EXTREME ENVIRONMENT HERMETIC SEALS

SAND2012-6736P

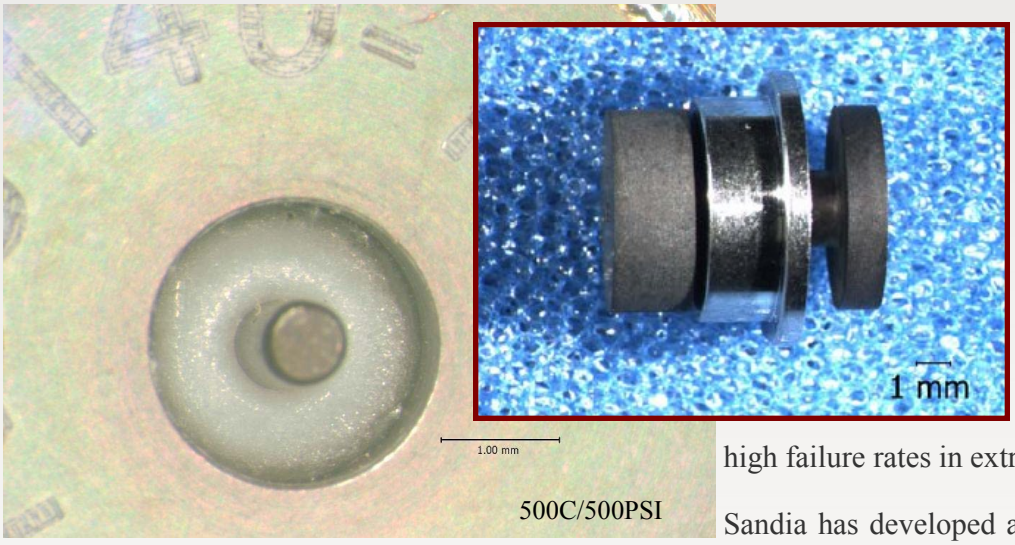
TECHNOLOGY READINESS LEVEL: 6– A PROTOTPE HAS BEEN DEVELOPED AND TESTED IN THE LABORATORY.

US PATENT # 5,820,989
8,082,663

SD # 5672
10578

TECHNOLOGY SUMMARY

Hermetic seals that retain function under extreme conditions are extremely important in the gas and oil industry as well as many electronic applications. These applications require seals which minimize residual tensile stresses from the coefficient of thermal expansion (CTE) mismatch between materials used to make the seal. Currently, one of the most commonly used materials to manufacture these seals is brazed $-Al_2O_3$. The downside is that these types of seals require numerous manufacturing steps with costly parts and are extremely sensitive to damage during handling. These seals also have extremely high failure rates in extreme environments.



Sandia has developed a novel hermetic seal using a Sandia developed borophophosilicate (BPS) glass ceramic composition with a stainless steel shell and a Paliney 7 pin. The pin and shell materials were chosen based on compatibility with currently available systems as well as possessing a high resistance to corrosion. These seals remain airtight up to temperatures of 700°C and pressures of 500 psi and can be modified to include multiple pins. This advancement has many implications as nuclear safety requirements stipulate seals must remain hermetic beyond 550° C and 500 psi.

POTENTIAL APPLICATIONS

- Electronics
- Aerospace Industry
- Oil and Gas Industry
- Automotive Industry

TECHNOLOGICAL BENEFITS

- Remains hermetic up to 700°C and 500 psi
- Reduced Cost
- Reduced vulnerability to handling damage

TECHNOLOGY INQUIRY?

Contact us for more information or licensing opportunities at

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or

https://ip.sandia.gov

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