



Ambrell®

INDUCTION HEATING SOLUTIONS

an InTest Company



**Improve Safety and Efficiency When
Brazing PCD Inserts in Drilling Tools**

Experience the Excellence.™

Induction Preheating for Brazing or De-brazing Offers Numerous Benefits:

- **Safety:** no preheating with open flame or hot furnace
- **Better efficiency:** instant on, instant off, no long flame or oven heating
- **Throughput:** induction heating reduces preheat time
- **Better quality** with braze temperature control
- **Repeatability:** you can count on a precise, consistent quality braze every time
- **Easy integration** into a lean manufacturing process
- **Small footprint:** frees up valuable factory floor space

Whether you're concerned with safety, manufacturing efficiency, throughput, or part quality, induction heating is the ideal preheating method for your PCD bit brazing process.

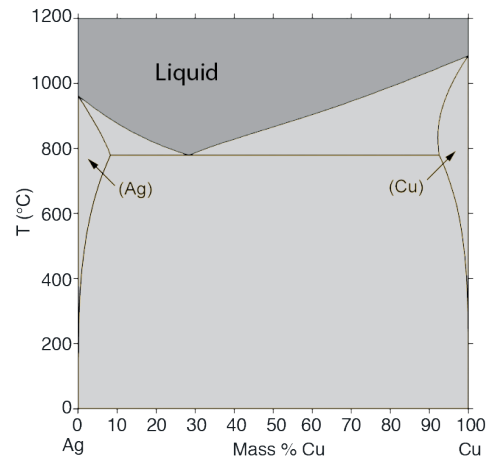
Oil and Gas Well Drill Bits

In down-hole fixed-cutter, rock, or hammer drill bit manufacturing and rebuild operations, multiple tool inserts (typically between 40 and 60) are individually brazed onto a single drill bit. These inserts may be a polycrystalline diamond compact (PCD) or tungsten carbide insert (TCI).

Induction heating is an excellent technique for preheating the drill bit to 600°C (1100°F) in preparation for the torch brazing of the diamond inserts.

Drill bits come in a wide range of sizes with diameters ranging from 8-20" (203-508mm). It takes 10-30 minutes for the heat to fully soak through the drill bit, which prepares the insert area for the brazing process. The torch is then used to trim the temperature of each individual joint to 790°C (1454°F) to flow the braze.

The insert's brazing silver and copper "eutectic alloy" has a melting temperature of 790°C (1454°F), well below the melting temperature of silver or copper. This lower melt temperature prevents overheating of the diamond bit during brazing, yet still results in a strong joint to the drill bit.



The PCD or TCI inserts are the cutting portion of the drilling tool, so they will wear out with use. Induction heating is used in the reclaiming process to heat up the drill bit, which allows the inserts to be removed for rebuilding the drill bit.



