

Always a Cut Ahead
LPKF StencilLaser Equipment



LPKF
Laser & Electronics

Commitment and Innovation

LPKF has been introducing innovations in electronics manufacturing for more than 30 years. The LPKF StencilLaser established a new form of electronics manufacturing in 1992. Even today we continue to be the world market leader at the top of SMD stencil manufacturing.

Investment in capital equipment is a big deal. LPKF StencilLaser systems are designed from the ground up to be safe and successful. The LPKF stencil cutting systems enable the stencil business to provide the highest performance, quality and reliability to their clients.

LPKF not only supplies the laser systems. Service and support by experts is available around the clock. The supplied software meets the requirements of stencil technology.

Feedback from the field confirms LPKF's combined strength of systems, software and application expertise. Our ambition is to offer the most

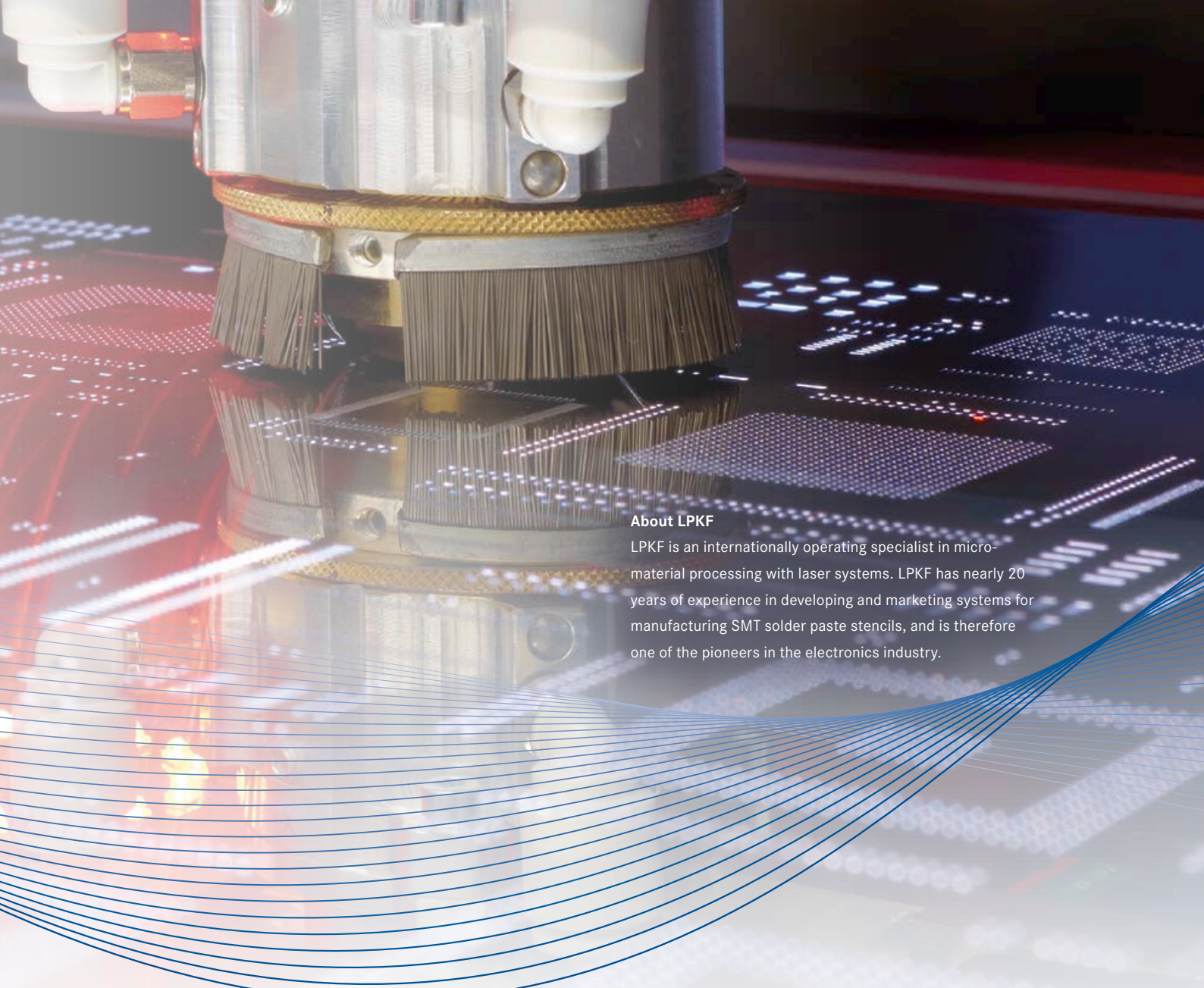
productive and accurate equipment – at the cutting edge of development. That is what our engineers and technicians are committed to. Performing “Made in Germany” at its best.



