Induction Shrink Fit Steel Tube

United Induction Heating Machine Limited

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Shrink Fit Steel Tube Objective Heating a steel tube to 500-1000°F for a shrink-fitting application. Determine expansion (growth) of ID at varying temperatures.Material Steel tubes 7” OD x 4.75” ID x 5” heat zone Type ‘K’ thermocouple to measure temperature Thermal blanketTemperature 500, 800, 1000 °F (260, 427, 538° C)Frequency 166 kHzEquipment Power of 20KW,20 kW, 150-400 kHz induction power supply, equipped with a remote heat station containing two 1.5 µF capacitors (for a total of 0.75 µF) A multi-turn, special series-parallel induction heating coil designed and developed specifically for this application.Process Initial tests were completed on a sample without a thermal blanket. A thermocouple is slipped between the copper ring and the steel tube to measure temperature. The part measured 4.940” (at room temperature with an ID gauge.) The part reaches 1000°F (538°C) in about 10 minutes.The chart below shows the comparison between theoretical and experimental measured resultsTemp (F)ID (in)Growth (theory)Growth (real)754.940.00.05004.950.0160.018004.9640.0250.02410004.9750.0320.035Results/Benefits The part measures 4.975” at 1000°F yielding an expansion of 0.035” (4.975 minus 4.94). At 500 and 800°F the expansion numbers were 4.950 and 4.964 respectively. When using a thermal blanket the heat time is reduced by about 90 seconds (8.5 minutes as opposed to 10 minutes).shrink fit steel tube

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