

FRIALIT®-DEGUSSIT® HIGH-PERFORMANCE CERAMICS THE POTENTIAL OF TECHNICAL CERAMICS HAS NOT YET REACHED ITS LIMIT

Peter Schramm works for the technical department at FRIATEC Aktiengesellschaft, Ceramics Division. He answered questions regarding manufacturing techniques, characteristics and applications of ceramic materials for Pumpen Aktuell (a newspaper for the German pump industry).

Pumpen Aktuell: How are technical ceramics manufactured?

Peter Schramm: Natural and synthetic raw materials are supplied as powders and used to manufacture high-performance ceramics. Methods used for further processing are grinding, mixing, filtering, granulating and spray drying. The result is a body that is processed using different shaping methods such as dry and wet pressing, isostatic pressing, extruding, slip casting, injection moulding and green machining such as turning, milling, drilling and cutting. After obtaining the required shape, the components are sintered - this process is called reaction sintering in different gas atmospheres or sintering in electric furnaces.

Cutting, laser cutting, drilling, grinding, lapping, honing and polishing are processing steps that are used for finishing. The end product is then subjected to a final quality control.

PA: For which pump component do you use ceramics?

PS: Primarily, for the ceramic spacer can. Pump impellers, complete dosing units (pistons and bushings), plungers for high-pressure pumps, shafts, bushings and gliding bearings are also of interest.

PA: Which properties should spacer cans for the pumping industry have?

PS: Spacer cans made of FRIALIT FZM High-Performance Ceramics offer some advantages when compared to parts made of conventional materials. FRIALIT FZM cannot be magnetised. Thus, no performance-reducing eddy currents occur and driving capacity can be reduced by 10 to 15 percent. FRIALIT FZM is resistant to corrosion and can be used widely for almost any acids and alkaline solutions.

FRIALIT FZM has a high mechanical strength. Testing pressures above 60 bar can be controlled at temperatures in excess of 450 °C depending on the size of the interior diameter. A relatively small E-module indicates the material's ability to show elastic deformation.

PA: How many ceramic spacer cans do you offer? What are the differences between them?

PS: Spacer cans are manufactured exclusively in accordance with customer requirements. Each customer uses different sizes, pressure levels and space requirements resulting in a variety of characteristics with regard to shape and size.

PA: For which project or application and industry have you recently delivered spacer cans?

PS: The applications are varied. Our customers use pumps with magnetic couplings for a wide variety of applications in the chemical industry, oil industry etc.

PA: What are the advantages and disadvantages of ceramic materials? Are there any limits?

PS: Ceramics have many benefits such as high hardness, excellent resistance to wear, high corrosion resistance and are highly resistant to high temperatures - not forgetting a low specific weight. They also achieve high levels of strength. The aim for all future activities should be a good cooperation between manufacturers, designers, plant engineers and users to resolve potential drawbacks in ceramic applications.

PA: Which future developments do you expect in the field of ceramic materials?

PS: The potential of technical ceramics has not yet reached its limit. New and improved manufacturing technologies have provided significant advances in quality and reproducibility. I think that high-performance ceramics will continue to play an increasingly important role in technology through further developments and cooperation between industry and research.