

oerlikon
heberlein ceramics

Competence in Ceramics since 1983



Know-how and Flexibility for your Success



Since the development of the first air jets for textile applications in 1983, Heberlein Ceramics, a department of Oerlikon Heberlein Temco Wattwil Inc., Switzerland has become a specialist firm in the machining of high grade ceramics.

As a customer you profit from our many years of experience in the fields of appropriate designs and precision machining of hard ceramics. Equally we are at your side ready to advise you when selecting the most suitable ceramics.

The machining of small and miniature parts made from Al_2O_3 , ZrO_2 , Si_3N_4 and SiC is one of our core competencies. As a commission manufacturer we have available additional capacity for the processing of prototypes right up to medium size production runs.

Since 8th January 2010, are our processes not only certified according to ISO 9001:2008, but also to ISO 13485:2007.

Your Ceramics Team



Peter Anderegg
Head of Heberlein Ceramics



Nicola Chiusolo
Product Manager & Sales



Jetmir Bejtulai
Technician & Support

Our Competencies

Our well founded know-how in consulting, development and processing of ceramic precision parts, enables us to offer you the following :

- Green machining of Al_2O_3 and ZrO_2
- Sintering
- Machining of hard materials:
 - honing
 - fine honing
 - laser cutting
 - lapping
 - grinding
- Laser inscription
- Sub-assembly work

Materials

- Aluminium oxide
- Zirconium oxide
- Silicon nitride
- Silicon carbide
- others on request



Our Finishing



Our technically competent and quality sensitive staffs have at their disposal many years of experience in the processing of high grade ceramics.

The high quality machine shop, with possibilities of automation, is construed for prototypes up to medium size production runs. We meet customer demands for flexible production thanks to our short reaction times.

As a result of highest precision we are in the position to achieve the fabrication tolerances required by the watch industry.

Quality control

- Optical measurements
- Tactile 3D measurements
- Surface roughness measurements
- Tear testing
- Grinding patterns



Engineering and Advisory Service

Advice on

- selection of appropriate high grade ceramic
- design of components appropriate to ceramic materials
- substitution of metal or plastic wear parts by ceramic execution

The experience of our highly qualified technicians over many years enables us to design parts that conform with customers needs.

We can advise your designers concerning all questions involving the subject of high grade ceramic.

