

Brazing a steel coupler and a steel wire

Objective To heat a steel coupler and a steel wire for a heating element to temperature for a brazing application; the finished component is for use in an electric furnace

- Material**
- Steel coupler
 - Steel heating element wire
 - Braze wire alloy
 - Black flux

Temperature 1400 °F (760 °C)

Frequency 305 kHz

- Equipment**
- Ambrell EASYHEAT 2kW 150-400 kHz induction heating system equipped with a remote workhead containing two 0.33 uf capacitors
 - A single-position, three-turn helical induction heating coil designed and developed specifically for this application

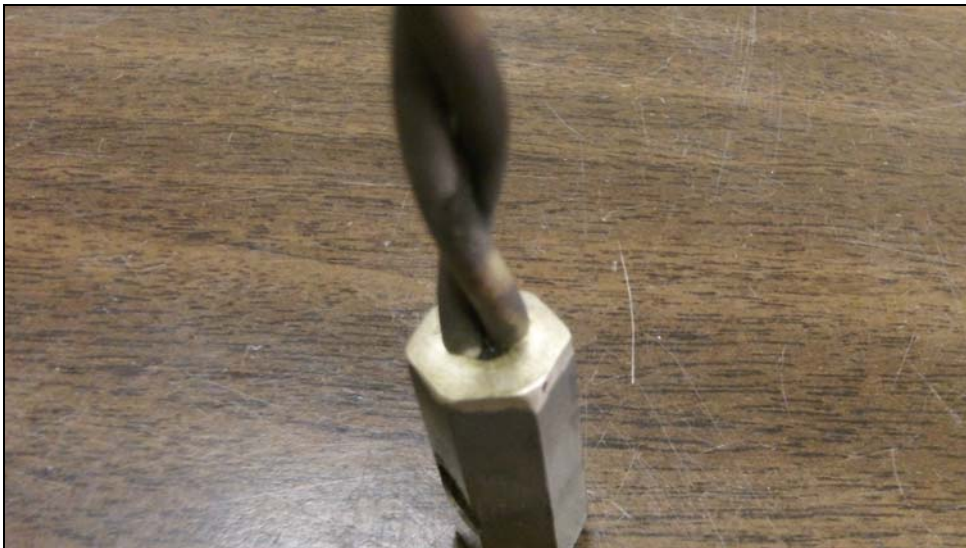
Process The parts were fluxed and two small 0.3" (8mm) long pieces of wire were placed into the coupler's cavity. The power was turned on and the assembly heated to temperature within 30 seconds.

During initial testing, the braze preform melted and it was noticed that the cavity could still hold more alloy. Consequently, more alloy was stick fed until the cavity was filled. The alloy stuck to the wire, likely due to a coating on the wire. Cleaning the wire prior to the brazing process eliminates that issue.

- Results/Benefits**
- **Speed:** Induction enabled the brazing process to be completed within 30 seconds
 - **Consistency:** The client was using a torch, and induction offers superior repeatability
 - **Safety:** There is no open flame with induction, so it's a more safe heating option than a torch
 - **Efficiency:** Induction delivers heat only where it's required, making it more efficient than torch heating



The coupler and wire being brazed together



The finished component