

Bonding plastic handles onto metal broom poles

Objective To heat a 0.85" (21.6 mm) outside diameter magnetic steel tube to temperature to melt plastic handles onto metal broom poles.

- Material**
- Customer supplied 0.85" (21.6 mm) O.D., 0.025" (.64 mm) wall thickness magnetic steel tubes
 - Customer supplied blue plastic caps/handles

Temperature Unknown

Frequency 91 kHz

- Equipment**
- Ambrell EKOHEAT 15kW/100 kHz induction heating system equipped with a remote heat station containing three 1.5 μ F capacitors
 - A single turn, two-position coil designed and developed to generate the required heat for this application

Process A rate of 25,000 parts per eight hour shift was desired, with two parts heated at the same time inside the coil. Plastic caps (handles) were placed on steel tubes (broom poles). The two tubes were inserted into the two-position coil and heated for 800 milliseconds. The tubes were then removed and set aside to cool. Once the tubes had cooled, the plastic caps were pulled by hand to ensure they had melted onto the tubes as desired. The handles had in fact bonded to the broom poles.

The overall cycle time of the process is 1.8 seconds (800 milliseconds of heating, and 1 second for the parts to cycle), which would enable the customer to exceed the desired production rate of 25,000 parts per hour.

- Results/Benefits**
- Reliability: The primary reason the customer came to Ambrell is they were using an old, unreliable system from another company, and parts were difficult to find
 - Uptime: With a more reliable induction heating system, they will not have to worry about lost production due to power supply issues that come with an unreliable system
 - High production rate: The customer needed to continue to produce 25,000 units per eight hour shift, which its old, unreliable system was capable of doing when it was not down
 - Correct system for the job: The customer had been using a 25kW system, even though they did not require that much power



Two assemblies (plastic handle and broom pole) in the two-position coil



After heating, the assembly was cut by a saw to show where the plastic melt occurred