Press Release

CeramTec: Ceramic and metal composite reduces weight

Higher, faster and ever lighter

Stuttgart/Plochingen, January 20, 2011

The use of light metal components is on the rise. Design engineers continually face the challenge of reducing the amount of material, i.e. weight in their constructions – especially in the automotive industry. Lightweight components made from aluminum and even magnesium or titanium are common alternatives to iron and steel. However, high tribological, mechanical or thermal stresses place limits on lightweight construction. Reinforcement precisely where components are exposed to the most stress offers the solution. The ceramics experts at CeramTec GmbH have succeeded in developing a unique local composite to achieve this purpose: Metal Matrix Composites (MMC).

Highly porous preforms are used in the areas that need reinforcement during casting and are infiltrated by the molten metal. This allows a substrate consisting of ceramic hardened particles to seamlessly combine the light weight of the metal with the resistance of ceramics. CeramTec has already proven the functionality and economy of preform MMC on a series-production scale.
Corporate communications

CeramTec corporate contact:
Jörg Kochendörfer
Advertising & Public Relations Manager
Phone +49 (0) 71 53 6 11-416
E-mail: j.kochendoerfer@ceramtec.de

Press contact echolot pr:
Bernd Münchinger
Phone: +49 (0) 711 99014-80
E-mail: muenchinger@echolot-pr.de

Press Release

At the beginning of the development of the material and during the years of cooperation that followed with a sports car manufacturer from Stuttgart and its casting component suppliers, the challenge was to make engines in a variety of models significantly lighter by using aluminum. It was CeramTec’s job to compensate for the anticipated local tribological weakness of the material by creating a ceramic solution that did not yet exist at the time, whereupon the engineers from Plochingen developed a suitable ceramic material along with the corresponding manufacturing process. The advantage for the manufacturer: The patented ceramic preforms developed can easily be integrated in existing pressure casting processes. This made it possible to use the preformed porous components for highly specific applications. In this particular project they were used locally for the cylinder sleeves, where it was necessary to ensure wear resistance of the material without having to reinforce the entire engine block in an expensive, time-consuming process.

For CeramTec this pioneering work launched an entirely new type of composite with virtually unlimited possibilities. The prerequisite is that the ceramic can be fixed in the mold during the casting process and that the infiltration takes place under pressure so that the metal and ceramic can combine perfectly and seamlessly. The preform geometry must also feature ceramic-appropriate design. It is then possible to freely choose the ceramic material for the light metal used in consultation with the customer. At the same time, the size of the ceramic can also be varied.
Local MMC also offers technical and economical advantages in other application areas where special mechanical properties or thermal expansion characteristics are required, for example. Ceramic materials and thus MMC are custom-tailored according to individual requirements. They can be put together individually – depending on the required properties: good tribology, high wear resistance, tensile strength or creep resistance, ideal thermal expansion or a specific Young's modulus. Use is also conceivable in equipment and machine construction, aviation or in building particularly light-weight bicycles. Generally speaking, the use of metal matrix composites should always be considered when reducing weight is essential and light metals are used that are expected cause problems in terms of local property characteristics.
About CeramTec GmbH
CeramTec products are often unseen, but always indispensable. The company and its Mechanical Applications division headquartered in Plochingen, Germany, supply customers with premium-quality ceramic products from 21 locations around the world. The products are used in many different applications today, especially in medical products, automotive manufacturing, electronics, equipment and machine construction, defense technologies, and chemical industries. The company’s success is rooted in the formula: Continued development of new, innovative materials with a strong commitment to quality, a focus on customer-specific systems solutions and dialog-based application consulting services that cover the entire product life cycle. CeramTec GmbH is one of the largest international manufacturers of ceramics for technically demanding applications.

CeramTec GmbH
CeramTec-Platz 1-9
73207 Plochingen, Germany
Internet www.ceramtec.com