Induction Forge steel rods

United Induction Heating Machine Limited

Objective To heat the ends of steel rods to 1800ºF prior to a forging operation. Processing of the rods includes heating, pressing in a two part die to forge the push rod end, and a final heating in a channel coil to temper the rods and relieve the forging stresses. The customer needs to process rods of different diameter between 1/8” and 1/2”. The rod temperature must be above 1400ºF in the center while the outer edge can be as high as 1900ºF.

Material Steel rods of different diameters from 1/8” to 1/2”

Temperature 1800ºF

Frequency 78 kHz

Equipment Power of 35kW output solid state induction power supply including a remote heat station containing 2 capacitors totaling 0.5 μF, along with a 6 turn (3 over 3) helical type coil.

Process Power of 35kW output solid state induction power supply was found to achieve the following results:

Results • Both diameter steel rods reached 1800ºF in less than 5 seconds as measured by an optical pyrometer.

• The 1/2” rod was limited by the physical properties of steel with the time required to transfer the heat from the

outside edge of the bar to the center to raise the temperature to 1400ºF without melting the bar surface.

The 1/8” rod heating was limited by the induction heating efficiency at 80 kHz. Larger diameter bars

progressively heated faster up to the thermal conductivity restrictions

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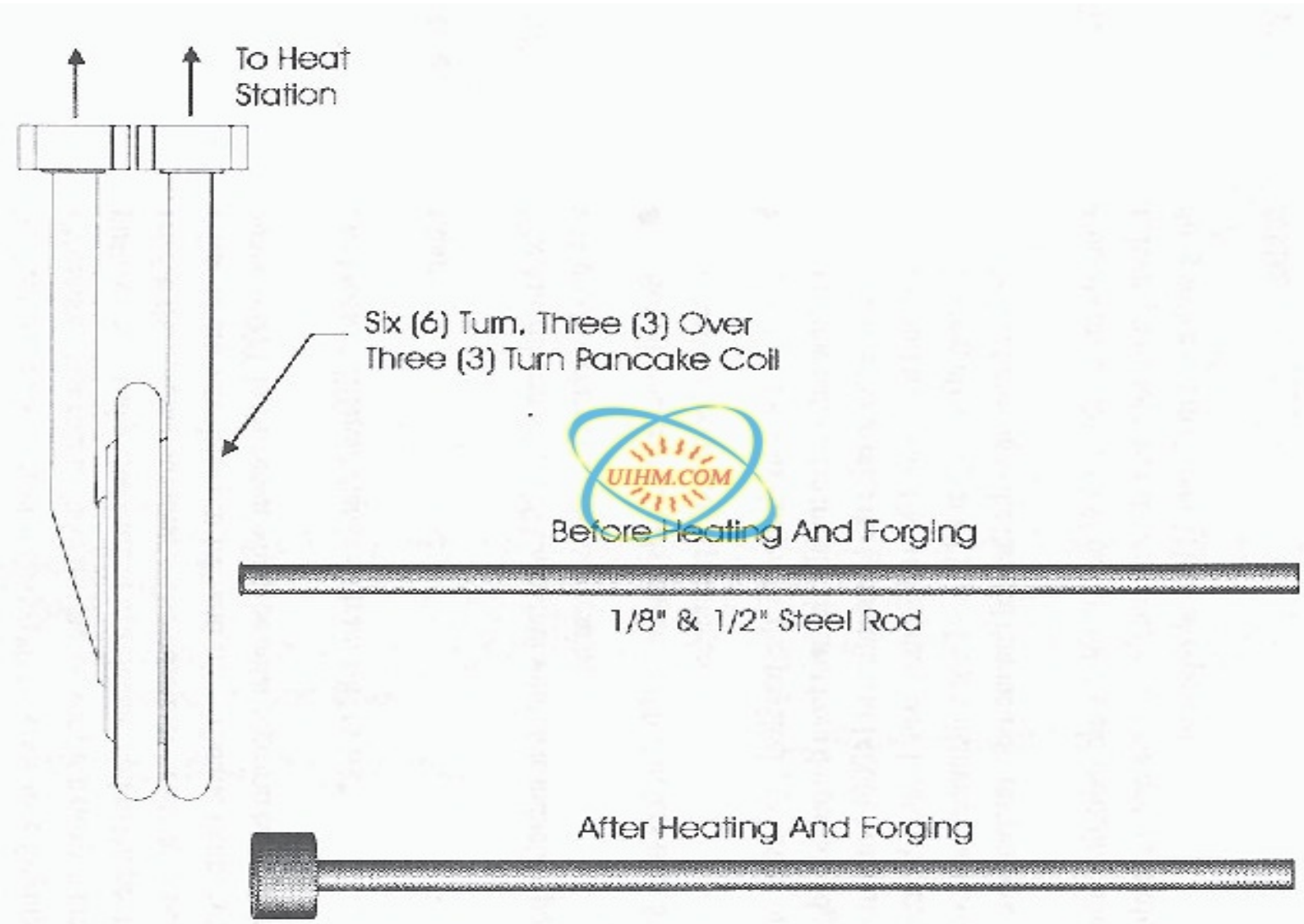
To Heat
Station
Six (6) Turn, Three (3) Over
Three (3) Turn Pancake Coil
Before Heating And Forging
1/8" & 1/2" Steel Rod
After Heating And Forging