

AdValue Photonics' short-pulse fiber lasers enable taper-free hole drilling in glass with 20µm chip size

December 6, 2017
Tucson, Arizona, USA

The performance characteristics of AdValue Photonics' fiber lasers have enabled glass hole drilling with unmatched hole quality and process speed. High precision zero-taper, straight inner-wall holes in transparent glass materials have been produced with chip sizes below 20µm. AdValue's unique combination of laser parameters and material processing controls have resulted in cost-effective solutions previously thought impossible.

There is a growing demand for precision zero-taper holes in transparent materials like glass and similar materials. Through careful selection of laser parameters and process development AdValue Photonics managed to improve the hole quality while maintaining zero-taper and fast processing speeds without the use of complex beam positioning systems, keeping the capital expenditure and running costs to a minimum.

AdValue Photonics' fully fiber based EVERESTpico 1µm has a 50ps pulse duration and produces a pulse energy of up to 50µJ at repetition rates of up to 1MHz and an M2 of less than 1.3. This unique combination of laser parameters enables production of zero-taper holes with chip sizes below 20µm at fast processing speeds as demonstrated by the AdValue Photonics application lab.

Conventional laser hole drilling processes typically result in tapered holes. Complex beam positioning systems with five or more axes are being used to minimize taper by adjusting the entrance angle of the laser beam dynamically in sync with the trepanning motion. These types of systems are expensive and difficult to align and maintain.

In transparent materials zero-taper holes can be achieved by using a different kind of drilling process that works with a conventional cost efficient galvo scan head. The laser sources of choice for this process have been frequency-doubled green DPSS lasers with pulse durations in the tens of nanoseconds range and pulse energy of several hundreds of µJ resulting in chip sizes from 150 to 200µm.

Chip sizes in the order of 20µm require picosecond lasers while zero-taper requirement calls for the same process that was originally developed for green DPSS lasers with nanosecond pulse durations. AdValue Photonics successfully adopted their EVERESTpico 1µm picosecond laser to the zero-taper hole drilling process. Zero-taper holes with chip sizes of 20µm or smaller were achieved in various types of glass and sapphire at fast processing speeds. The laser's unique set of specifications make the EVERESTpico 1µm the ideal choice for this process.

About AdValue Photonics: AdValue Photonics is a leading manufacturer of innovative fiber lasers for materials processing, scientific, LIDAR, and medical applications. Founded in 2007, with a reputation for delivering groundbreaking products based on its proprietary technology, the company utilizes its unique capabilities in specialty glasses and fibers to optimize the performance and reliability of its fiber lasers. For more information, please visit: <http://www.advaluephotonics.com> Contact: Dr. Katherine Liu Director of Marketing & Sales +1 (520)790-5468 contact@advaluephotonics.com