

Perfect Surface Finishing Gives Ceramic Axles a Long Service Life

Ceramic pins are now used in areas where metals were previously used. Just a few decades ago, applications that are taken for granted today were not considered to be possible. However, just because the more expensive product is chosen does not necessarily make it the best. Only the finishing of the surface gives the material a long life and constant performance.



Fig. 1
The BP-MX brush polishing machine

It is unbelievable in which sectors and areas of application ceramics are used today. The broad spectrum shows us the diversity of our enquiries. A clear sign that top mater-

Keywords

surface finishing, ceramic axles, medical technology, gearboxes, electric motors

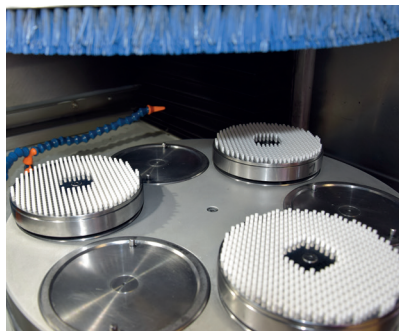


Fig. 2
Ceramic axles in the BP-MX brush polishing machine

ial has to be increasingly chosen in order to meet the high demands of technology. However, it is also worth investing in more expensive where the service life is considerably longer.

In medical technology, ceramic materials have been used years as replacements for bones or even teeth. Here, the great mechanical strength and wear resistance as well as the high compatibility with living tissue are of great importance.

A major field of application for ceramic pieces are the so-called hot applications. These include firing systems, which withstand unimaginable operating temperatures of up to 2500 °C without fatigue. Due to the ever-higher temperatures to be aimed for in combustion engines, development applications and demands on components such as bearings, turbocharger turbine blades and engine parts are increasing. The best-known applications, however, are the components used as insulators, e.g. in spark plugs.

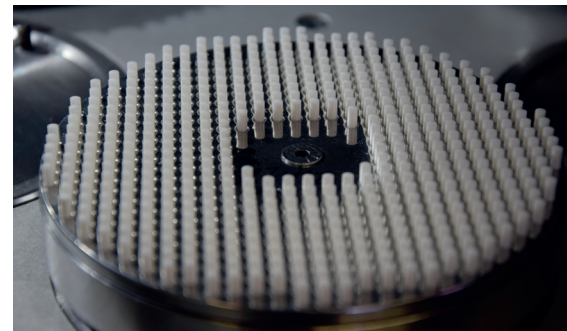


Fig. 3
Ceramic axles

Ceramic materials also dominate in bearing and sealing technology. Ceramic materials can be used as bearing shells of gas turbines with speeds of several thousand revolutions per minute. In pumps, mechanical seals made of ceramic seal the shaft feedthroughs through the pump housing from the outside world against corrosive and abrasive media – to name just a few fields of activity from the wealth of applications for ceramics. As one can see, ceramics are the new metal or carbide.

People invest in high-quality materials such as ceramics when they have to be perfect and the highest precision is required. Due to their inorganic, non-metallic and crystalline nature, ceramic parts are extremely

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durable, wear less and offer consistent performance in engines at very high speeds. The parts that Gerber AG likes to introduce in this application report are axles that are used in small gear-boxes and electric motors, mainly in medical technology as well as in drives for dialysis machines. The technical challenge of post-processing or finishing a ceramic component to create the perfect part increases with its size and shape. The task is difficult in that it requires

perfect and targeted honing and polishing of the end faces and axle ends and not, as in barrel finishing, where all sides are machined. This is where the Gerber brushing process comes to the fore, because only a perfectly machined ceramic part beats high rotational speeds and the associated high friction.

The BP-MX brush polishing machine developed by René Gerber AG is ideally suited for achieving efficient and reliable edge prepar-

ation and polishing and delivers outstanding results. Surfaces as well as slightly curved parts are machined on a planetary polishing table. The rotating movements of the polishing table, work-piece carriers and brushes ensure that the desired edges are evenly rounded. At the same time, the entire face swept by the brush is also polished. Rotation takes place in cages, individually equipped, the capacity is 2700 axles at a processing time of 30 min i.e. 0,66 s per part.