



Press Release

Laser welding of glass is now ready for industrial practice

A new femtosecond laser system by TRUMPF facilitates economical, high-quality glass welding, with no additional material required – the process is already in use in the production of laser light cables at TRUMPF

Ditzingen, July 20, 2016 – Economical, high-quality laser-welding for glass? That posed a major challenge – until now! The laser specialist TRUMPF has developed a femtosecond laser system that replaces conventional joining processes such as glueing. The advantage: in contrast to glueing processes, no additional materials that are susceptible to evaporation or embrittlement are required. This reduces costs and increases durability as well as the stability of the seam. The special nature of glass poses considerable challenges with regard to processing: glass is hard and brittle, has lower thermal conductivity than metal and tends to crack when heated unevenly due to the internal tension developed. Femtosecond laser systems can prevent such cracking. “The laser system must permit variable programming of pauses and pulses,” explains Elke Kaiser, applications engineer at TRUMPF.

Glass is permeable to light with wavelengths ranging from ultraviolet to near infrared. Absorption takes place only when the energy densities are very high, so that processing within the glass is facilitated. The highest performance density lies deep in the lower glass at the focal point. The energy from several thousand laser beam pulses causes a melt pool to be created and pushed upwards in just a few milliseconds. Skillful thermal management and an optimal ratio of pulses and pauses prevent the glass from cracking.

Protective caps for laser light cables are laser-welded instead of glued

Glass components that were previously glued to each other can now be economically welded with high-quality results, as TRUMPF has demonstrated in its own production of laser light cables. Until recently, the lids of the protective caps for the laser light cables were glued on. Now, lasers are used to weld them on. The joint strength of the glass parts depends primarily on the level of pulse



Press Release

energy. The pulse energy for 1030 nanometer infrared light needs to be 9 microjoule.

TRUMPF is currently building a laser-welding system for reliable glass welding for mass production of the protective caps for the laser light cables in its own production plant in Schramberg. Elke Kaiser states, “The laser system also serves as a pilot system to demonstrate to potential users that new, innovative laser methods are reliable and ready for deployment in glass processing and offer immense advantages.” The new laser welding methods for glass prove their economy and efficiency by eliminating the disadvantages of conventional methods such as glueing: optical beam paths are no longer contaminated, there is no evaporation and no long-term embrittlement of adhesives, which means that the protective caps made of glass will be considerably more durable. TRUMPF is currently preparing further applications for the laser welding of glass for use in its own production.

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Laser light cables

TRUMPF has demonstrated in its own production that the process of welding the glass protective caps using femtosecond lasers is ready for industrial use.



Breakage test

Laser-welded protective caps are more than twice as strong as conventionally joined caps in breakage tests.





Press Release

About TRUMPF

The high-technology company TRUMPF provides manufacturing solutions in the fields of machine tools, lasers and electronics. These are used in the manufacture of the most diverse products, from vehicles, building technology and mobile devices to state-of-the-art power and data storage. TRUMPF is the world technological and market leader for machine tools used in flexible sheet metal processing, and also for industrial lasers. In 2014/15 the company – which has approximately 11,000 employees – achieved sales of 2.72 billion euros. With almost 70 subsidiaries, the TRUMPF Group is represented in nearly all the countries of Europe, North and South America, and Asia. It has production facilities in Germany, France, Great Britain, Italy, Austria, Switzerland, Poland, the Czech Republic, the USA, Mexico, China and Japan.

For more information about TRUMPF go to www.trumpf.com

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