Dr. Ingo Bretthauer
Chief Executive Officer
LPKF Laser & Electronics AG



Dipl.-Ing. Nils Heining
Vice President
Cutting & Structuring Laser



About LPKF

LPKF is an internationally operating specialist in micro-material processing with laser systems. LPKF has nearly 20 years of experience in developing and marketing systems for manufacturing SMT solder paste stencils, and is therefore one of the pioneers in the electronics industry.

Precision and Speed

Stencil manufacturers depend on efficient production processes. This means a perfect combination of high-speed, top-level-accuracy and trusted repeatability. LPKF StencilLaser technology itself plays a key role here.

But there is more: One of the most important points is a deep understanding of the stencil application. LPKF has gained expertise in this field through the years of close co-operation with our stencil business partners. We use our skills and experience to translate inspired ideas into reliable industry products. This means absolutely smooth interaction of excellent hardware with highly productive software and handling components, specific to the stencil business needs.

Last but not least, having a stable and attentive business partner is a vital advantage. LPKF offers exactly this complete package to every customer, wherever on the globe the business is located.

For stencil shops, EMS or printed circuit board manufacturers, this leads to more precise SMT solder paste stencils, a wider range of materials and industry-benchmark throughput as well as a leading overall price-performance ratio.



Always a Cut Ahead

All LPKF StencilLasers deliver high-quality and successfully tested technology. They are engineered to be very reliable and ready for 24/7 industrial operations.



LPKF P 6060

LPKF P 6060: The Entry Level System

The special economic StencilLaser LPKF P 6060 is the entry level tool for the production of high quality SMT solder paste stencils. With minimum training, an operator or engineer can easily manufacture a new stencil in a very short time. The system is also perfect for producing small and medium-sized batches, for job-shop applications directly at the SMT manufacturing line, or as a back-up system.

German engineering has been enjoying a good reputation worldwide. The StencilLasers by LPKF only confirm this standing. At LPKF about 20 percent of the employees work on advancing the systems and processes. They support customers in creating optimal production processes and provide solutions for complex tasks. LPKF customers benefit from the valuable experience from the field: every StencilLaser has 20 years of laser know-how built-in. Today new laser technologies and production processes bring the systems to even higher levels of performance and efficiency.



Made in Germany

LPKF G 6080



LPKF G 6080: The High-Volume System

The StencilLaser G 6080 is designed for high volume production. The system incorporates lightweight carbon fiber compound materials for increased acceleration and deceleration – with a minimal weight of moving parts. The LPKF G 6080 positively demonstrates that precision does highly dynamic productivity. Latest system versions include 100 % process monitoring of cuts during full speed cutting. Elements of the stencil can be assigned separate quality standards: at lower standards, e. g. for edge perforations, the laser moves into a special gear. The process optimization features the control of cutting gases alternating between compressed air and industrial gases, as required by individual jobs.

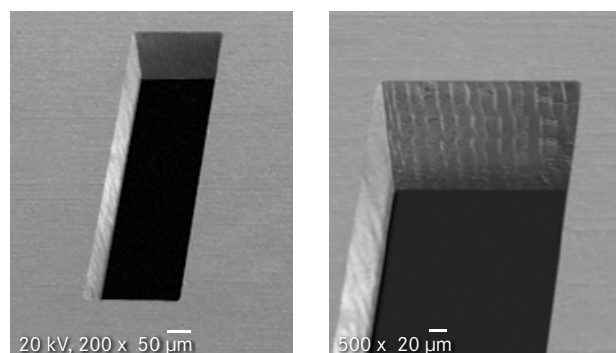
We Know How...

LPKF provides and services the entire system solution including CAM software, laser source, motion system and optics. Application centers in Asia, Europe and North America are ready to help with special tasks.

