PRECISION BRAZING

Based on Strong Materials Science Expertise and Long Production Experience

VPE has been continually developing and optimizing precision brazing processes since the company was founded in 1976. Our reputation for brazing excellence has come from applying strong engineering solutions and project management skills to complete many challenging R&D projects and to provide long-term volume production runs for critical applications.
Successful precision brazing results in lower production costs, higher production yields and more robust end-use performance. For VPE, precision brazing means using a materials science-based approach to ensure that the process parameters are correctly designed and implemented.

**CRITICAL PROCESS PARAMETERS FOR PRECISION BRAZING INCLUDE**

- Joint design
- Joint volume control
- Temperature profile design
- Selective enabling or limiting capillary action
- Interface chemistry
- Filler alloy metallurgy
- Service environment
- Production tooling design

**EXAMPLES OF PRECISION BRAZING APPLICATIONS**

- NASA – space exploration and lander programs
- Aerojet – rocket thruster nozzles
- Major aerospace contractor – engine fire sensors
- Major medical device corporation – ceramic-to-metal heater assemblies
- Fortune 10 corporation – reactor and gas turbine components
- Several markets – microchannel devices such as heat exchangers

**PRECISION BRAZING PROCESSES PERFORMED BY VPE INCLUDE**

- Vacuum
- Induction
- Hydrogen
- Aluminum
- Retort
- Controlled dewpoint
- Diffusion
- Pressure assisted
- Ultra fast
- Quartz lamp
- Controlled atmosphere
**PARENT MATERIALS BRAZED BY VPE INCLUDE**

- Copper
- Glidcop™
- Aluminum
- Nickel
- Inconel™ alloys
- Kovar™
- Invar™ alloys
- Havar™
- Haynes alloys
- Stainless steel
- Aluminum
- Molybdenum
- Tungsten
- Tantalum
- Titanium
- Ceramics
- Aluminum oxide
- Aluminum nitride
- Composites
- Tungsten carbide
- Vanadium
- Rhenium
- Platinum
- Silver
- Reactive materials

**OTHER JOINING PROCESSES UTILIZED BY VPE**

- Diffusion bonding
- Transient Liquid Phase (TLP) bonding
- Electroforming
- Low temperature
- Press seals
- Thin film
- Solder
- Hermetic

**OVERALL CAPABILITIES OF VPE**

- Contract R&D, prototyping, turnkey product design
- ISO 9001-2008 certified manufacturing and processing services
- Many joining processes, including diffusion bonding and vacuum baking
- Thin film coating, heat treating, comprehensive analysis and testing lab, clean room processing