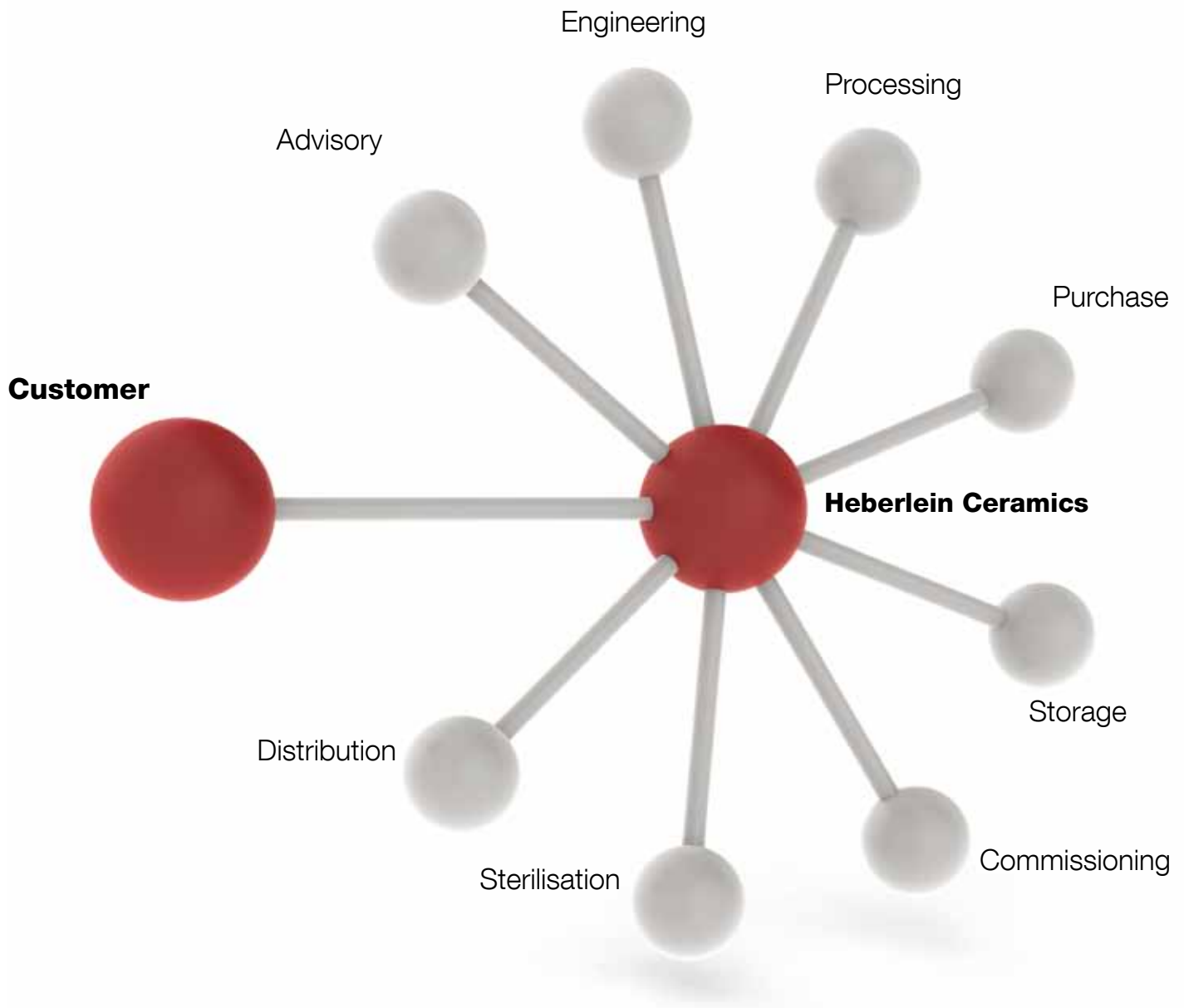
Prototyping

Heberlein Ceramics offers the fabrication of prototypes to customers' drawings and also their conversion to jointly developed products.

The shape and function of the sample, identical to the end product, enables our customers to carry out practical tests and offer the ideal basis for possible improvements before the start of series production.

Commission processing

As a further service Heberlein Ceramics offers a so-called „extended workbench“ also described as working on a commission basis. Commission work includes complete and on time precision machining of ceramic materials ranging from prototypes to medium size production runs.



Systems Supplier

As your systems partner Heberlein Ceramics takes over all the work in progress stages from development to the distribution of your products.

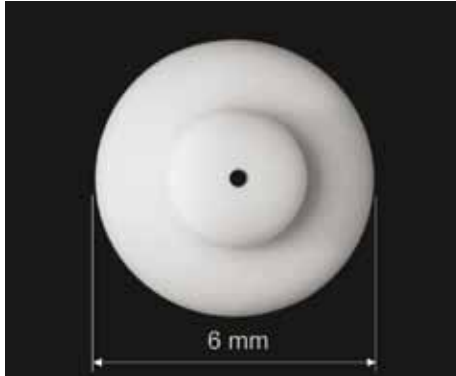
We are happy to make available our know-how. Our infrastructure makes it possible to administer the stocking of purchased parts if requested.

Commissioning implies the expert assembly (for medical products in accordance with ISO 13485 standard) of purchased and in-house products. The utilisation of the distribution system, which was established over many years, enables Heberlein Ceramics to ship your products on time at the right cost.

