Why does DEK produce stencils and screens?
DEK provides complete screen printing process solutions and support to its global customer base. Our experience as equipment developers, application and process specialists, and high quality manufacturers makes us uniquely able to deliver stencils and screens that answer the challenges our customers face every day when building advanced products for demanding world markets.

Why is DEK an expert in Screen manufacture?
With over forty years experience of quality precision screens design and manufacture, our in-depth knowledge and expertise enables DEK customers to print advanced materials within a few microns accuracy. From alternative energies through to biomedical, automotive, SMT and semiconductors, we are opening the door to efficient commercial processes for a diverse range of industries.

What stencil technologies are supported?
DEK can offer the widest selection of stencil technologies to support mature and leading-edge processes in electronic and semiconductor assembly as well as additional applications and markets:

- Laser cut stainless steel for high quality SMT assembly and semiconductor assembly
- Laser cut nickel stencils optimised for lead-free printing
- DEK VectorGuard® frame-mounted foils in stainless steel, nickel, Electroformed nickel and VectorGuard PumpPrint® acrylic stencils
- Electroformed stencils for fine-pitch processes to wafer-level
- Chemical etch stencils
- DEK Platinum stencils for ultra-fine-pitch applications
- PumpPrint stencils for adhesive deposition
- Solder ball placement stencils
- Emulsion screens for screen printing solder paste, flux, conductive and non-conductive inks, plasma materials and many others
- Precision screens for back side semiconductor wafer coating, solar cell photovoltaic coating and conductor printing, and fuel cell ionomer membrane printing
- Stencil foils for solar cell photovoltaic conductor printing

Are screens and stencils aimed at different applications?
Emulsion screens can address many applications including depositing non-electronic materials such as coloured inks for instrumentation or precision dial-faces. However, the only rule is to choose the solution that delivers the best results for any given process. Some strengths of stencils include high durability and fast turnaround with laser processing. Emulsion screens on the other hand deliver outstanding results with low-viscosity materials such as polymer thick film inks. DEK is the only screen printer supplier to have screens and stencils capabilities in-house, which gives us unique abilities to recommend and deliver an optimal solution for any precision screen printing process or application.

What stencil thicknesses are supported?
Laser cut stainless steel stencils are available in thicknesses ranging from 50µm to 500µm, allowing customers to achieve a wide range of deposit heights. Common foil thicknesses for VectorGuard are from 75µm to 200µm in 25µm steps. Stainless steel foils (the VectorGuard Blue range) are additionally available up to 250µm thick. Acrylic PumpPrint stencils are available from 1mm to 3mm, or 8mm for special applications. Bottom-side routing can be carried out to prevent contact with components attached to the board, such as ICs, passives, connectors or RF shields.

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What stencil sizes are supported?
Mesh-mount frames compatible with common screen printer sizes are the most widely available. Available VectorGuard frame size options include 584mm x 584mm, (23” x 23”) 584mm x 736mm, (23” x 29”) and 736mm x 736mm (29” x 29”). Special 600mm x 550mm (23.6” x 21.6”) VectorGuard frames and stencils are also available, to fit screen printers from Sanyo, Panasonic and others.

What is the accuracy of the laser cutting process?
Apertures as small as 75µm can be spaced at 50µm. Positional accuracy is ±10µm over the entire print area. As a leading user of this technology, DEK works closely with laser equipment manufacturers to develop next-generation equipment, and is therefore always able to deliver the highest quality and greatest accuracy.

What are the capabilities of DEK’s precision screens?
At the finest resolution, track and gap widths in the range of 50-75µm can be achieved with high repeatability. The thickness is also closely controlled, so that the screen will produce the desired deposit height when in operation. Screen thicknesses up to 500µm and sometimes thicker are achievable, within tight tolerance limits. A 50µm-thick screen, for example, can be produced accurately to within a maximum of 2µm.

What screen dimensions are possible?
The maximum size of an emulsion screen is practically limited according to the mesh-covering equipment installed including the maximum achievable frame size. Common frame sizes are up to frames up to 350mm x 250mm, and a rule of thumb when determining the printable area is to leave a margin of 40mm at each side and 50mm at each end. In fact, DEK has the largest mesh covering table in Europe, and is able to produce screens up to 1500mm x 1500mm. The mesh used is typically a high performance modern polyester, but stainless steel meshes also may be used.

