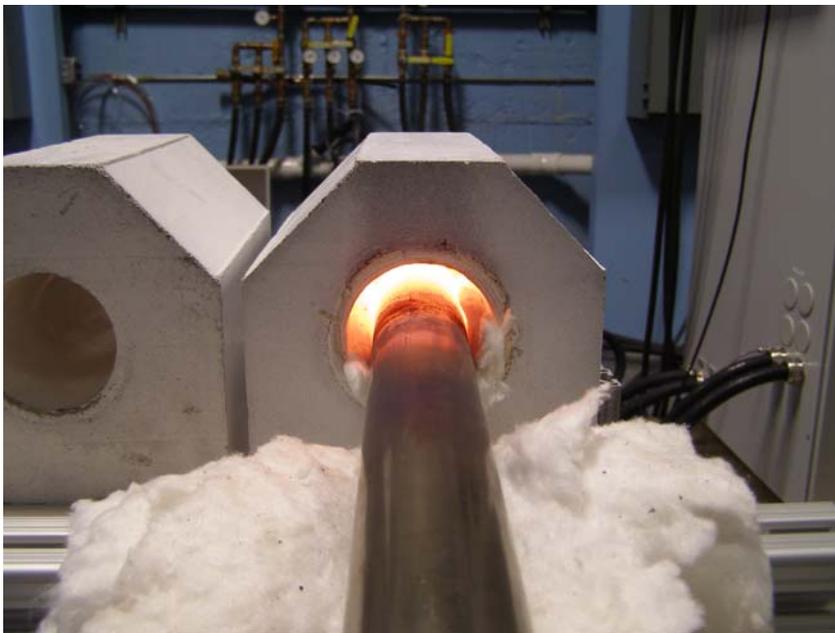
Eight coils were created, so eight rods could be heated to the desired temperature at the same time. This process achieved the target cycle time of 25 seconds per part.

**Results/Benefits**

- Even heating: The coil design enabled the rods to be heated evenly, as the application required
- Fast heating: The client targeted an aggressive cycle time, which Ambrell was able to achieve thanks to its process design and the efficiency of induction heating
- Superior design: With this process, the client no longer needed to swap out coils to heat rods of differing diameters within a specific range, which saved considerable time
- Responsiveness: The client was looking for a true partner in an effort to design an optimal, time saving heating process for their application, and they found that in Ambrell.



The eight coil induction heating unit designed for this application



The steel rod being heated inside a coil