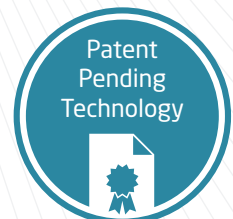




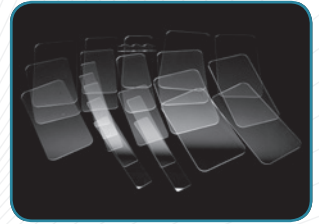
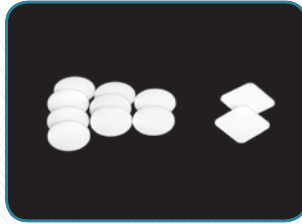
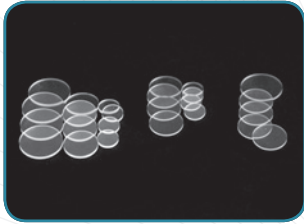
Workshop of Photonics

WOP Laser Technology for Cutting Glass and Sapphire



WOP laser technology for cutting glass and sapphire

Workshop of Photonics has developed a new state of the art glass and sapphire cutting technology to overcome new challenges arising from new materials and customer's requirements. Our technology enables scribing glass or sapphire from 30 μm to 3 mm (tested) thickness with process speeds from 100 mm/s to 1000 mm/s depending on industry requirements. Straight and curved cuts can be performed.



Technology specifications

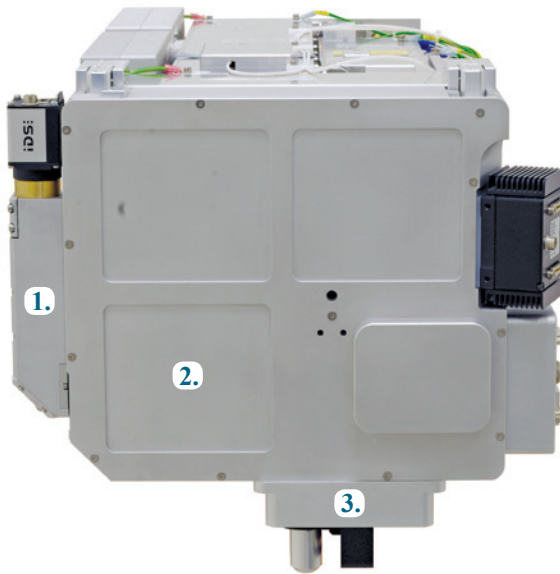
Workshop of Photonics has developed a break through transparent material cutting technology, which enables:

- Scribing tempered, non-tempered glass and sapphire
- Irregular shape cutting
- High process speed ≥ 200 mm/s
- High throughput and yield
- Low chipping < 20 μm for most materials
- Easy breaking for non-tempered glass and self breaking for tempered glass
- Smooth side walls after breaking, $R_a < 1$ μm
- No debris on back and front surface
- Single pass process for glass up to 1 mm thickness
- Already tested with high DOL glass from 0.4 mm to 1.3 mm thickness
- DOL layer from 10 μm to > 40 μm .
- High bending strength
- Easy adaptation for different glass types

Solutions for system integrators

Transparent material cutting module specifications:

- Optimized for 1028 nm wavelength
- Sealed monolithic housing
- Integrated autofocus (AF) unit with 400 μm piezo axis for sample tilt compensation
- Integrated motorized linear axis with 15 mm travel, optional, eliminates the need of external Z axis
- Optional external Machine vision unit (not present in picture below)
- Optional alignment module for adjustment
- Dimensions HxWxD: 315x369x102 mm



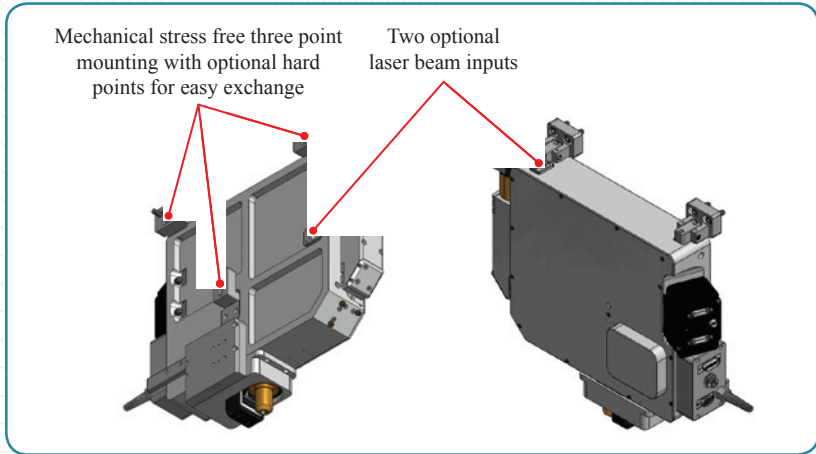
1. Detachable alignment unit (DAU) – for adjustment and for servicing procedures (alignment check). One DAU can be used for several modules
2. External Machine vision module. Includes objective (from 1.5x magnification) with coaxial light source GigE camera
3. 400 μm piezo stage for AF and 15 mm motorized internal linear Z stage for adjustment between different thickness glass

