



The possibility of induced stress failures should not be overlooked in designing glass seal pin terminations to electronic circuits.

Termination problems are not likely when packaging with matched materials for pin and housing, such as Kovar.

However, with high-expansion housing materials, such as aluminum, brass or steel, the designer must be concerned about thermally induced stress resulting from the expansion difference between a seal pin and the housing if the pin is terminated rigidly to the circuit.

If sufficient strain is developed, a failure will manifest itself in pin glass fracture, or solder joint fracture at the pin termination. The former would cause loss of hermeticity and the latter, electrical failure.

Obviously, this failure mode can be averted simply, by avoiding a rigid attachment at the circuit. A sliding contact is one method frequently used, for example with RF terminations. Another is to make the circuit connection with wire or ribbon carefully soldered or bonded to the pin and circuit with enough strain loop to prevent the high stress condition when temperature changes occur.

The risk of failure varies directly with the free length of the pin and the expansion difference between the pin and housing materials. Particular caution would therefore be in order in the case of an RF feedthru seal (typically Kovar) in a thick wall of aluminum (ie: long air line).

One might be tempted to solder the pin at the circuit in concern for supporting its cantilevered length. The risk of thermal failure in such a case might be higher than the risk of structural failure if the pin were unsupported.

If vibration of the pin or deflection under centrifuge testing is of concern, this can easily be calculated to verify if a problem exists and appropriate alternatives considered which avoid the thermal stress issues.