Annealing stainless steel tubing

Objective To heat a stainless steel tube for an annealing application; the client is looking to replace their oven with induction

Material
- ¾" (19 mm) stainless steel tubing

Temperature 1900 ºF (1038 ºC)

Frequency 25 kHz

Equipment
- Ambrell EKOHEAT 50 kW, 15-45 kHz induction heating system equipped with a remote workhead containing three 6.3 µF capacitors for a total capacitance of 18.9 µF
- A direct heating method was leveraged to heat the stainless steel tubing

Process A set of copper clamps and flex leads were used to place the stainless steel tube into the tank circuit. Direct heating was the chosen for this application. Clamps were placed on the part and the power was turned on. The pipe bend radius began to increase, as the inside of the pipe bend was hotter than the outside of the pipe bend. Because of the temperature differential, it is recommended that power be pulsed on and off to enable conduction for part temperature equalization.

A tensional constraint was implemented to prevent the legs of the part from spreading. Fixturing was added to the ends of the part to prevent its legs from beginning to close. With these steps in place, the part heated well and quickly – in just 30 seconds.

Results/Benefits
- Speed: The part heated to temperature in just 30 seconds, making it a more time efficient heating option than an oven for this application
- Ambrell Lab Expertise: The client leveraged the lab to come up with the right solution for its process
- Efficiency: Induction is an energy-efficient medium of heating when compared to an oven

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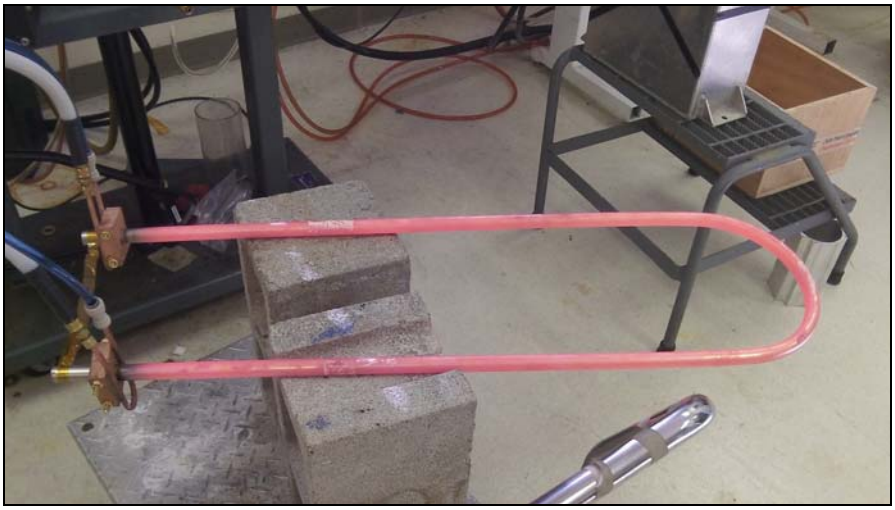

The part heating with the tensional constraint which maintained the radius of the part