What are VectorGuard foils?
VectorGuard foils are mounted in the VectorGuard frame before use, which applies a carefully controlled tension to the foil ensuring an excellent gasket seal against the board for repeatable paste transfer. The frame is easy to use quickly and accurately. The foil is only 5mm thick when detached from the frame after use, allowing large numbers of frames to be stored space-efficiently close to the factory floor, and retrieved quickly when required.

What other benefits does the VectorGuard system deliver?
Another advantage is that the foils can be completely dismantled for easy recycling. DEK also supplies a purpose-designed VectorGuard storage cabinet, which is not only space-efficient but also allows the foils to be filed in a logical sequence to speed up retrieval and thereby boost productivity.

What are PumpPrint stencils?
DEK Pump Printing® is a very high-speed process for depositing adhesives, typically during assembly of double-sided boards. This allows a regular screen printer to be used, removing the need to operate dedicated dispensing equipment, which brings additional cost of ownership expenses and is also much slower than Pump Printing in terms of total throughput. Pump Printing can also deposit complex shapes with no impact on cycle time.

What are DEK Platinum stencils?
DEK Platinum stencils represent the finest resolution and highest accuracy stencils currently available, serving advanced processes including assembly of BGAs, direct chip attach, flip chip and wafer-level packaging. Apertures as small as 20µm can be produced within 3µm accuracy, and pitch as fine as 50µm. DEK Platinum stencils also benefit from exceptionally smooth aperture walls for highly repeatable paste transfer in ultra-fine-pitch applications requiring very low paste-volume per deposit.

Are any other products available that help customers use stencils more efficiently?
DEK also offers the Printer Caddy, which provides a convenient storage for wipes and solvents used for cleaning stencils, squeegee blades and printer components. There is also a convenient work surface that operators can use to facilitate loading, unloading and maintaining stencils.

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**Can you accommodate special requirements?**

DEK innovations to support special processes include additive stencils capable of creating thicker deposits in selected areas without the drawbacks of step-etch stencils. Intelligent stencils for lights-out assembly and automatic traceability are also available. Emulsion screens are highly customisable to meet individual customer requirements, including printing onto non-flat surfaces and precision deposition for fuel cell and solar cell applications.

**What quality policies are in place?**

Our designers are experienced professionals, and all screens and stencils are subjected to an extensive inspection using automatic inspection equipment as well as a nine-point manual quality check. A certificate of conformity is provided with each unit. We follow ISO9000 procedures at all our design and production centres, and maintain documented workflows for traceability and continuous improvement.

**Where are DEK screen and stencil production facilities located?**

DEK has an international network of production facilities for laser-cut, electroformed, PumpPrint and VectorGuard stencils, including:

- World precision screens centre in UK
- European stencil design and production hub in Germany
- Stencil design and laser-cut production centres in UK, Netherlands, France, Hungary, Tennessee, Alabama, California, Singapore, China, Malaysia
- PumpPrint stencils production in Europe, Mexico and Malaysia
- Electroformed stencil production capabilities in Benelux and Singapore

**Why are screens produced in the UK only?**

A screens manufacturing facility capable of meeting the fine resolutions required by modern processes represents a considerable investment. For example, we operate to class 10,000 clean room standards and maintain a constant temperature environment, to maximise repeatability and quality. We also use DEK’s global logistics infrastructure to ensure rapid fulfilment of order to anywhere in the world. More than 20,000 screens per year are produced at this facility.

**What is the benefit of having so many stencil production centres?**

Our customers can work directly with local DEK staff, promoting close partnerships, rapid response and local delivery. At the same time our global network can meet delivery schedules that other suppliers cannot match. Work can be completed late in the evening and even out of hours, by transferring to a centre in a later time zone. Key DEK stencil production centres located close to the air freight distribution hubs in the USA (Memphis) and Europe (Cologne) allows the latest possible pick-up times. This allows a very fast turnaround for our customers, including next day delivery.

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