

# PRESS RELEASE

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**PRESS RELEASE**September 12, 2019 || Page 1 | 3

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## Deburring EXPO: Finishing sheet edges and functional surfaces with the laser

**At Deburring EXPO, the leading trade fair for deburring technology and precision surfaces in Karlsruhe, the Fraunhofer Institute for Laser Technology ILT will be presenting current developments in the field of laser deburring and polishing from October 8 to 10, 2019. The focus is on laser polishing for tribologically stressed surfaces, sealing surfaces and laser deburring of sheet edges.**

The topics of deburring and polishing are becoming increasingly important in metalworking. Laser-based deburring and polishing processes are particularly advantageous for functional surfaces and demanding deburring tasks.

### Rounding off cut edges and polishing surfaces

Laser deburring of sheet metal parts is one of the techniques Fraunhofer ILT will be demonstrating in Karlsruhe. Continuous wave lasers are the preferred choice for this application thanks to their ability to remove burrs and sharp edges quickly and reliably – in some cases at a rate of several meters a minute – and to mold the part into the required shape by means of remelting. Users can harness this melting process to create a defined shape, for example by rounding off the part smoothly and evenly.

Laser polishing techniques for metal surfaces make use of both continuous wave and pulsed lasers. Pulsed lasers with pulse durations of a few hundred nanoseconds and a remelt depth of several micrometers are a popular choice for machining ground surfaces with low roughness, for example. In contrast, continuous lasers capable of achieving remelt depths of up to 100 micrometers are a good choice for rougher surfaces, such as those formed by milling or erosion machining.

For metal surfaces, polishing rates of 1 to 60 s/cm<sup>2</sup> are achieved. The exact figure depends on the application and laser power in each case. “We’re already seeing some interesting applications in the automotive and mechanical engineering sectors as well as in precision mechanics and medical devices,” says Dr. Edgar Willenborg, manager of the Laser Polishing group at Fraunhofer ILT. “Laser polishing is particularly suitable for surfaces exposed to high tribological stress, as well as for sealing surfaces and, in some cases, for areas that are difficult to access using conventional methods.”

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#### Editorial Notes

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Another advantage of this method is that it can be used with many different materials, including various types of steel and some cast alloys as well as nickel, titanium and cobalt-chrome alloys and even pure titanium.

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**PRESS RELEASE**September 12, 2019 || Page 2 | 3

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**Increasing interest in laser polishing**

Laser polishing is still relatively rare in industrial manufacturing. Nevertheless, the first applications are already implemented and have proven to be both cost-effective and technically viable. At Fraunhofer ILT, a dedicated research group consisting of seven scientists is working intensively on this still young topic. Though modest in size, its leader Dr. Edgar Willenborg believes this may be the world's biggest research group focused specifically on laser polishing.

**Laser polishing for 3D parts**

Lasers can even be used to process complex, three-dimensional parts. Working in collaboration with a special-purpose machine maker, Fraunhofer ILT has developed a machine technology the Aachen-based scientists use to continue developing and testing laser polishing for new applications. "The technology has lived up to its promise on a laboratory scale, and now we're close to seeing the first industrial applications," says Willenborg. "Laser polishing primarily caters to medium levels of quality – for example to achieve technical functionalization with a high degree of automation." When it comes to mirror-like, high-gloss surface finishes, he adds, laser polishing is not generally such a good choice.

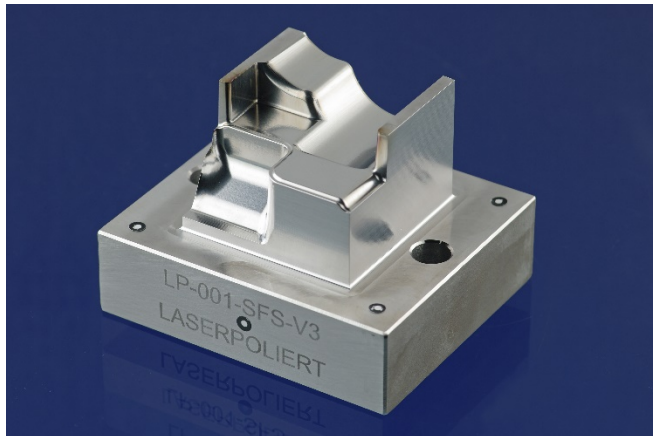
Dr. Willenborg reports that high demand for new polishing techniques has boosted interest in laser polishing across the board, noting that this method also offers the advantage of being easy to integrate in existing production lines for smaller parts.

**Fraunhofer ILT at Deburring EXPO 2019**

Further details on laser deburring and polishing will be presented by Dr. Willenborg and his team from October 8 to 10 in Karlsruhe at the Fraunhofer ILT booth 319 in Hall 1 of the Deburring EXPO Research Pavilion.

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**Image 1: Focus on functionalization:**  
Fraunhofer ILT will be demonstrating its expertise in the fields of laser deburring and polishing at Deburring EXPO in Karlsruhe.

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**PRESS RELEASE**

September 12, 2019 || Page 3 | 3  
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**Image 2: Partially laser-rounded sheet edges made of stainless steel (sheet thickness 1.5 mm).**

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