Success Stories

Ceramic cores stay stable as casting temperatures soar

Evan Reed, Sales Manager Morgan Technical Ceramics. (Source: Certech)

Morgan Technical Ceramics Certech (MTC Certech), a leader in the investment casting industry, has introduced a new ceramic core material, P52. »We're pleased to announce this new material which enables our customers to optimise their metal casting processes,« says Evan Reed, Sales Manager, Morgan Technical Ceramics – Certech. Developed to maintain rigidity and provide tight dimensional and geometric control, P52 ensures ceramic cores remain extremely stable during the casting of turbine blades with high temperature super alloys that are now being used in quieter and more fuel-efficient jet engines.

Ideal for airfoil casting of blades and vanes used in rotating and static engine parts the P52 material's ability to hold thinner metal walls more accurately provides part manufacturers with higher casting yields, reduced scrap rates and lower casting costs. The stability of P52 also enables manufacturers to reduce or eliminate the use of costly platinum pins that hold the ceramic in place and support the core during the casting process.

P52 ensures ceramic cores remain extremely stable during the casting of turbine blades with high temperature super alloys. (Source: Certech)

In addition to dimensional strength P52 exhibits improved crushability during solidification. This means that it remains rigid and stable through the cooling process but is crushable when it needs to be during the metal solidification process. This is particularly useful for alloys that are prone to hot-tearing or re-crystallization. »We continue to develop materials that push boundaries in the manufacture of turbine blades and allow more complex geometries with higher tolerances to be cast,« explains Evan Reed.

Precision down to grain boundaries

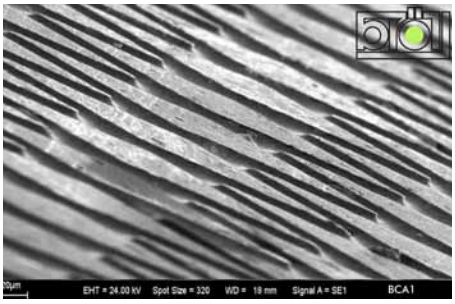
Emil BRÖLL GmbH & Co. KG, Dornbirn (Austria) has now been mass-producing components made of tailored superpure metal oxides with enhanced properties for ten years. BRÖLL is keen to capture the best of ceramic performance by adjusting production methods to minimize potential defects.

After selecting the aluminum oxides, zirconium oxides or dispersion ceramics the appropriate binder systems and shaping methods are adjusted and optimized. The subsequent debinding and sintering steps are also tailored for the individual components. Wear occurs first at weak points, which in the world of ceramics, means micro cracks and pores. Therefore, BRÖLL always follows the maxim: small grains and high density.

The density of the ceramic components produced by BRÖLL is exceptionally high and they are extremely free of pores. So not only are the mechanical properties improved, but also the thermodynamical, chemical and optical properties, as well as the haptics ("look and feel") of the product.

The BRÖLL team including the partners Felix Backmeister, Helmut Sommer and Dr. Eckhard Sonntag consists of approx. 35 employees. (Source: BRÖLL)

BRÖLL uses more than ten percent of its turnover for research and development and its know-how in the field of tribology and surface engineering offers key insights. At the surface of a crystalline solid the structure significantly differs from the solid's volume, mainly because there are missing atomic layers at the interface to the environment. At these interfaces the properties of the material such as adhesion, friction coefficient or reflection (brilliance) are determined. The surface topography and structure are important factors for the functionality of the components.



Almost defect-free microstructures, at very high material densities, can be mass-produced with high precision. (Source: BRÖLL)

Publication information

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