A Demanding Process Made Easy

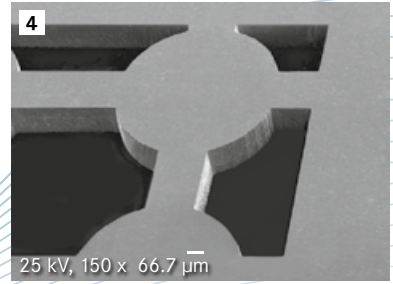
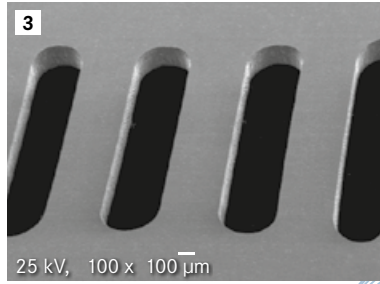
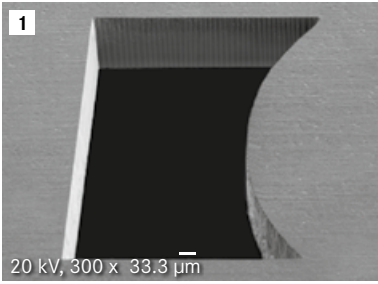
Smaller and smaller components – more and more accurate solder paste deposits. This is simply what developing stencil technology comes down to. The first step is transferring the layout data into the CAM software. Here the apertures designed with the layout program are optimized. It's essential to accurately fit the openings in the stencil to the thickness of the stencil foil and the soldering paste to be printed. Stencils with simple circular openings no longer meet the requirements of modern SMT lead-free solder paste printing. Modifying the apertures is an important step supported by the LPKF EasyEdit package.

LPKF stencil cutting is a success story with three prime benefits: economic efficiency, technological superiority, and assured quality. Quality assurance is constantly gaining in importance: LPKF StencilCheck is used independently from the cutting system once the stencil is cut.

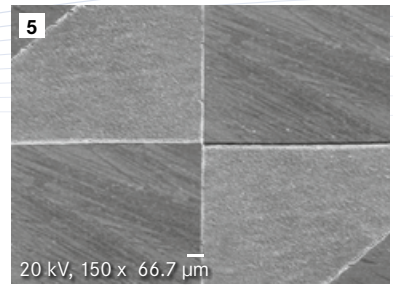
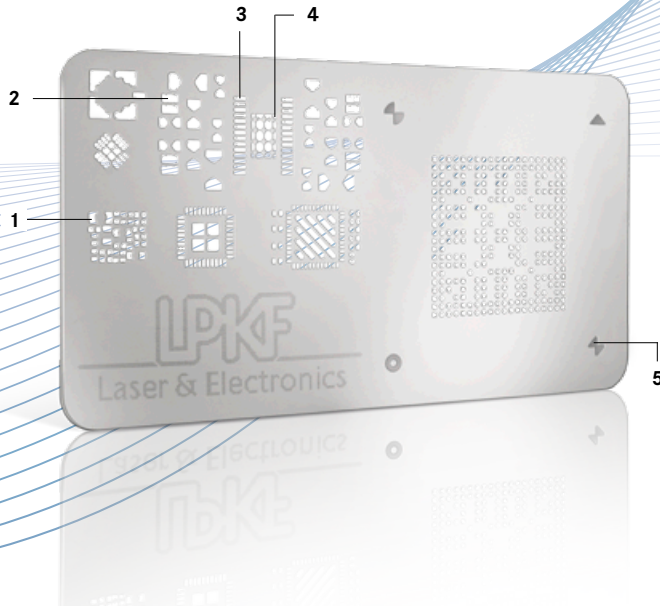


The software compares the layout data with the actual geometry and certifies precise machining.

The latest LPKF technology boasts innovative integrated monitoring process. This process monitoring while cutting at full speed, makes a crucial difference compared to other integrated systems: No valuable production time is wasted.



High quality cuts in stainless steel SUS 304/125 μm

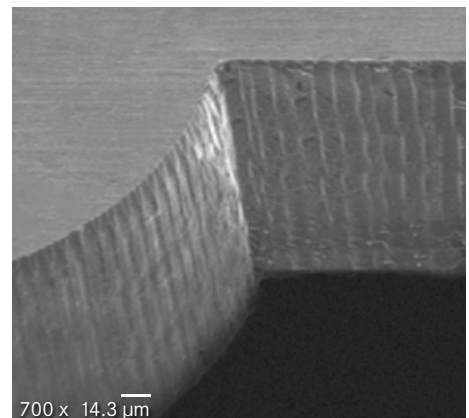
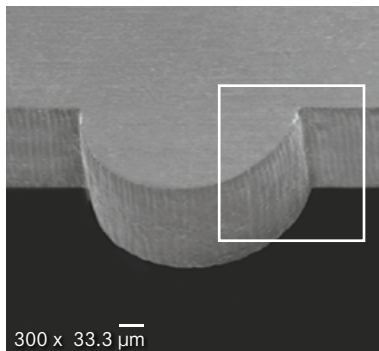
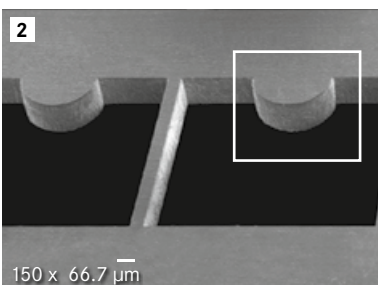


