Brazing a carbide ball to a spring to create a part that controls the armature position in a motor

Objective

To heat a tungsten carbide ball and steel rod that acts as a spring to 1300 ºF (704 ºC) within five seconds for a brazing application to create a part that governs the armature position in a motor

Material

- Steel rod (0.025”/0.64mm diameter)
- Tungsten carbide ball (0.0468”/1.19mm diameter)
- Braze
- Black flux

Temperature

1300 ºF (704 ºC)

Frequency

313 kHz

Equipment

- Ambrell EASYHEAT 0224, 2kW 150-400 kHz induction heating system equipped with a remote heat station containing two 0.33 µF capacitors
- A single position, two-turn pancake induction heating coil designed and developed specifically for this application

Process

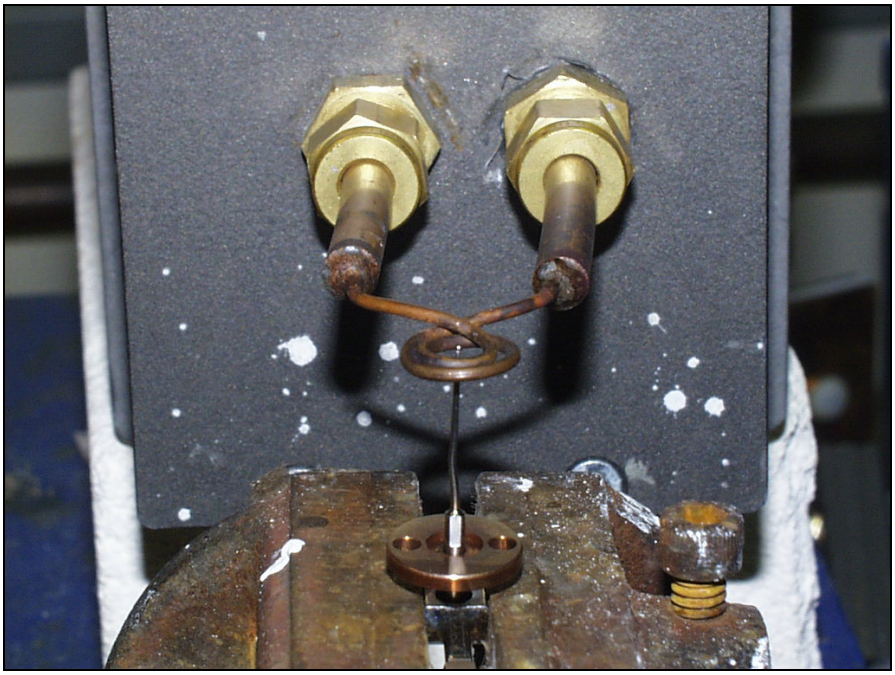
Initial testing was conducted to optimize power delivered to the part. First, de-brazing an old assembly took place. The part was fluxed and placed into the induction heating coil. The power was turned on and the parts began to heat. A ceramic rod was used to dislodge the ball and the power was turned off.

In order to braze a new ball on top of the rod/spring, the ball was fluxed and placed on top of the rod. The power was turned on and the assembly began to heat. The flux transitioned through its clear phase and the power was turned off.

With 2kW of power, the parts can be heated to the targeted temperature within five seconds or less.

Results/Benefits

- Experience: Ambrell has successfully implemented a similar solution, and that experience made them extremely interested in working with Ambrell
- Responsiveness: Ambrell’s ability to conduct testing and pass along samples proved helpful to the client
- Part quality: The end user was impressed with the quality of the part



The tungsten carbide ball on top of the steel rod inside a two-turn pancake coil

The assembly viewed from above the coil.