Integration

For system integrators *Workshop of Photonics* offers easy to implement packages:

- Optical module and technology licence
- Optical module, technology licence and suitable laser source

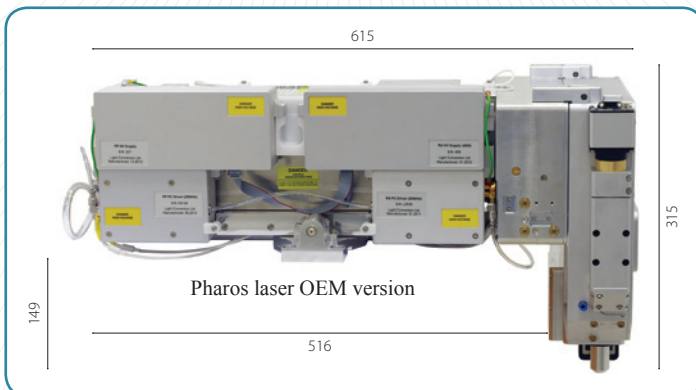
Standalone module mounting can be seen in the picture bellow:



As an alternative optical head mounted on dedicated source can be offered.

Specifications:

- Module mounted directly on laser in the place of harmonics module
- Size of the package HxWxD: 315 mm x 369 mm x 615 mm
- Weight: 50 kg
- Dedicated to mount on top of XY stages working plane. 15 mm travel range motorized Z axis for cutting plane height control is integrated inside



Examples

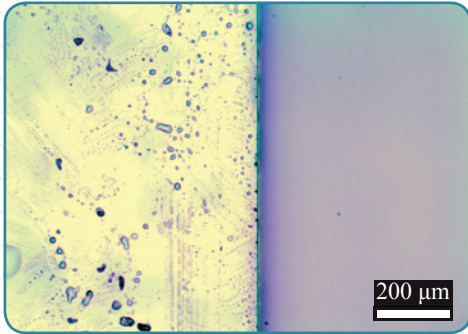


Figure 1. Tempered glass 0.55 mm thickness, 42 μm DOL. Top view.

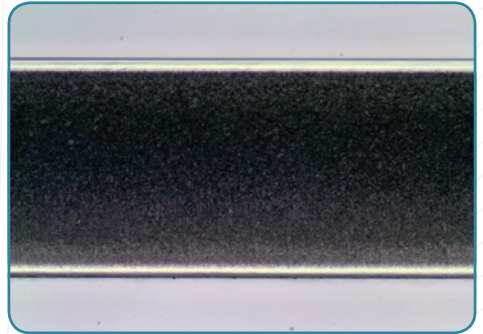


Figure 2. Tempered glass 0.55 mm thickness, 42 μm DOL. Side view.

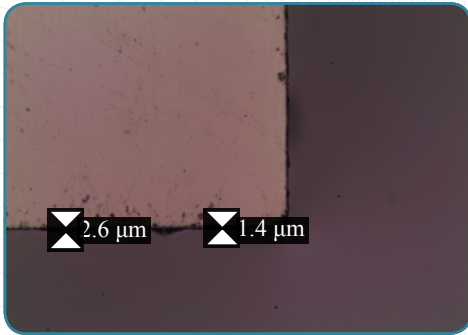


Figure 3. 1 mm tempered glass. Top view.

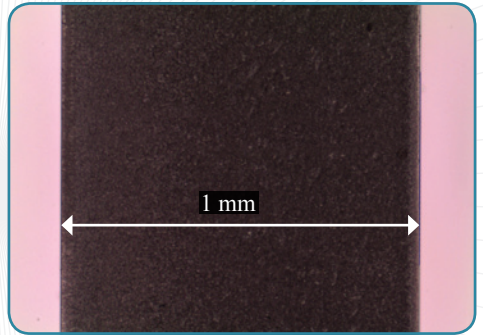


Figure 4. 1 mm tempered glass. Side view.

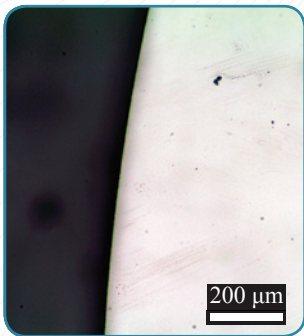


Figure 5. Sapphire 0.325 mm thickness. Top view.

