

## Brazing an aluminum manifold (air conditioning)

**Objective** To heat an aluminum manifold to 1050 °F (566 °C) for a brazing application

- Material**
- Cu tubes (3/4"/19mm)
  - Cu tubes (5/8"/15.8mm)
  - Al tubes (3/8"/9.5mm)
  - Al manifold (5/8"/15.8mm)
  - Al manifold (3/4"/19mm)
  - Lucas-Milhaupt Handy One alloy 30-832
  - Braze wire

**Temperature** 1050 °F (566 °C)

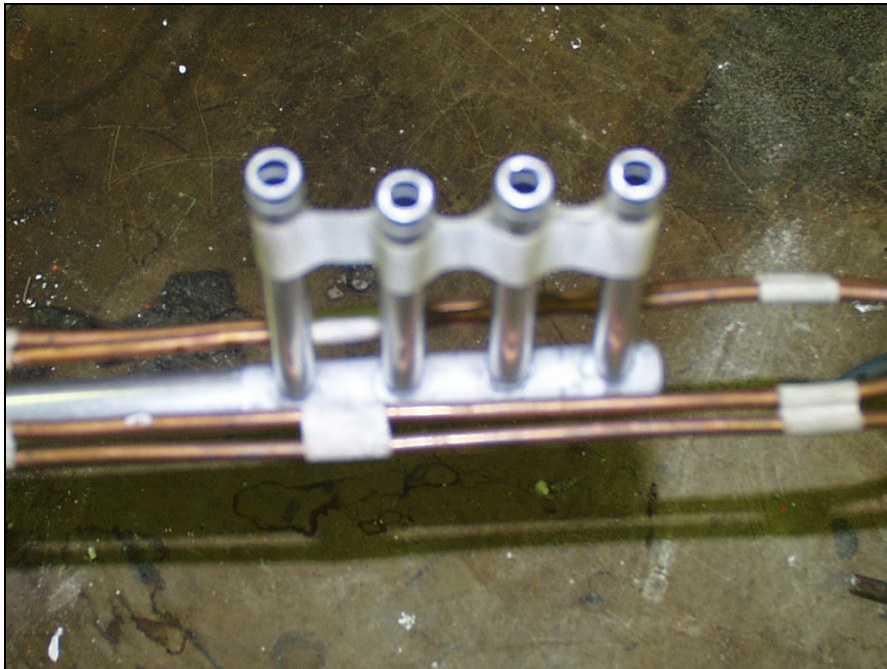
**Frequency** 179 kHz

- Equipment**
- Ambrell EASYHEAT 3542, 3.5kW 150-400 kHz induction heating system equipped with a remote heat station containing two 1.5 µF capacitors
  - A two-turn oval helical induction heating coil designed and developed specifically for the aluminum assembly
  - A five-turn helical induction heating coil designed and developed specifically for brazing the Cu tubes to Al joint assembly

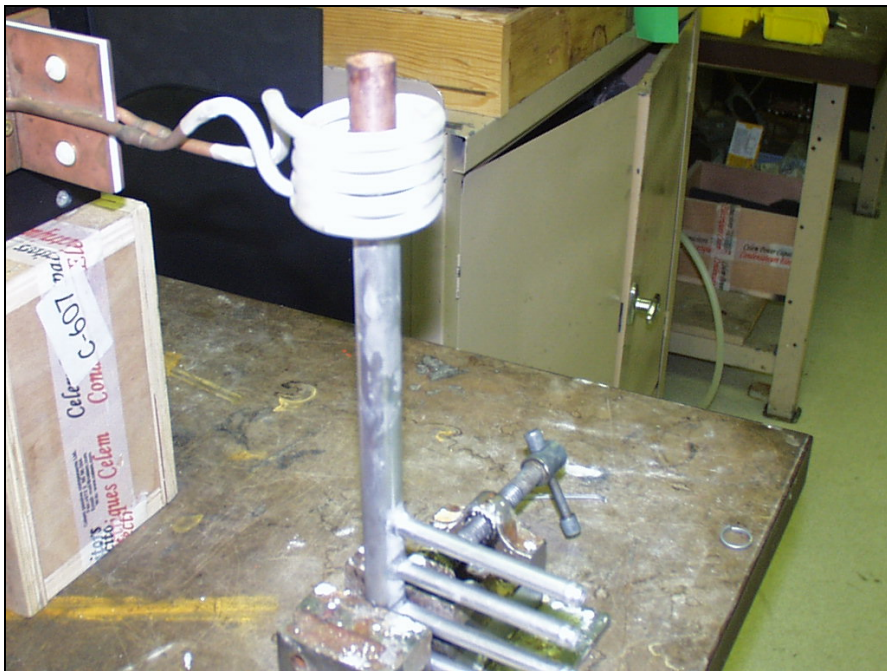
**Process** Braze pre-forms were designed to fit the aluminum tubes. Then the four aluminum tubes were placed into the manifold and the assembly was inserted into the coil. The assembly was heated for approximately 70 seconds, at which point it reached the targeted temperature and braze flowed.

For the Cu tubes, a braze pre-form was also designed for them, wound around the tubes, and the assembly was placed inside the coil. The heating cycle time was approximately 100 seconds. Some joints required stick feeding of braze to fill the entire joint area due to the braze wire size. If the cycle time was lengthened, the need for stick feeding would be eliminated.

- Results/Benefits**
- Precise, repeatable heating: The client wanted more precise and repeatable heating than a torch could deliver, which induction was able to achieve
  - Temperature control: Induction allows for superior temperature control when compared to other methods, including a torch, which the client desired



Aluminum assembly in the two-turn oval helical induction heating coil



The Cu tube to aluminum joint assembly inside the five-turn helical induction heating coil

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