FUSION FOR ENERGY

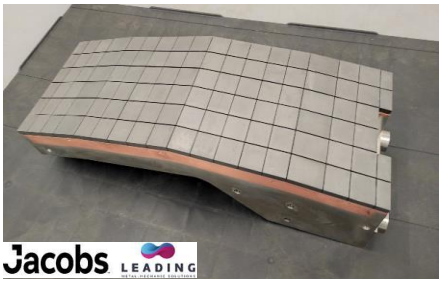
TECHNOLOGY OFFER

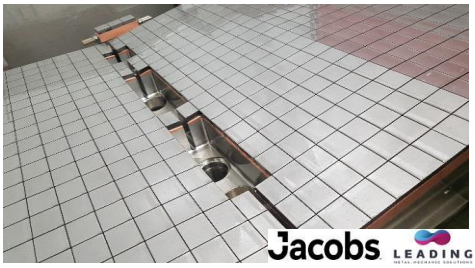
Hot Isostatic Pressing (HIP) Joining of Similar and Dissimilar Materials

Jacobs has developed the use of HIP bonding for the manufacture of plasma facing components (PFCs) across a suite of projects over the past 25 years. Jacobs, in combination with F4E and Leading Metal-Mechanical Solutions, has developed designs for manufacture for various ITER First Wall Panel (FWP) prototypes, which have been successfully produced via HIP bonding. This technology is applicable to many industries (for example space, automotive industries), providing consistent manufacture of high-performance components

The technology

Hot Isostatic Pressing bonding provides strong, solid state bonds and is suitable for similar or dissimilar materials (solid or powder forms). Jacobs and F4E have found HIP technology to be a reliable, repeatable and robust solution for the manufacture of the complex First Wall Panels (up to circa. 1800 parts). Prime examples are the Full-Scale Prototype (FSP) and more recently the Alternative Design Mock-Up (ADMU) where bonding of multiple parts has been demonstrated.





Reliable, repeatable and robust solution for complex components

Large components can be HIP processed (typical FWP scale is ~1-2m) with the bonding of larger material sections proven. Jacobs has also developed effective HIP processes for numerous materials including but not limited to beryllium, copper, CuCrZr alloy, stainless steel, and zirconium. Jacobs' approach prevents distortions from the bonding of dissimilar metals and uses advanced coating and cleaning processes to ensure high-performance bonding.

A technology applicable to many industries

This experience has helped secure relationships with key manufacturers and suppliers. This technology is applicable to many industries (for example space, automotive industries), providing consistent manufacture of high-performance components. Jacobs is able to offer extensive materials testing and characterisation in addition to joint inspections via non-destructive testing (NDT).

Collaboration opportunities

Jacobs works with manufacturers to develop joining processes, design for manufacture, quality control, destructive/non-destructive testing and manufacture of nuclear grade components.

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