Option contrast: A variety of fiducials can be performed

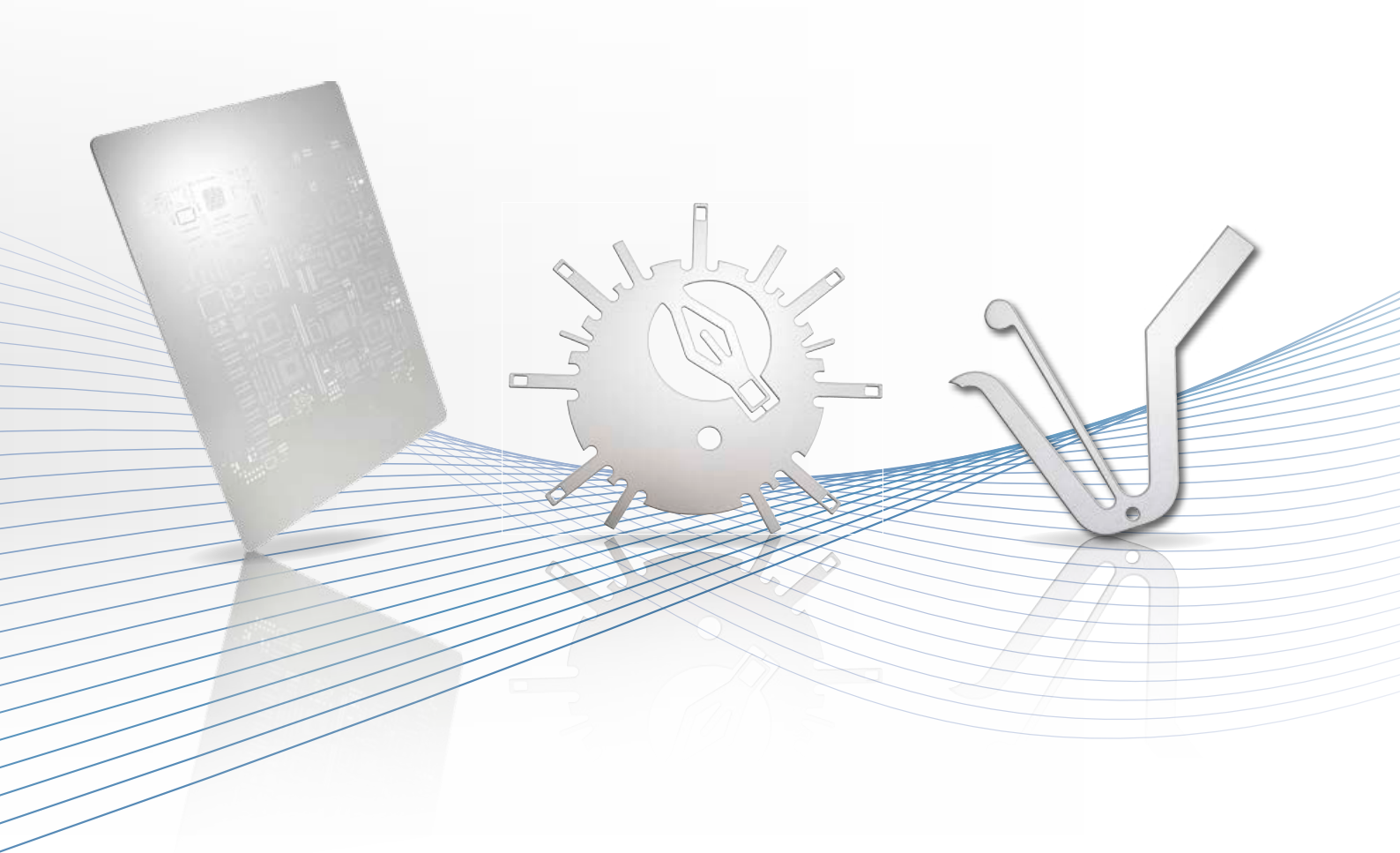
Optimum Results

Stencil apertures with defined properties are essential for perfect solder printing results. LPKF StencilLasers are capable of cutting sheets from 20 μm up to 600 μm. The pictures above show exact geometries with virtually no burrs stainless steel. Steep or tapered sidewalls with equally smooth surfaces, as displayed in the pictures below, result in optimum paste release.

