Hardening steel pipe segments (sleeves)

Objective  Induction is used in a process to harden a steel pipe segment to improve wear-resistance

Material  Steel pipe segments: 1.6” (40 mm) outer diameter, 0.125” (3 mm) wall 2” (50 mm) tall

Temperature  1832 ºF (1000 ºC)

Frequency  88 kHz

Equipment  • Ambrell 15 kW, 100 kHz induction heating system, equipped with a remote workhead containing four 2.0 μF capacitors for a total of 2 μF
  • An induction heating coil designed and developed specifically for this application to cover the range of wire diameters.

Process  A five-turn helical coil is used to heat the steel sleeve. The distance between the coil turns is adjusted to provide uniform heat to the steel part. The parts are quenched in a 7% polymer quench following the heat cycle to achieve a hardness of RC40.

Narrative  Disappointed with low quality levels in a previously outsourced process, the customer uses induction to bring the heat treatment and the control of the end-product quality in-house.

Results/Benefits  Induction heating provides:
  • heat directly into the part, saving energy and time
  • precise control of heating
  • even distribution of heating along the part
  • faster production rates & increased production
  • a flameless process
Sleeve is heated within active induction coil