LASER PROCESSING

GLASS AND OTHER TRANSPARENT & BRITTLE MATERIALS
LASER PROCESSING OF GLASS AND OTHER TRANSPARENT & BRITTLE MATERIALS

Laser processing of glass and other transparent brittle materials provides unmatched advantages compared to conventional production methods. Laser processing of glass is contact-free as the laser is a tool that doesn’t wear out. COHERENT | ROFIN provides laser sources and complete system solutions as well as processes tailor-made to the customer’s needs. Customers benefit from COHERENT | ROFIN’s broad application know-how to find the right solution for their specific needs.

SmartCleave™ - IP protected laser cutting process
The COHERENT | ROFIN SmartCleave™ process utilizes ultrashort-pulsed lasers with dedicated properties, e.g. the Burst Mode. The basic invention is a patented process using laser filamentation to separate brittle and transparent materials in a high-speed, quasi debris-free and zero-gap process and nearly no post-processing. The patent portfolio is expanded continuously by COHERENT | ROFIN.

Superior Technology
- Kerfless separation process
- Cutting speed up to 2 m/s
- Glass thickness range 50 μm to 12 mm
- Suitable for glass, sapphire, crystals, ceramics etc.
- Cutting of chemically and thermally strengthened glass
- Cutting of complex geometries
- Cutting stacks of brittle material

Unmatched Quality
- No micro-cracking and minimal chipping
- High bend strength
- Surface roughness Ra < 1 μm
- Quasi debris-free

Compelling Economics
- Low cost of ownership
- Dramatic reduction of process steps
- Green technology without water use
LASER PROCESSING OF GLASS AND OTHER TRANSPARENT & BRITTLE MATERIALS

COHERENT | ROFIN not only offers a revolutionary glass cutting process with SmartCleave™, but also solutions for a wide range of other applications.

**Drilling/Cutting**
- High aspect ratio (> 1:20) drilling
- Good quality cutting of complex shapes/geometries
- Micro holes (< 200 µm diameter)
- Low risk of micro cracks/chipping

**Marking/Inside marking**
- Powerful software allows easy and flexible decoration (text, DMC, bitmaps etc.)
- Smallest spot diameters for almost invisible markings for e.g. traceability
- Inside glass marking (no contamination) without surface damage
- High contrast surface marking on various materials
- Excellent marking speeds

**Decoating/Thin film ablation**
- Perfect thin film removal with excellent ablation rates
- Superior beam quality equals highly sophisticated microstructures

**LIFT-process**
- Nano layers with optical effects (e.g. color changes) can be transferred, forgery-proof
- Wide range of colors, selectable
- Functional layers possible
- Base material properties remain unchanged
GLASS AND BRITTLE MATERIALS
APPLICATIONS AND SYSTEMS SOLUTIONS

COHERENT | ROFIN Laser Type

<table>
<thead>
<tr>
<th>Process</th>
<th>HyperRapid NX</th>
<th>Monaco</th>
<th>PowerLine Pico</th>
<th>PowerLine E</th>
<th>StarFiber P</th>
<th>DQ Laser</th>
<th>PowerLine L</th>
<th>StarShape</th>
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CombiLine
System Features
- Spacious working chamber with observation window
- Programmable z-axis
- Smart operation technology
- Space-saving design
- Selectable lasers
- Low investment costs

MPS Flexible
System Features
- Welded steel construction base frame
- Granite base for the motion modules
- Precision and High Precision
- Modular design
- Laser garage for 19” laser source or laser supply cabinet
- Spacious working chamber
- CNC controller (Beckhoff)
- Pneumatic sliding door
- Option manual sliding door (e.g. for crane loading)

MPS Advanced
System Features
- Welded steel construction base frame
- Granite based motion modules
- Modular design
- Laser garage for 19” laser source or laser supply cabinet
- Spacious working chamber
- CNC controller (Beckhoff)
- Pneumatic sliding door
- Option manual sliding door (e.g. for crane loading)