The unsurpassed control of LPKF's LongLife fiber lasers – even down to the level of single laser pulses – also allows for machining extraordinary narrow partition walls. LPKF systems make it easy to automatically utilize different cutting parameters while producing one single stencil from any common material. Even engraving on both sides of a stencil is easily possible.

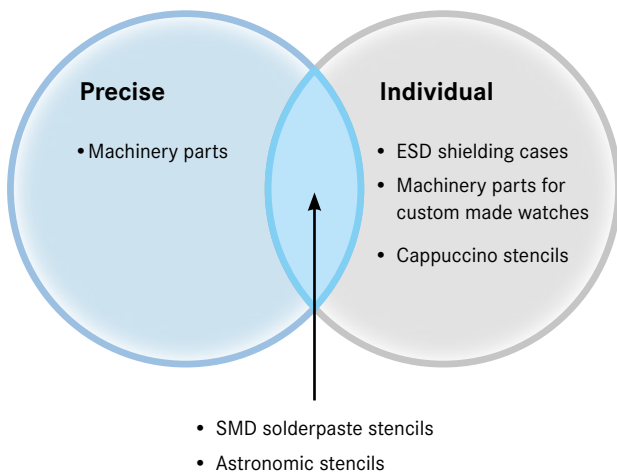


Accurate geometry, smooth sidewalls, steep flanks – LPKF quality



New Markets

From the manufacturing of micro-machined parts to the production of individually customized high precision solder paste stencils.



The more than 450 StencilLaser systems already installed highlight LPKF's importance as the market leader for SMT solder paste stencil production. The systems are used by stencil manufacturers as well as printed circuit board manufacturers, EMS and accessory suppliers.

In addition to producing solder paste stencils, they are also used to manufacture ultra-micro-cutting parts, stainless steel membranes, and other special applications. Furthermore, LPKF StencilLasers are used for thin metal applications from 20 µm up to a thickness of 600 µm.

Sophisticated Software



Easy Edit is a solution for fast, easy and effective data preparation. Don't lose time by using a software that is designed for PCB's to do a job for SMT solder paste stencils. With this LPKF custom made software for preparation of SMT solder paste stencils, the operator can modify apertures in every shape. Also, special shapes for individual components are possible to create with LPKF Easy Edit. As this Software is custom made, LPKF is able to match new market requests quickly and flexibly - to support our customers' need for a higher level of productivity.

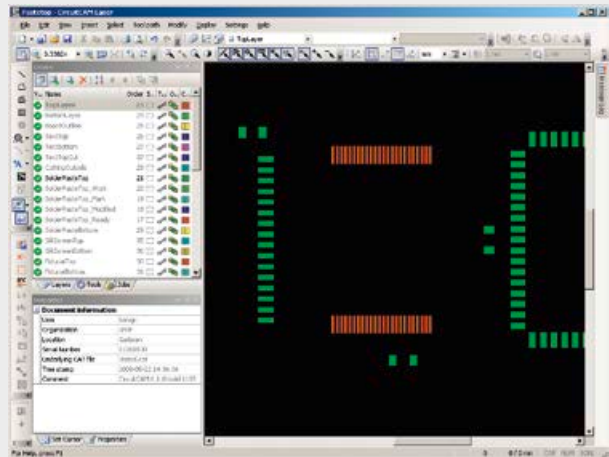
To save even more time on data preparation, the operator is able to set up libraries for individual customers or customer groups. In this way, changes of footprints and apertures in size or shape can be performed fully automatically. Footprints or apertures that are not already in the library are highlighted so that the operator can instantly see any new designs which should be added to the library.

Use of a laser optimized font saves production time. On the other hand, each TrueType font can be used to label SMT solder paste stencils.

