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Advances in HIP Equipment with the Tie-Rod and Quick Can Approaches

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Through the last 30 years, Isostatic Forging International Ltd (IFI) has developed innovative concepts of HIP equipment that shows great promise for the full range of HIP processing from the very smallest (and fastest) units to the units of unprecedented size and capability.

With all advances of the precision casting and PM technologies the sizes of the large components are limited only by the size of the HIP systems. Moreover, the cost of the largest PM parts often exceeds the cost of the HIP cycles.
The larger the HIP, the more requirements are imposed on the safety of the operations. Therefore the damage tolerance of the HIP equipment and the cost efficiency of making parts through HIP become the factors of the major importance.

The IFI Tie-Rod Pressure Containment System (PCS) is a robust pressure vessel substitute that is extremely damage tolerant with a design that is analysis and inspection friendly. The design does not depend upon statically indeterminate factors (such as pre-stress and friction). Furthermore it can be disassembled and inspected equivalent to the original build. An advanced design of the Tie-Rod PCS done through modern techniques of fracture mechanics enables to reliably scale up the system with practically no limits

The Quick Can technique enables an access to the interior of a HIP can during the HIPing procedure so that the integrity of the HIP can be monitored and controlled through the whole process, hot out-gassing can be substantially enhanced and reactive refining of the powder surface performed.

This presentation will review our work to date and the promise for future development as well as formulate detailed requirements to the design of the HIP System from the point of view of the manufacturer of large scale parts.

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HIP Process

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