

Glass Melting and Sealing

Manufacturing Technologies

The Manufacturing Science & Technology Center performs process development of glass and glass-ceramic-to-metal seals. Small batches of specialty glass can be melted from reagent grade oxide powders. Glass and glass-ceramic-to-metal seals are made in microprocessor controlled inert atmospheres and are checked for hermeticity after sealing.

Sandia's extensive properties database of low melting solder glasses is used to aid in material and processing decisions when making glass-to-glass, ceramic-to-ceramic, and glass-to-ceramic seals. These seals are typically done in air at much lower temperatures than glass and glass-to-ceramic seals.

Capabilities

- Interface with designers and vendors to assure that the most appropriate materials are selected to meet specifications
- Produce small volume melts of specialized glass and glass-ceramic compositions
- Establish key processing time-temperature schedules for glass annealing, sealing, and crystallization



Various technical glass-to-metal sealing projects

- Measure thermal-physical properties of glasses
- Chemically strengthen glass to customer specifications
- Assess component structural design by performing finite element stress analysis
- Fabricate prototype electronic and specialty components that incorporate glass or glass-ceramic-to-metal seals

Resources

- Precision measurements of thermal-physical properties of glasses
- Computer-aided seal design

- Microprocessor-controlled sealing furnaces with controlled atmospheres for glass and glass-ceramic sealing
- Precision leak checking to 10×10^{-9} atm. cc/sec

Accomplishments

- Invented a belt-processable, high expansion, corrosion-resistant glass ceramic

Contact

*Ron Stone, (505) 844-4853
rgstone@sandia.gov*

*Scott Reed, (505) 845-9151
streed@sandia.gov*