Better Safe Than Sorry – LPKF StencilCheck Guarantees Stencil Quality

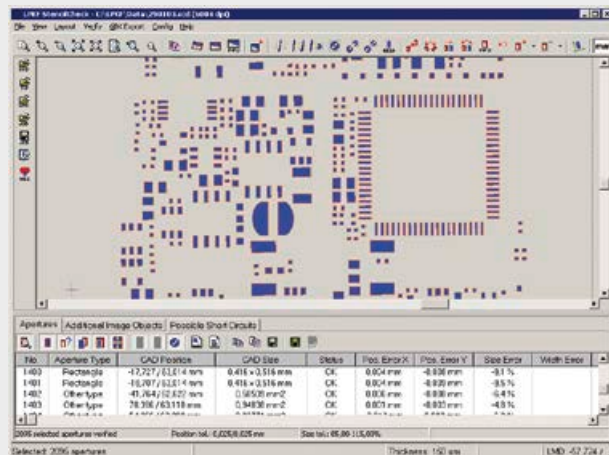
Continuous quality assurance is vital for modern production processes. LPKF combines standard hardware with its StencilCheck software to thoroughly examine the quality of stencils – without blocking the Stencil-Laser from being used for its primary purpose of cutting.

LPKF delivers an inexpensive solution built from a standard scanner and the StencilCheck software to inspect stencil geometries. The stencils are viewed to identify the openings. StencilCheck compares these findings with the original layout data and then issues an inspection record. This software is very interesting for stencil producers and SMT manufacturers. It enables stencil shops to document stencil compliance with the cutting data. It also helps SMT manufacturers slash unproductive time if every stencil is inspected before it is installed. The optional CPK module prints the inspection results, and supplies the basis for comprehensive quality assurance.

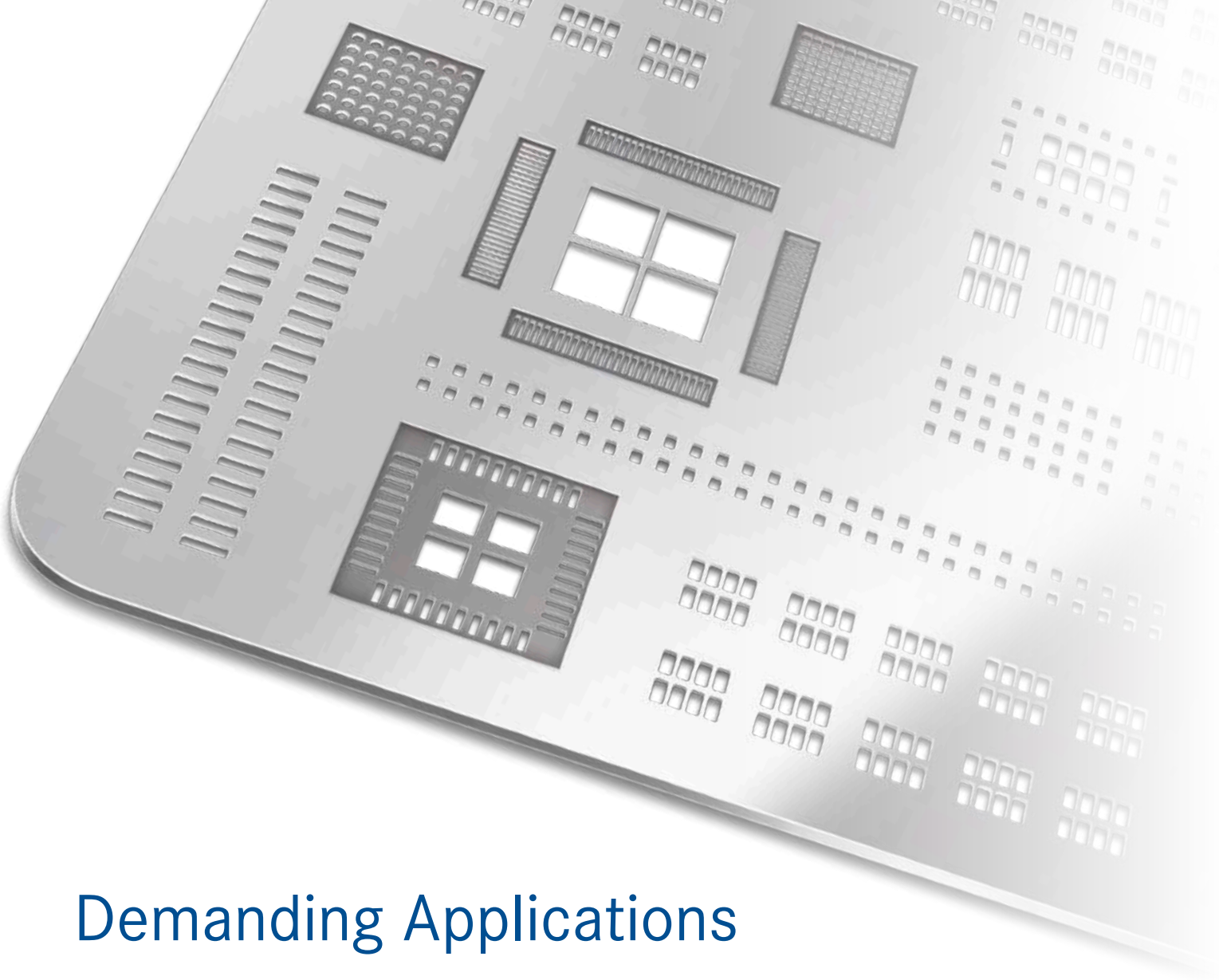


Even the creation of a barcode or data matrix is easily possible. Enter letters or numbers in LPKF Easy Edit and it converts this automatically into a bar or data matrix code.

