Annealing brass and bronze tubing prior to bending to form handrails

Objective Annealing brass and bronze tubing for bending in a mandrel bender to form handrails

Material

- Brass tubes 1.5” (38.1mm) and 2” (50.8mm) diameter with 0.065” (1.65mm) wall thickness
- Bronze tubes 1.5” (38.1mm) and 2” (50.8mm) diameter with 0.100” (2.54mm) wall thickness

Temperature 1000 ºF (538 ºC)

Frequency 228 kHz

Equipment

- Ambrell 6 kW induction heating system, equipped with a remote workhead containing two 0.5µF capacitors for a total of 0.25µF
- An induction heating coil designed and developed specifically for this application.

Process A twelve turn helical coil is used to heat an 8” (20.3cm) area 3” (7.6cm) above the end of the tube. Each of the four tubes require a different heat cycle and time to reach the required temperature. Please see the chart below for each tube.

	1.5”	1.5”	2”	2”
	Brass	Bronze	Brass	Bronze
Heat Cycle Time (secs)	80	100	100	120
Power (kW)	4	4.15	3.1	3.4
Current (Amps)	248	255	200	212
Frequency (kHz)	197	197	228	228

Results/Benefits Induction heating provides:

- High efficiency, low energy costs
- Precise and controllable placement of heat
- Hands-free heating that involves no operator skill for manufacturing
- Even distribution of heating, eliminating fractures during bending

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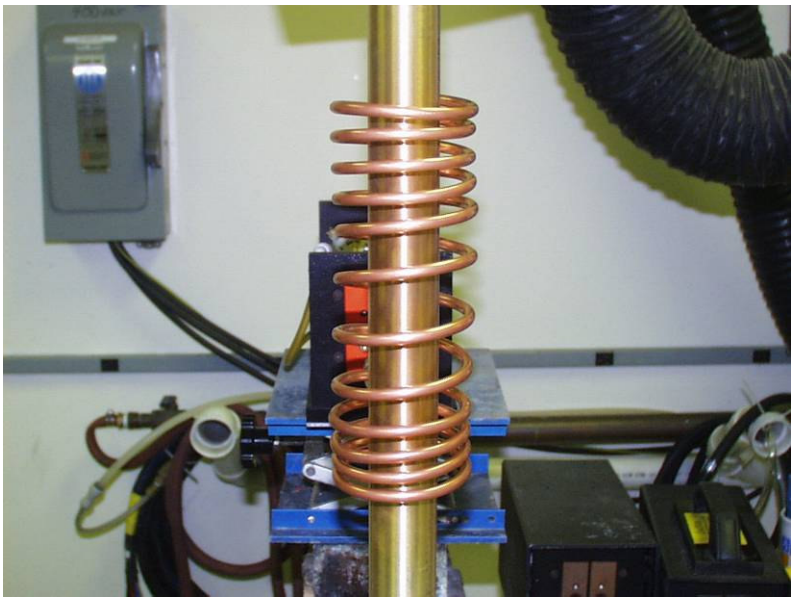
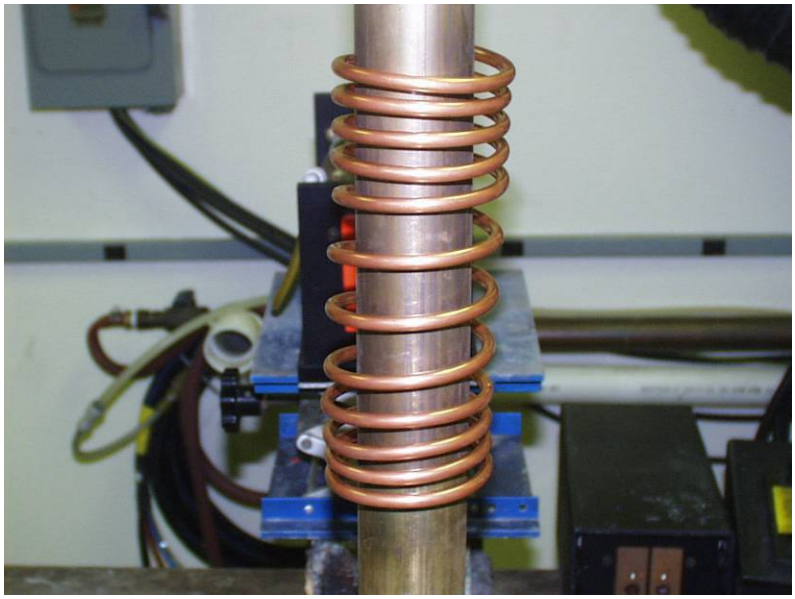


1.5” (38.1mm) tube in coil



2” (50.8mm) tube in coil