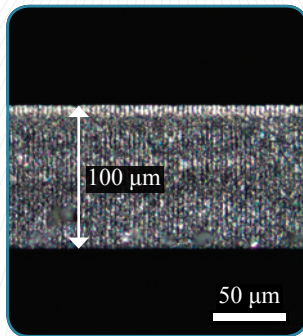


Figure 6. Sapphire 0.1 mm thickness. Side view.

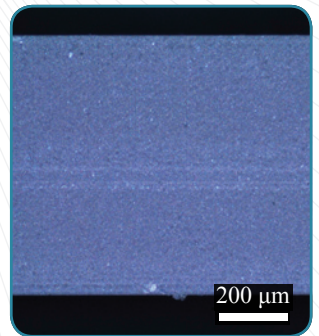


Figure 7. 0.75 mm thickness sapphire. Side view.

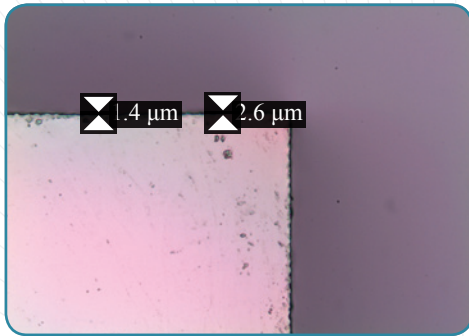


Figure 8. 0.6 mm non-tempered glass.
Top view.

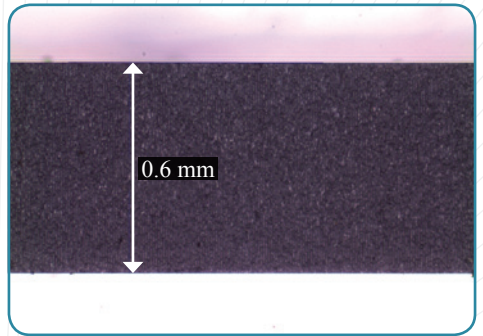


Figure 9. 0.6 mm non-tempered glass.
Side view.

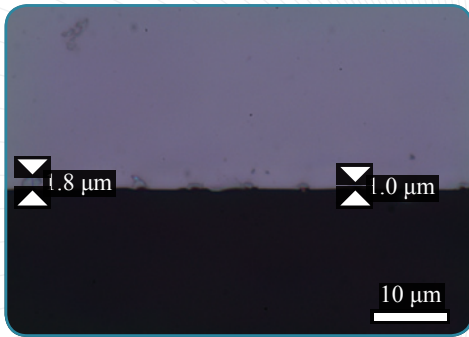


Figure 10. Non tempered optical glass.
Thickness 80 μm. Top view.

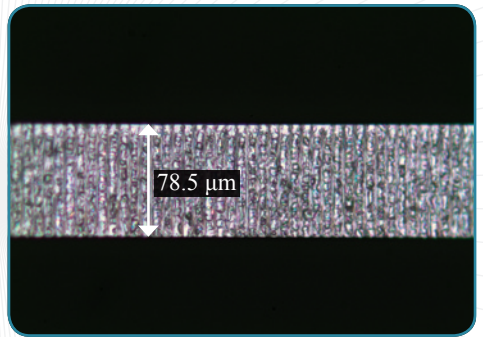


Figure 11. Non tempered optical glass.
Thickness 80 μm. Side view.

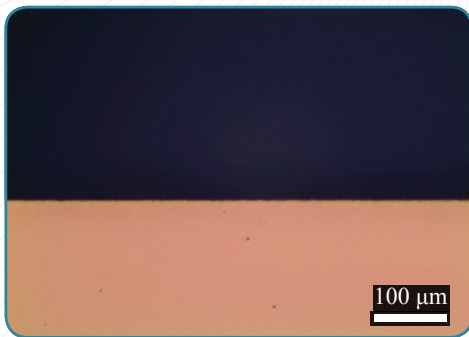


Figure 12. Non-tempered Eagle glass,
thickness 0.4 mm. Top view.

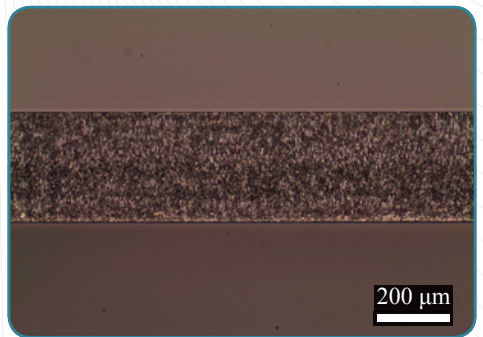


Figure 13. Non-tempered Eagle glass,
thickness 0.4 mm. Side view.