With LPKF Easy Edit and the LPKF StencilLaser systems, LPKF offers a complete package for high quality, fast and effective production of SMT solder paste stencils.



LPKF StencilCheck is also useful when basic data has been lost. An optional vectorization module extracts the cutting data from scans of stencils or blanks. The results are an important source of data for recreating the basic data with conventional layout software.



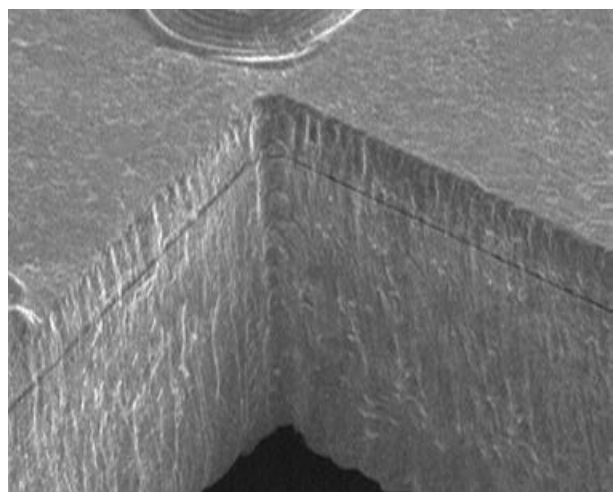
Demanding Applications

Even though the main area of use for LPKF StencilLasers is cutting metal foils, there are also some completely different applications for the high-power laser machines. A selection:

Step Stencils

Step stencils allow the exact adjustment of the solder paste volume on the variously sized contact surfaces. A step stencil is a special SMD stencil shape which features local recesses (step-down) or bumps (step-up). This allows assembly of a circuit board with semiconductor components having little pitch or with rugged connection components in one work step.

Up until now, production of such stencils was assigned to external service providers. The desired steps were manufactured by deep etching or milling.



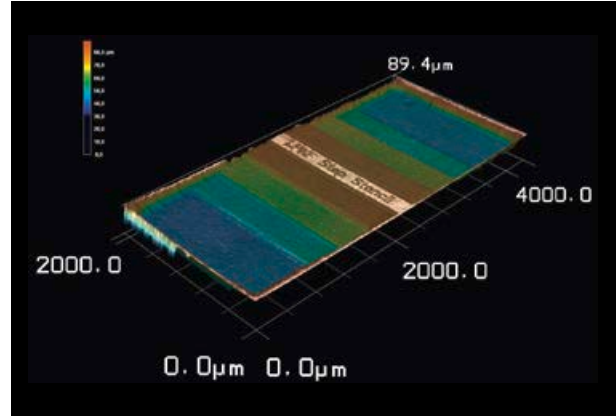
A 30- μm step on top of 120- μm foil

- Local modification of layer thickness
- Suitable quantity of solder paste
- No system intervention necessary

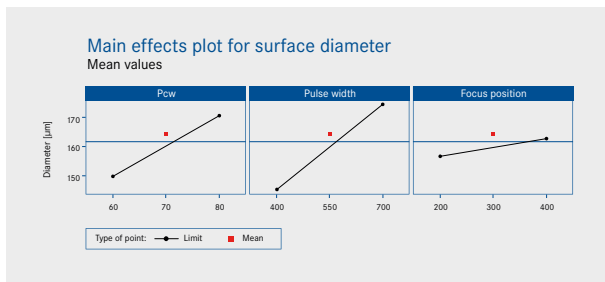
For both step variants, LPKF has developed parameters in extensive series of measurements so as to create step-up and step-down stencils with the unchanged laser systems.

In the case of step-down stencils, the laser removes a small amount of material with each pulse. The control of the laser energy is so precise that steps in a 10- μm pattern can be produced. Up to now, step-up stencils had been produced by etching or milling surfaces from thicker foils. A newly introduced laser process builds up the step by highly precise spot welding of the step exactly in the desired area.

