

## Brazing a magnetic steel cutting tool

**Objective** To heat a magnetic steel cutting tool for a brazing application; the end product is a cutter for the logging industry

- Material**
- Various magnetic steel cutting tools with carbide tips
  - Braze alloy

**Temperature** 1600 °F (871 °C)

**Frequency** 55 kHz

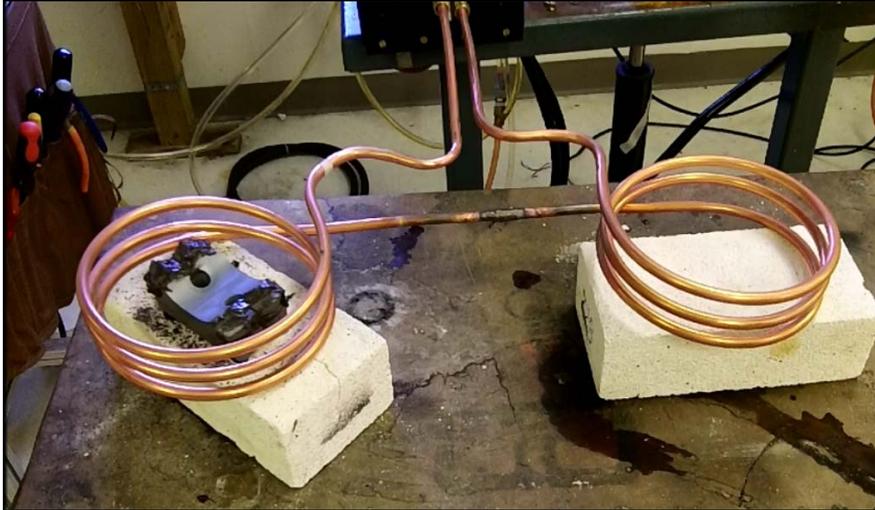
- Equipment**
- Ambrell EKOHEAT 45 kW, 50 to 150 kHz induction heating system equipped with a remote workhead containing eight 2 uf capacitors for a total of 2 uf
  - A multiple position, three-turn helical induction heating coil developed for this application

**Process** The multiple-position coil was used to test the brazing application on a large rectangular cutting head. With an EKOHEAT 45 kW power supply, the part can be heated to temperature within 150 seconds.

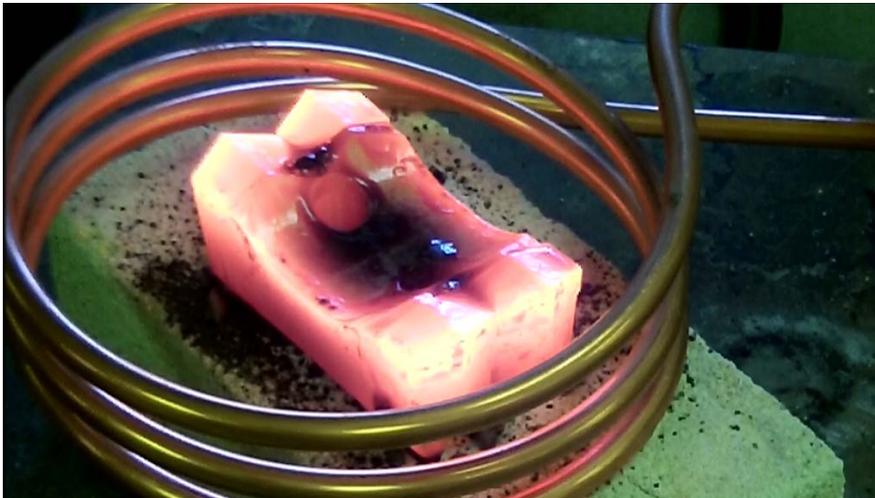
Despite testing occurring on a 45kW /100 kHz power supply, Ambrell actually recommends an EKOHEAT 50 kW/30 kHz power supply. This unit can deliver power at lower voltages due to increased capacitance. This results in the unit running at a lower frequency. Since it runs at lower voltages, the Ambrell Auto Tap feature can be leveraged.

Auto Tap is a feature in Ambrell EKOHEAT power supplies which allows the transformer tap to automatically change during a heat cycle. This is particularly beneficial when magnetic properties experience changes during heating, which is the case here. It improves the power delivered during the heat cycle and can reduce the heat cycle by at least 20 seconds.

- Results/Benefits**
- Speed: Induction is able to rapidly heat the parts to temperature, especially with the EKOHEAT's Auto Tap feature
  - Expertise: The Ambrell Applications Lab used their expertise to create the right solution for the system and recommend ways to maximize the system hardware



The multiple position, three-turn induction heating coil used for testing.



The part during heating.