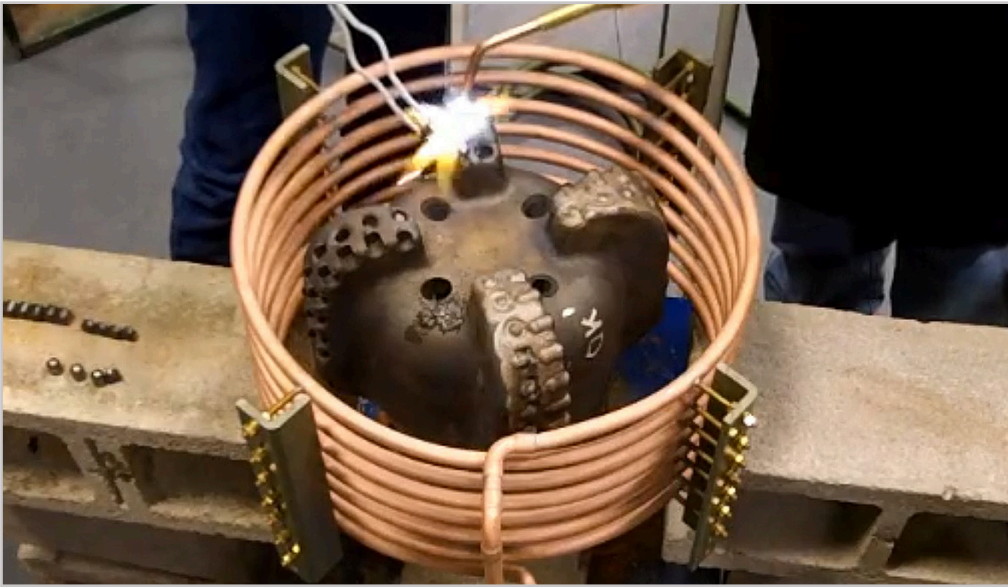
Fixed Cutter Inserts

Hammer Bit Inserts

Rock Bit Inserts

Photos of the inserts courtesy of U.S. Synthetics, Orem, UT.

Brazing Diamond or Carbide Inserts Onto Down-Hole Drill Bits

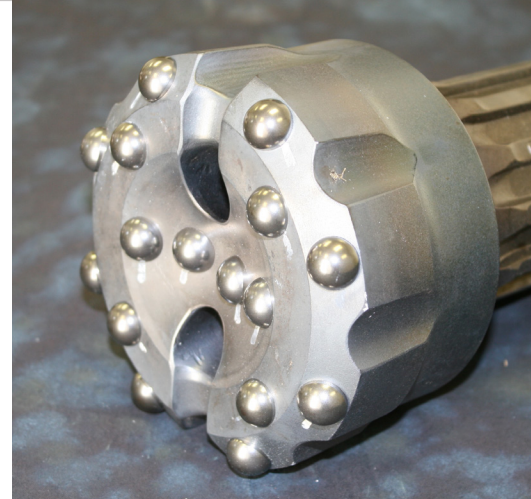


Reducing the Risk of Injury

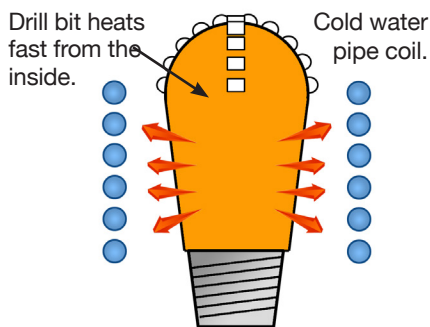
Preheating down-hole drill bits to 600°C (1100°F) for insert brazing is often achieved by an open flame torch or by placing the bit into a large gas fired oven. Both methods of heating are time consuming and involve risk of injury to the operator by exposure to an open flame or the moving of hot drill bits. Using induction eliminates the use of gas torches or ovens in the preheating process and allows for the final PCD brazing without moving the drill bit.

Improving Efficiency and Reducing Costs

Induction heating generates the heat within the drill bit so it heats from the inside. Both torches and ovens heat from the outside, are not as efficient and take much longer to preheat the drill bit. Heating a drill bit to 600°C (1100°F) often will take 2 hours with torches or in an oven compared to 30 minutes using induction.

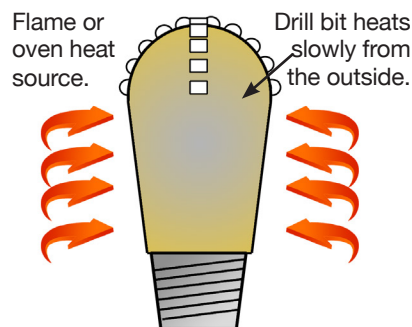


Induction Preheating



Drill bit is safely preheated to 600°C (1100°F) in a quarter of the time, and with instant on/off heating.

Flame or Oven Preheating



Preheating with torches or ovens expose operators to hot inefficient heat sources.



*Our global reach includes a direct sales team
along with an extensive distribution,
channel partner and OEM network.*

About Ambrell

Founded in 1986, Ambrell Corporation, an inTEST Company, is a global leader in the induction heating market.

We are renowned for our application knowledge and engineering expertise. In addition, our exceptional product quality and outstanding service and support are at the core of our commitment to provide a superior customer experience.

We are headquartered in the United States with additional operations in Europe including the United Kingdom and the Netherlands. All Ambrell products are designed, engineered and built at our manufacturing plant in the United States, which is an ISO 9001-certified facility. Over the last three decades we have expanded our global reach through an extensive distribution and OEM network, and today we have more than 20,000 systems installed in over 50 countries.



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