For both processes, LPKF offers free tech papers with process descriptions and measurement values on the www.lpkf.com website.



Step-down steps with 10- μm steps: different step heights can be produced in one work step with laser technology



Extensive series of measurements and analyses document the suitability of StencilLasers for step-up and step-down stencils.

(Main effect diagram for evaluating laser power, pulse width and focal position on the welding depth with step-up stencils.)

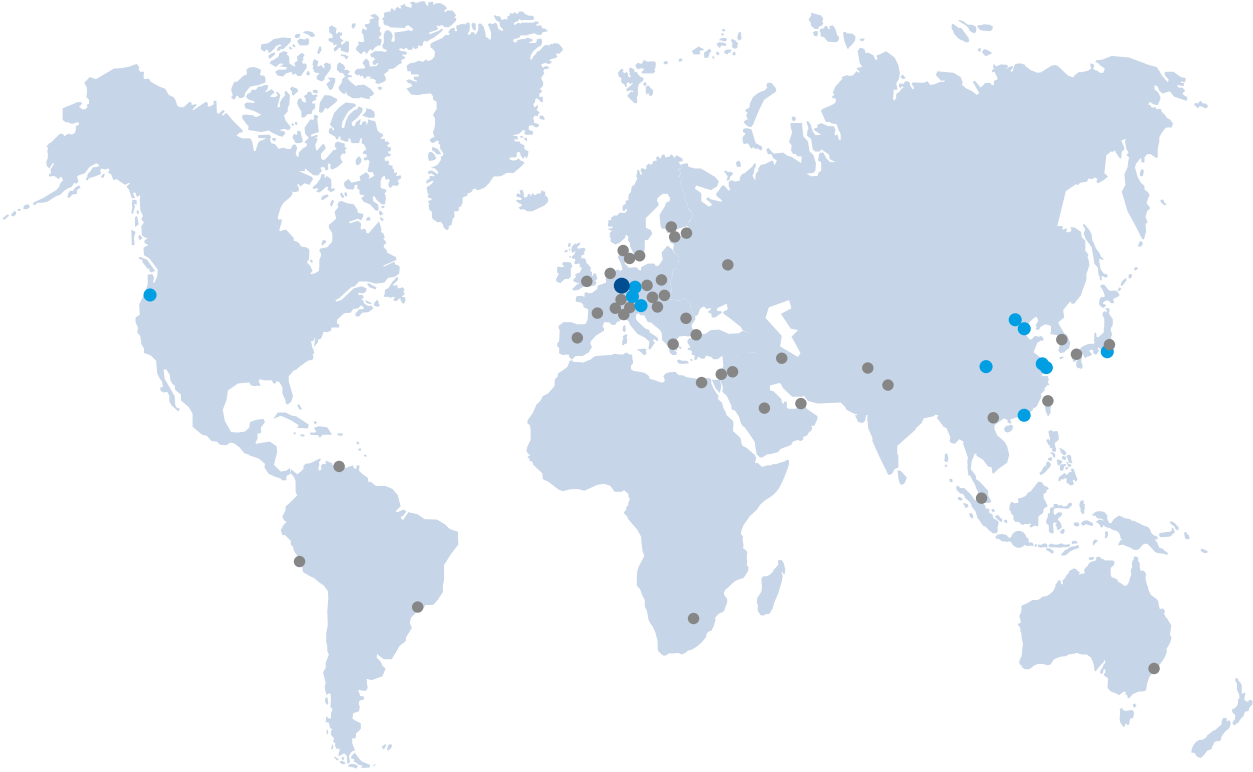


A step-up stencil in a step-down surface is required when a fine-pitch SMD component has a heat sink. In order to facilitate appropriate heat dissipation, the volume of the soldered joint at this point must be as large as possible.

A combined step-up and step-down stencil in the cross section (right: stripped [red] and welded-on surfaces [yellow] highlighted) meets this requirement. The illustration clearly shows the individual welding spots.

24/7 Support

If production runs around the clock, customer care must also be available at all times. LPKF satisfies this demand: ten local support stations in Germany, China, Japan, Korea, Hong Kong, USA and the UK support operators on site. The trained service engineers help with technical problems and can get direct access to the laser systems via remote software when required. Remote software and a camera are standard with every LPKF StencilLaser. The video camera allows details to be clarified person-to-person – quickly and professionally – anywhere in the world.



The global LPKF network for service and distribution:

- Headquarters
- LPKF Group
- LPKF Distributors

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