

# Thermal Clad Reliability

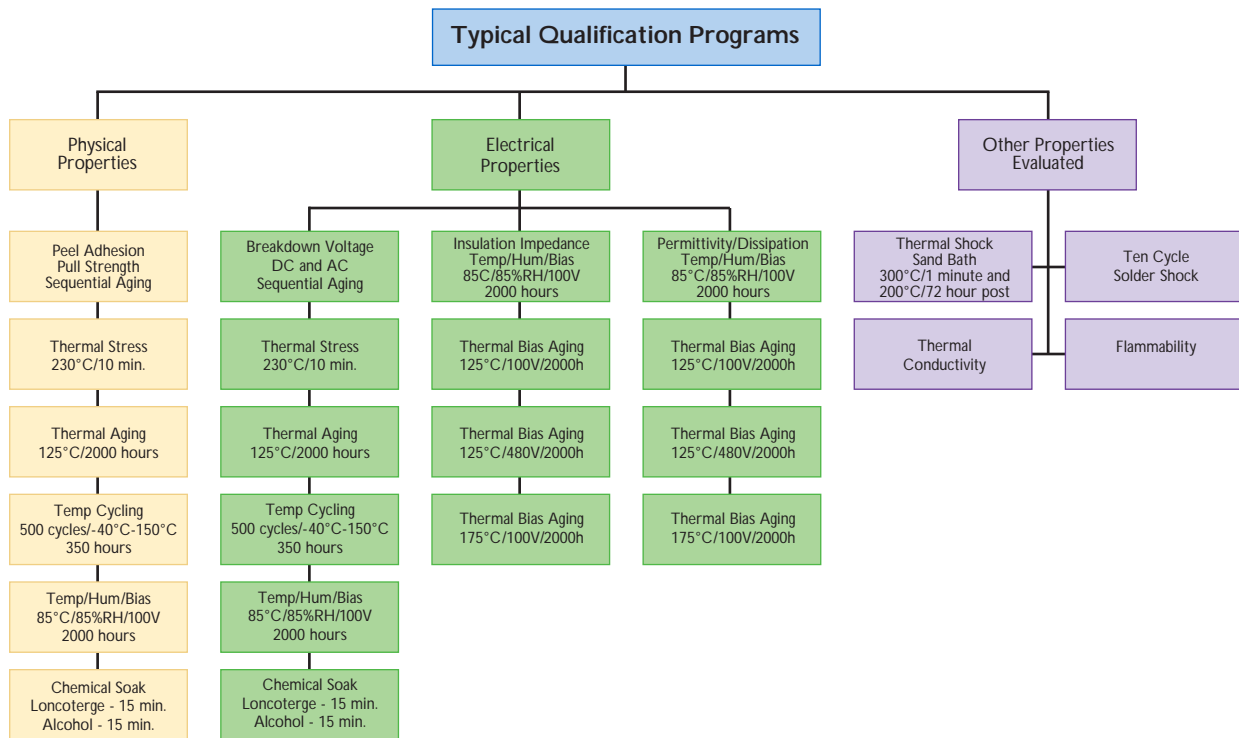
## Thermal Clad Long Term Reliability

New materials undergo a rigorous 12 to 18 month qualification program prior to being released to the market.

In state-of-the-art laboratories and test facilities, Bergquist performs extensive testing on all their thermal materials for electrical integrity. Bergquist utilizes stringent development procedures. The lab facilities at Bergquist are U.L. certified and manufacturing facilities are ISO 9001:2000 certified.

Extensive qualification testing consists of mechanical property validation, adhesion, temperature cycling, thermal and electrical stress. To validate long term reliability, electrical testing is performed at selected intervals to 2000 hours where final evaluation is completed.

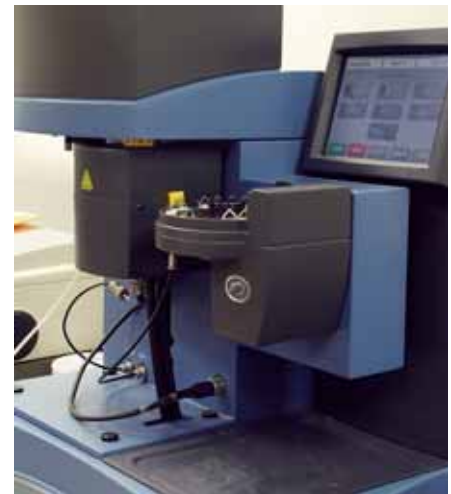
To ensure consistent product performance with manufactured materials, we couple the up-front qualification test with regular audits. Audits include physical, electrical and thermal property tests.



**Dynamic Mechanical Analysis (DMA)** – Measures the modulus of materials over a range of temperatures.



**Chamber Ovens** – Over 3000 cubic feet (85 cubic meters) of oven capacity is dedicated to long term thermal bias age testing. The ovens take material to temperatures above  $T_g$ . At selected intervals, samples are removed and tested to verify material integrity.



**Thermogravimetric Analyzer (TGA)** – Measures the stability of our dielectrics at high temperatures, baking the materials at prescribed temperatures and measuring weight loss.