

Ceramic Hermetic Sealing for Missile Electronics



Customer Challenge

A customer approached Winchester with issues related to its existing glass-to-metal hermetically sealed connector. The connector was being used in the extreme environmental conditions of a missile ignition system and the glass seal was not providing true hermeticity, which could impact electrical performance.

Challenge Review

Due to the temperature extremes, the customer's glass seal experienced cracking and could not provide a 100% reliable hermetic seal. It is the tendency of materials, such as glass and metal, to change in volume in response to a change in temperature. This change in volume, due to thermal expansion, caused the current glass-to-metal solution to crack. Although stainless steel is considered a high thermal expansion metal, the customer was still using a stainless housing in its solution because stainless is part of the QPL Mil-Spec, easier to machine, and not corrosive. In summary, the customer's existing hermetic solution using a glass seal and stainless steel was not reliable enough to withstand the application's exposure to high temperature.

Winchester Solution

Winchester replaced the existing glass seal with a more reliable ceramic-to-metal solution. Winchester used its exclusive ceramic dielectric material, Ceramax™, in order to provide a 100% hermetically sealed connector that can withstand this application's extreme conditions and the corresponding thermal expansion that can occur.

Ceramax™ is a multi-phase devitrified ceramic compound that provides superior hermetic reliability and outstanding electrical performance with an operational temperature range of -269°C to +450°C. Since Ceramax™ seals are more compatible than glass with high expansion metal alloys including aluminum, titanium, and stainless steel, the customer was able to enjoy the benefits of stainless but have a hermetic seal that can better withstand temperature extremes.



Customer Improvement

Winchester Interconnect's Ceramic hermetic sealing provides:

- 100% hermetic seal/reliability
- Compatibility with standard housing materials despite higher thermal expansion properties

Contact our Winchester Interconnect Experts for your custom solution!

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