



## LASER CUTTING OF THIN GLASS

### Task

Fast and precise cutting of any shapes out of thin glass (thickness of glass < 1 mm) is currently showing an increasing market potential due to an increasing demand of OLEDs and LCDs. Conventionally manufactured glass, when it is cut or mechanically scribed and cleaved, often exhibits poorly cut edges. These, in turn, have to be ground and polished in a time consuming process. Manufacturing contours according to any wish is also difficult. In particular, the cutting of strengthened glass, which is commonly used in the display technology, causes difficulties for conventional processes.

### Method

By using ultra-short pulse lasers, the thin glass can be cut quickly and precisely, so that no further post processing is needed. When glass is machined with ultra-short pulse lasers, however, the material cannot be cut through at once. The material is ablated layer by layer until it is cut through by repeated scanning of the cutting contour. Depending on the material thickness, several cutting lines have to be positioned in parallel and on top to be able to cut through the material completely.

For cutting thin glass, a frequency-doubled ps-laser is used. The laser beam is moved by a scanner and focused by an f-theta lens on the glass surface. The laser beam is moved at a scanning speed of up to several m/s.

### Result

When ps lasers are used it is possible to precisely cut thin glass. Damages in the glass can be minimized by adapting the cutting parameters. This way, cut glass samples with a breaking strength of more than 200 MPa can be produced.

### Applications

This technology is of interest for all applications where complex structures have to be cut out of thin glass. This glass can be used e.g. for smart phone or tablet displays but also for the solar industry. In addition, new application areas like design glass elements can be manufactured due to this technology.

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1 Cutting of thin glass with a green ps laser.

2 Cross-section of a 300  $\mu\text{m}$  thick laser cut glass.