

Application Note

Brazing Carbide Tips on Drill Bits

- Objective:** To braze carbide cutting tips to drill bits ranging in size from 0.5" to 1.5" (12.7 to 38.1 mm) in diameter. The brazing takes place at 1900 °F (1038 °C) and is presently done in 11 seconds for the 0.5" diameter bit and 39 seconds for the 1.5" (38.1 mm) diameter bit. Customer goals include decreasing the brazing times, especially for the larger drill bits, and repeatability must be adequate. Heating can be done using a helical coil since the drill bits are presently front-loaded into a double turn helical coil.
- Equipment:** Ambrell EKOHEAT[®] 20 kW induction heating power supply with a workhead and coil specifically designed for this application.
- Material:** 4140 Leaded Steel Twist Drill Shanks and Tungsten Carbide Tips with Harris 870 Braze and Tricon Gray Flux.
- Temperature:** 1900 °F (1038 °C)
- Process:** The Ambrell EKOHEAT 20 kW solid state induction power supply along with specifically designed coils and laboratory research were combined to produce the following results:
- A brazing temperature of 1900°F was reached through the use of a unique 4 turn helical coil. Different coils were designed for each size drill bit to maximize efficiency through coupling.
 - Quality braze joints were achieved due to the uniform heat pattern created by the induction field.
- Results:** Heating times were met and surpassed. For the 0.5" (12.7 mm) drill bit 11 seconds was required to reach 1900 °F (1038 °C) while 32 seconds was necessary for the 1.5" (38.1 mm) drill bit. These results indicate a decrease in heating time of 7 seconds for the 1.5" (38.1 mm) drill bit while retaining quality and repeatability.

