

CERAMICS MACHINING

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FEATURES OF PERFORMANCE

Cutting, scribing and drilling of ceramic materials such as:

- Al₂O₃ 96 %; Al₂O₃ 99.6 %.
- monocrystalline Al₂O₃ (sapphire)
- AlN (aluminum nitride)
- Si₃N₄ (silicon nitride)
- SiC / BC (silicon carbide/boron carbide)
- LTCC ceramics
- porous ceramics
- glazed ceramics
- quartz glass
- structured substrates

TYPICAL APPLICATIONS

- manufacturing of separable substrates for electronic circuits (with position markings, drillings, scribe lines etc.)
- friction rails
- ceramic spacers, washers, diffusors
- filter elements made of porous ceramics
- functional ceramics (e.g. converter substrates)

POSSIBILITIES OF PROCESSING

- very fine structures due to good focus ability of the laser beam (kerfs down to 0.07 mm possible)
- short-term and cost-effective production of the desired workpieces due to the high flexibility of the laser as well as the unproblematic correction of the geometries for prototypes and sample production
- processing with CO₂ or/and YAG laser possible
- processing of ceramic substrates up to 9" x 9"
- standard thickness up to 3 mm (larger thicknesses available on request)
- scribing depth:
 - > typically: 40 % of the substrate thickness
- dimensional accuracy of scribing lines:
 - > nominal dimension ± 0.05 mm; whereby the specification for the distances of the lines to each other as well as to the outer cutted edges of a lasered substrates
 - > for non-lasered outer edges, the dimensional accuracy applies to the agreed stop points during the processing
- break edge accuracy of the scribing lines:
 - > nominal dimension - 0.050 + 0.150 mm; whereby the break-off edges should have at least five times the width of the substrate thickness
 - > burr after breaking < 0.02 mm
- shot spacing for scribe lines:
 - > freely programmable Standard: 0.15 mm
- dimensional accuracy: for drilling and cutting
 - > drilling and cutting positions up to ± 0.05 mm
 - > cutting contours up to ± 0.05 mm
 - > minimum distance between cutting contours as well as to substrate edge must be substrate thickness
- after-treatment of material throw-up:
 - > during machining, an unavoidable throw-up of vitrified ceramic material occurs around the recesses
 - > delivery of the processed substrates with post-treatment (removal of the throw-up by means of by vacuuming, brushing, ultrasonic treatment) or without
 - > material chipping on the back side of the substrate (exit side of the laser beam) < 0.15 mm
 - > edge grinding, glass bead blasting
 - > surface grinding, lapping and polishing in cooperation with manufacturing partners