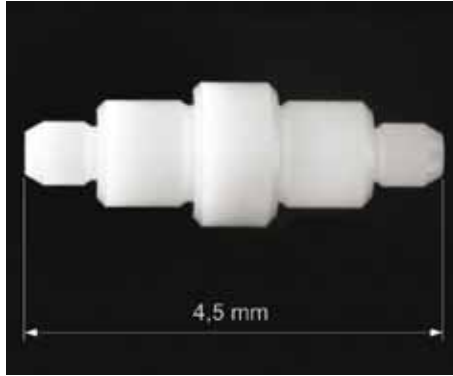
Metal Working and Component Assembly

Heberlein Ceramics offers the machining of all common metals. Amongst others we dispose of a modern turning and milling centre with nine controlled driven spindles. In addition Heberlein Ceramics is able to assemble small component groups and to include functional testing.

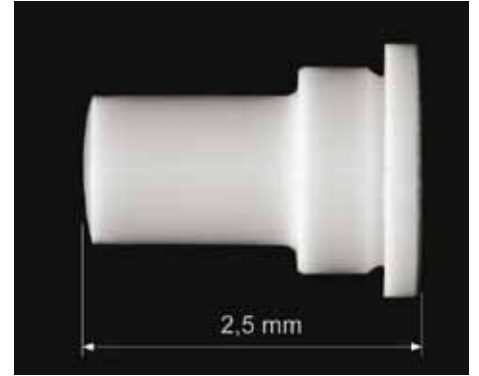
Selection of Precision Parts



Jet with high precision drilling $\varnothing 0,35$ mm



Shafts made from ZrO_2



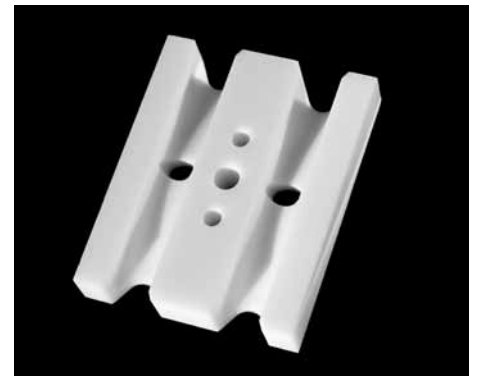
Bearing spigots made from ZrO_2



Aluminium oxide plate, thickness 5 mm, laser cut



Drilled plates with holes $\varnothing 0,5$ mm



Jet made from Al_2O_3

Properties of Ceramic Raw Materials

	Unit	Aluminium oxide		Zirconium oxide		Silicon carbide	Silicon nitride
Chemical formula		Al ₂ O ₃	Al ₂ O ₃	ZrO ₂ - TZP	ZrO ₂ - ATZ	SiC	SiN
Composition		99.7%	99.9%	95% ZrO ₂ 5% Y ₂ O ₃	76% ZrO ₂ 20% Al ₂ O ₃ 4% Y ₂ O ₃		
Colour		ivory	white	ivory	white	black	grey

Mechanical Properties

Density	g/cm ³	3.85	3.98	6.05	5.5	3.1	3.24
Vickers hardness	MPa	1'800 - 2'300	2'100	1'200	1'400	2'550	1'400
Impact strength	MPa	2'800	3'800	2'000	2'000	2'200	2'500
Bending strength	MPa	300	500	1'000	2'000	400	700
Brittleness	MPam ^{1/2}	-	4.0	8.0	8.0	4.0	7.0
Elastic module	GPa	300	380	200	220	410	300

Thermal Properties

Temperature resistance in protective gas	°C	1'600	1'900	1'000	1'000	1'800	1'300
Temperature resistance in air	°C	1'600	1'900	1'000	1'000	1'500	1'100
Specific conductivity at 20 °C	J/Kg K	900	900	500	600	600	700
Thermal conductivity from 20 – 100 °C	W/mK	19 - 30	30	2.5	6	125	25
Expansion coefficient (between 20 °C and 1'000 °C)	10 ⁻⁶ /K	9.0	8.0	10.0	9.0	4.1 / 5.2	2.0 / 4.0
Resistance to temperature change	K	100	190	300	300	350	450

Electrical Properties

Specific resistance at 20 °C	Ωcm	10 ⁴	10 ¹⁴	10 ⁹	10 ⁹	10 ⁶ -10 ⁸	10 ¹¹
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