Braze a thin walled tube to a steel cap in a hydrogen atmosphere

Objective  
Braze a NI-SPAN-C alloy tube to a steel cap in a hydrogen atmosphere

Material  
NI-SPAN-C alloy tube (5mm) dia, steel cap (7mm) dia, (7mm) long, nickel braze, quartz tube and hydrogen

Temperature  
1875 °F (1024 °C)

Frequency  
313 kHz

Equipment  
- Ambrell 10 kW induction heating system, equipped with a remote workhead containing two 1.5µF capacitors for a total of 0.75µF
- An induction heating coil designed and developed specifically for this application.

Process  
A single turn helical coil is used to heat the tube assembly directly. The tube assembly is held in place inside the quartz tube by a copper fixture and hydrogen is fed into the quartz tube. Braze preforms are placed at the braze area and heat is applied for 60 seconds to flow the braze.

Results/Benefits  
Induction heating provides:
- Rapid localized heat to joint area only
- Minimized oxidation reduces cleaning time
- Improved part quality
- Hands-free heating that involves no operator skill for manufacturing
Tube assembly in hydrogen atmosphere

Brazed tube assembly