

SMD stencil

Laser cut stainless steel stencil

1.0

Precise cut

LaserJob was the first company in Germany to produce laser cut stencils. Within a very short time period, demand for SMD laser cut stencils greatly outpaced demand for chemically etched stencils.

The stencils are produced in temperature-controlled production rooms with a fiber laser. The fiber laser generates a more superior beam quality than traditional laser systems. The unique lower cutting opening ($20\ \mu\text{m}$ versus $40\ \mu\text{m}$), with an equal depth of focus sharpness, transmits much less heat into the material. At the same time, the edges are less coarse and the cut quality of every aperture is more accurate.

The precision of the slightly tapered apertures allows for more efficient solder paste release and increases the process flow into the pick and place operation. In order to produce true-to-size stencils, the laser cutting process takes place with the foil under high tension. With this procedure, we guarantee the aperture positioning to be $\pm 10\ \mu\text{m}$ across a 200 mm (7.85 inch) area.

Advantages of laser cutting

- exact aperture geometry
- aperture size accuracy $\pm 3\ \mu\text{m}$
- size aperture position accuracy $\pm 10\ \mu\text{m}$
- high tensioning force $> 30\ \text{N}/\text{mm}^2$
- smooth walls
- less coarse brushed edges

Stencil post-processing

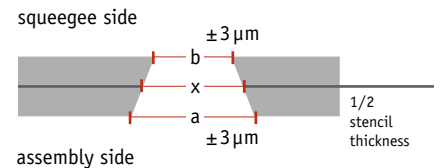
All laser cut stencils from LaserJob are subjected to an automated post-cut brushing process. The CNC-controlled brushing system removes all exposed burrs on the laser exit side. The brush head travels across the entire stencil surface in horizontal and vertical directions.

Advantages of this process

- no enlargement of apertures
- minimal loss of material (less than $2\ \mu\text{m}$)
- consistent thickness of stainless steel material

Quality control

Quality assurance is paramount at LaserJob. Effective quality control starts with incoming inspection of stainless steel sheets and stencil frames. A thickness measurement instrument controls every stainless steel sheet with an accuracy of $\pm 0.5\ \mu\text{m}$. Pad size and pad geometries are inspected immediately after the laser cutting process. The aperture shape is measured, via CCD-camera with transmitted light, to a precision of $1.0\ \mu\text{m}$. The tolerances of the laser cut opening are illustrated in picture 1.



$$x = \text{reference value}$$

$$x = \frac{a + b}{2}$$

$$b = \text{value measured by transmitted light}$$

$$a = \text{value measured by reflected light}$$

$$a - b \leq 12\ \mu\text{m}$$

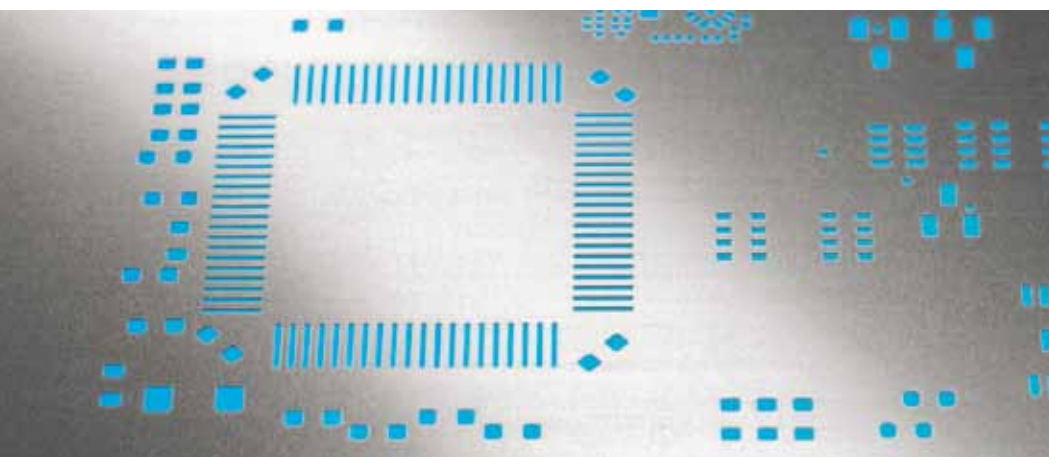
$$b - x \leq 6\ \mu\text{m}$$

$$a - x \leq 6\ \mu\text{m}$$

Picture 1: Opening tolerances of a laser cut

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Fulfillment

The stainless steel material, which is utilized for the stencils, has an optimal hardness and tensile strength. Only stainless steel sheets with a nominal thickness variance are utilized.

