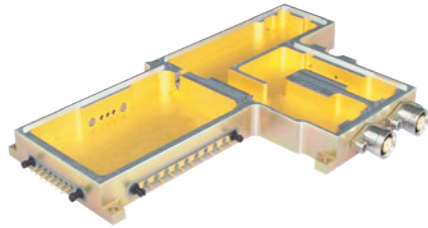


Hermetic Solutions For Extreme Environments

Integrated Packaging



Using technologies such as Kryoflex® and explosively bonded metals, SOURIAU PA&E designs and manufactures hermetic packaging for extreme environments — whether it's integrating components that protect satellites deep in space or connectors for oil-drilling tools that bore deep below the earth's surface. By pairing our Kryoflex and explosively bonded metal technologies, we can build hermetic packages using precision laser welding rather than solder joints, thus eliminating the two most common causes for hermetic package failure: solder joint fatigue and cracked glass.

Rectangular DC Connectors



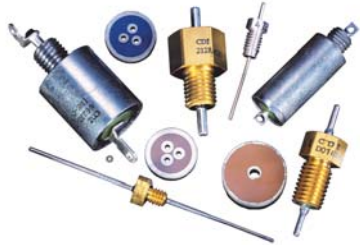
SOURIAU PA&E's hermetically-sealed rectangular DC connectors exceed most mil-spec requirements and are designed for use in military and commercial applications, where environmental conditions require an extremely rugged and reliable hermetic seal. The uniquely-controlled CTE characteristics, chemical bonding properties and polycrystalline structure of Kryoflex allows SOURIAU PA&E to manufacture these hermetic connectors with 304L stainless steel shells and gold-plated beryllium-copper contacts to maintain excellent electrical performance and environmental characteristics.

RF/Microwave Connectors



SOURIAU PA&E's 50 Ohm hermetic RF/Microwave connectors are designed for use in military and commercial applications where environmental conditions require an extremely rugged and reliable hermetic seal. Low-loss Corning 7070 glass is used for dependable electrical performance. SOURIAU PA&E manufactures these hermetic RF connectors from a variety of compatible shell and contact materials, in both laser weld and solder-in styles, which provide excellent electrical and environmental performance characteristics.

Ceramic EMI Filters



SOURIAU PA&E's military-qualified Filter Products Group specializes in the design and manufacture of high-reliability low-pass EMI filters. Utilizing multi-layer ceramic discoidal capacitors and ferrite inductors, SOURIAU PA&E's engineering staff are experts at designing EMI filtering solutions for electronic circuits operating in hostile EMI environments. In-house manufacture and testing, in accordance with MIL-PRF-28861, Class B (QPL) and SOURIAU PA&E class H, are standard practice.

SOURIAU PA&E

434 Olds Station Road Wenatchee, Washington 98801
TEL 509.664.8000 FAX 509.663.5039
www.pacaero.com

Kryoflex is a registered trademark of SOURIAU PA&E.
pae.ds.0112.v5 © 2012 SOURIAU PA&E, All Rights Reserved



ISO 9001:2008/
AS9100



EXPLOSIVELY BONDED METALS

SOURIAU PA&E

Explosive Metal Welding

- ✓ Joins ferrous, non-ferrous metals
- ✓ Bonded at the molecular level
- ✓ Variety of combinations
- ✓ No galvanic corrosion



SOURIAU PA&E bonds a wide range of dissimilar metals to create advanced composite materials with superior performance characteristics.

