

# HIP technology enable ceramic manufacturers to control material properties and increase productivity.

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Hot isostatic pressing (HIP) technology has been known for more than 50 years, and is considered today as being a standard production route for many applications. The HIP process applies high pressure (50-200 MPa) and high temperature (400-2,000°C) to the exterior surface of parts via an inert gas (e.g., argon or nitrogen). The elevated temperature and pressure cause sub-surface voids to be eliminated through a combination of plastic flow and diffusion. The challenge is to reach the highest possible theoretical density while maintaining productivity goals.

Uniform rapid cooling is a process by which thin-walled pre-stressed wire-wound HIP units increase productivity up to 70% compared with natural cooling, and increase the density to ~ 100% of theoretical density for many alloys. The added cost to reach this density is around \$0.20-0.30/kg for a large production HIP system, depending on the material.

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Materials

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