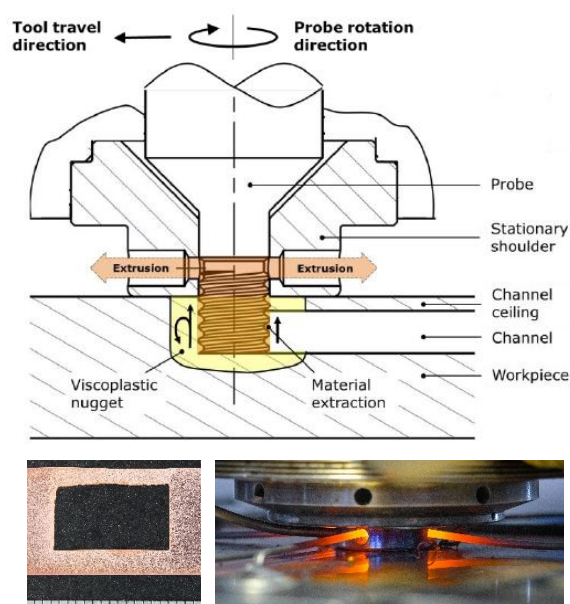


CoreFlow® friction stir channelling of copper

CoreFlow® is a patented sub-surface machining process developed by [TWI](#), designed for creating efficient cooling channels in nuclear fusion components. With mentoring support of F4E experts, this technology enhances the manufacturing of Plasma-Facing Components (PFCs) in Tokamak reactors like ITER. CoreFlow® simplifies production and enables optimised channel paths for enhances performance, making it a vital solution for cutting-edge engineering.

The technology

[CoreFlow®](#) builds on [friction stir welding \(FSW\)](#) principles, forming internal channels within metals in a single-step. Research initially focused on aluminium alloys, and the process has now been developed for nuclear fusion material, such as copper and CuCrZr alloys. The CoreFlow® process minimises material waste and preserves structural integrity, enabling intricate channel geometries optimised for thermal efficiency. Developed to meet fusion standards, CoreFlow® supports PFC manufacturing, ensuring components can withstand demanding reactor environments. Additionally, the process's flexibility allows customisation for specific thermal requirements, enhancing its utility across applications.



Thermal management for aerospace, automotive, and beyond

CoreFlow®'s versatility extends to aerospace, automotive, and heat exchanger industries. It provides efficient, scalable cooling solutions for industrial energy systems, electric vehicle batteries, and heat transfer devices, meeting high-performance demands with precision and sustainability. By enabling innovative designs and rapid prototyping, it supports industries seeking efficient thermal management solutions without compromising material strength.

Collaboration opportunities

CoreFlow® is suitable for nuclear fusion projects like ITER and Gen IV reactors, and adaptable for aerospace, automotive, and industrial thermal management applications. TWI invites partnerships to explore CoreFlow®'s transformative potential across sectors, including customized solutions for advanced engineering challenges. Its proven scalability and reliability make it an attractive choice for long-term industrial collaborations.

Fusion for Energy Technology Transfer
Programme

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