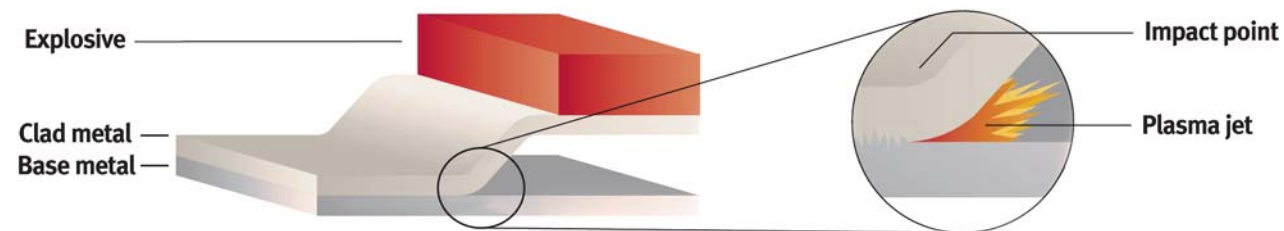




Examples of bonded metal applications

Material Bonding

Design engineers are often faced with the dilemma of material selection. Frequently, material that would work the best for one specific element of the design is lacking in properties required by other elements of the design. For example, a material may exhibit good corrosion resistance, electrical or thermal conductivity, yet be lacking in the strength, hardness, weldability or wear characteristics required by the final design. Explosively bonded metals, produced by SOURIAU PA&E, allow design engineers to specifically place certain materials exactly where they need them without compromising other critical design elements. Design engineers who apply these principles of explosive bonded metals applications hold a distinct advantage over those who don't.



The explosive bonding process.

Explosive Welding

This solid-state welding process uses controlled explosive energy to join two or more dissimilar metals at the atomic level. This process results in a permanent, solder-free metallurgical bond. A weldable bimetallic transition is one of the most common applications of explosively bonded metals and explosively bonded metals routinely withstand the rigors of forming and forging operations.

Weld Transitions

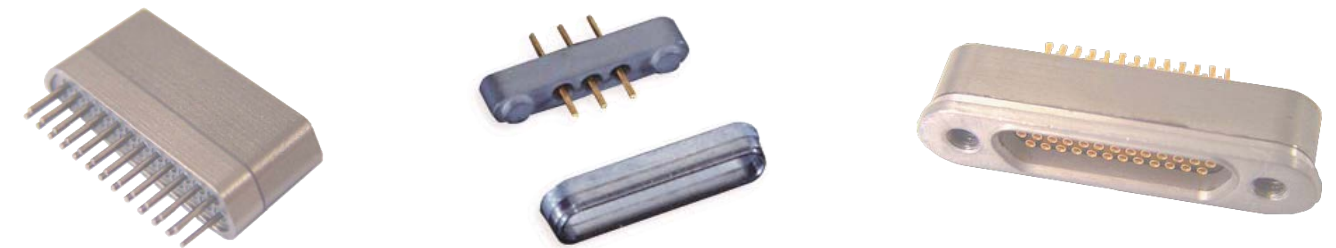
Explosively bonded metals can be used as weldable transitions between two dissimilar metals, allowing designers and fabricators to apply the best-suited materials to a location or function, when they cannot make the entire structure out of just one of the metals, thereby optimizing the design. This technique is most commonly used to directly weld high-strength steel parts onto lightweight aluminum or titanium structures.

Precious Metal Conservation

Precious metals, refractory metals and other expensive alloys can be explosively bonded in thin layers to the specific area of a designed part. This technique not only significantly reduces the cost of the manufactured part or material, but also allows for the use of more structurally sound materials, where required.

Galvanic Corrosion

Explosively bonded dissimilar metals are a significant inhibitor to galvanic activity that would occur between mechanically fastened dissimilar metals. Maritime customers benefit from the use of explosively bonded metals by designing for weldable transitions between dissimilar metals that significantly reduce or eliminate galvanic corrosion.



Explosive bonding is used to create components with unique performance characteristics.

Corrosive Resistant Lining

Explosively bonded (or clad) metals are often used as corrosive- or erosive-resistant linings to pressure vessels, chemical process tanks, heat exchangers and tube sheets. Not only do customers benefit from the protective lining, but also from significant cost reduction by being afforded the opportunity to utilize structural steels to improve wall strength, without the need to manufacture the entire structure out of the typically expensive, corrosive-resistant materials.

Bearing Surface

Similar to process for creating a corrosive lining, bearing materials can also be explosively bonded to sheets of metal. This technique allows a structurally sound component to have a bearing surface clad directly to it, significantly reducing the wear on the part, and improving its operation.

Radiation Shielding

Thin layers of shielding materials, such as tantalum or silver, can be bonded to other structural metals or components. This process has been a cost-effective method to provide radiation shielding to satellites.

Explosive Hydro-Forming

Explosive hydro-forming is a metal forming technique that uses the energy generated by an explosive detonation to form the metal work piece. Since explosive hydro-forming transmits the explosively-generated energy through water, it can simulate a variety of other conventional metal-forming techniques. This process creates a great deal of flexibility in metal-forming.