Material

Stainless steel: 1.4301
Hardness (Hv): min 370
Tensile strength (N/mm²): > 1100
Thickness of stainless steel sheet: ± 3%

Dimensions of stainless steel materials

SMD stencils are available in metal sheet thicknesses of (µm):
20, 30, 50, 70, 80, 90, 100, 120, 130, 140, 150, 180, 200, 250, 300, 400
SMD stencils in VectorGuard® tensioning systems are available in metal sheet thicknesses of (µm):
80, 100, 120, 130, 150, 180, 200, 250
Maximum thickness of metal sheets: 2 mm
Maximum machine surface: 800 mm x 600 mm

Variations

- NanoWork®-stencil
- PatchWork®-stencil (Step stencil)
- 3D PatchWork®-stencil
- combination PatchWork®-stencil with NanoWork®-coating
- stencil in screen printing frame glued over stainless steel mesh
- in tensioning system LJ 745
- in Quattroflex tensioning system
- in VectorGuard® tensioning system
- in Alpha Tetra/Micromount/Vector tensioning system
- in Zelflex tensioning system
- in Stencilman tensioning system
- in customer-specific tensioning system

Frames

- aluminum frames
- cast aluminum frames
- stainless steel frames

For more information on the sizes and types of available frames, please refer to data sheet **1.4 Frames and Tensioning systems**

The stainless steel screen cloth, composed of 0.1mm diameter wire woven into an 80 mesh array, is strong, durable, heat-resistant and resilient. Optional screen filler can be applied after tensioning in order to avoid contamination of the screen cloth and printer.

Service

LaserJob offers a full range of consulting services for layout and design. Our team generates, from your CAD-CAM data, automatic cutting instructions for the laser. Our highly focused laser systems cut with high positioning accuracy the apertures.

We offer additional

- scaling apertures up and down
- changing aperture design, e.g. home plates and rounding sharp corners
- optimizing apertures (anti tombstone design)
- rotating or mirroring of the whole design or sub-areas
- control of aspect and area ratios
- generation of stencils with multiple panels
- generating layouts from existing PCBs
- generating stencil layouts for adhesive applications
- customer-specific storage for used frames. The frames will be cleaned, re-strung and provided for new orders. Your actual inventory is always retrievable.
- data storage
- test certificates (as well as customer's specifications)
- data for solder paste inspection systems
- Data Matrix Code
- measuring of printed circuit boards
- production of stencils from provided PCBs, stencils, or films

Shipping conditions

Shipping time

Standard shipment time ex works is 3 work days
Order entry before 5 p.m. (= first work day)

24 hour express shipment –
Confirmed orders will be shipped the next day
Order entry before 5 p.m.

6 hour express shipment –
Confirmed orders will be shipped the same day
Order entry before 1 p.m.

Common carrier: UPS, DHL, GO, FedEx (any shipping service) as well as direct shipments with courier delivery with partner companies.

Packaging

All LaserJob stencils are shipped in reusable packaging. To avoid damage of stencils, proven packaging materials are used. We deliver stencils in specialty packaging as well as per customer request.
For stencils in tensioning systems, a special storage bag is recommended.

Order process

For complete processing, we need the drawing of the component with tolerances. We can read drawings in DXF-format or Gerber files.
To guarantee fast handling of your order, send the purchase order via

- e-Mail: mail@laserjob.de
- fax: +49 (0) 8141 52778-60
- post

Please send the gerber files for the stencils via e-mail to mail@laserjob.de

We are ISO 9001:2008 certified



LaserJob data sheets

- 1.0 SMD stencil
- 1.1 NanoWork® stencil
- 1.2 PatchWork® stencil
- 1.3 Tensioning system LJ 745
- 1.4 Frames and tensioning systems
- 1.5 Repair and Re-balling stencil
- 1.6 Wafer bumping-stencil
- 1.7 LTCC Via fill-stencil
- 2.0 Laser Material Processing

Auch in Deutsch erhältlich.

