

CO₂ Flatbed Laser for Demanding Cutting Tasks in Hard and Soft Materials

Clean Cut Corners

The type of tool required to cut panels or fabrics precisely depends on the strength and thickness of the particular material. Almost any material can be cut wear-free if tightly focused laser beams are used instead of knives or stamps. Applications by Kögel Filter and VIS Visual Information Systems illustrate how a flatbed laser from Trotec cuts very diverse materials very precisely.



The flatbed laser used in the cleanroom: suction and cooling are installed in the false ceiling outside the cleanroom. © Kögel

Cutting with light is no longer science fiction. In fact, laser cutting has become established as a reliable and economical alternative to mechanical cutting techniques. Depending on the particular cutting task, various types of lasers are used that differ in structure, light wavelength, and power. The SP CO₂ series of flatbed lasers from Trotec Laser GmbH, based in Marchtrenk, Austria, offers an almost universally applicable solution. They are capable of finishing large, one-piece formats, for example, from a panel or a roll, as well as sensibly

processing smaller oddments. This flatbed series comes in five versions with surfaces ranging from 1250 x 710 mm to 3250 x 3210 mm depending on the version. Two practical examples from entirely different branches show what great potential lies in the use of large-format lasers.

Cutting Complex Shapes from Soft Materials

Processing equipment, such as centrifuges, agitated suction filter driers for the

chemical, food, and pharmaceutical industries, requires hygienically manufactured filter products. Kögel Filter GmbH of Landau, Germany, specializes in the production of such filter inserts. They range in shape from simple circles and tubes to filter cloths with diverse cutouts (Fig. 1). The materials for finishing are weaves and fleeces on rolls that are approximately 2.6 m wide and up to 100 m long, and the portfolio of materials includes PP, PE, PA, and PTFE.

Kögel's filter experts rely on the SP 3000 large-format laser to finish »

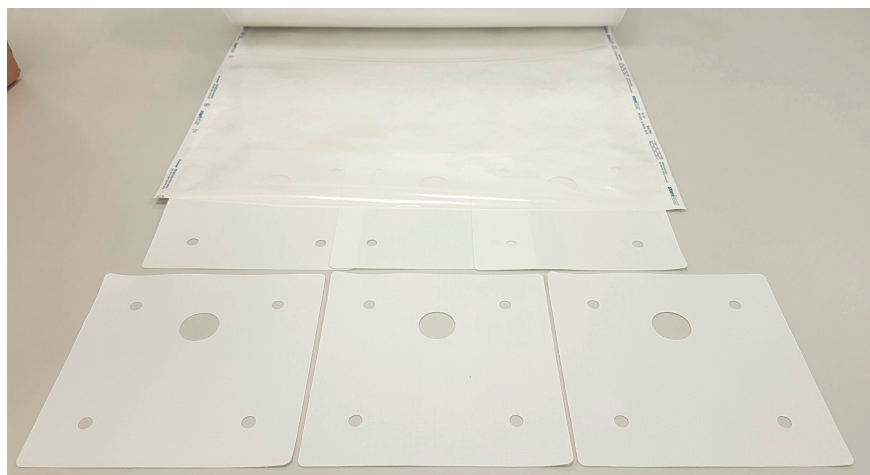


Fig. 1. From simple contours to tubes and even filter cloths for freeze drying with a variety of cutouts, all possible formats are demanded from Kögelt. © Kögelt

Company Profile

Trotec Laser GmbH arose from a Trodat research unit in 1997 and has become a leading company in the field of laser technology. As a part of the TroGroup, Trotec develops, produces, and markets laser machines for labelling, cutting, and engraving as well as materials for lasering and engraving. Trotec serves customers in over 90 countries and employs more than 500 people worldwide. In 2019, the Upper Austrian laser manufacturer achieved sales of over EUR 140 million.

www.troteclaser.com

Kögel Filter GmbH Contecma – Filtration manufactures fabric and fleece filters for well known companies in the food products, pharmaceutical, and chemical industries. As experts in the field of solid/liquid separation and gas filtration, the company specializes in the finishing of PTFE and PEEK weaves, as well as PTFE weaves with laminated PTFE membrane. The portfolio includes, among other things, ready-made filter cloths for centrifuges and suction strainers, bag or pocket filters for dust separation or thermal drying, as well as filter inserts for the pharmaceutical industry.

www.contecma.de

Visual Information Systems offers an extensive portfolio of advertising systems, exhibition systems and advertising technology ranging from small-formats up to XXL printing on almost any material and with special equipment such as LED textile frames. Their services are utilized by customers such as Audi AG, BMW Group, the Süddeutsche Zeitung, or PGA of Germany.

www.vis24.de

them. Its 2210 x 3210 mm cutting surface provides enough room to cut large parts or as many small parts as desired. The beam power of the CO₂ laser system can be set between 40 and 400 W and enables finest cuts, sealing the edges of the weave or fleece material in the same time.

Tino Fidler, Kögel's technical manager, explains: "We are the market leader for filter products for liquid separation and gas filtration with cleanroom production in Germany. We strive to solve our customers' problems and optimize their processes. We depend on a very flexible cutting system in order to optimize a particular filter for its intended use. The laser enables us to supply even complex structures for prototyping in two to three days and respond just as quickly to the customer's specific wishes."

The Use of Lasers under Cleanroom Conditions

The suction housed directly in the cutting head catches almost all fumes and particles right at the source and removes them from the cleanroom. For this customer-specific solution, suction and cooling were installed in the false ceiling outside the cleanroom in order to conform to the conditions of ISO 7/GMP C in operation. The thoughtful design of the laser plotter in particular fulfills cleanroom conditions well enough to cut even the very demanding filters for medicinal or pharmaceutical technology (**Title figure**). Fidler comments: "Cleanroom

conditions were essential, since our filters have to be produced according to GMP (Good Manufacturing Practice). The Trotec laser easily fulfills the conditions required for cleanroom production and is an important addition to previous cutting solutions." In contrast to conventional manual work with cutting tools, it can produce parts with many cutouts and incisions especially quickly and with sharp contours. Rapid production of complex shapes is particularly desirable for prototyping and at various stages of development. In these cases, the specialists in Landau can respond very quickly and flexibly thanks to the laser cutter. Since the large-format laser can work



Fig. 2. Precise and contour-sharp cutting is essential for many parts that VIS finishes for their customers. © Visual Information Systems

24/7 "of the roll", even relatively large lots, for example, for contract finishing of filter cloths, can be produced on short order.

Advertising Technology and Digital Printing

An entirely different field of application is served by Visual Information Systems GmbH (VIS) of Krailling near Munich, Germany, with display-exhibition systems and advertising technology. In the main, digitally printed sheets of plexi-glass/acrylic glass, cardboard, or wood are lasered into shapes as much as 20 mm thick. Since the individual parts are often fitted together without play, as is the case for pop-ups for fair stands, for example, a precise and contour-sharp edge is essential (Fig. 2). Other products, such as small 3D stand-ups for countertop decoration or name tags call for very small cutting radii. Printed cardboard with figures has to be cut precisely along the picture (Fig. 3). Conventional cutting techniques, e.g., with milling heads, reach their limits at minimal thicknesses of about 3 mm. Moreover, the cutting work produces additional waste that has to be removed. That is why laser technology is the better tool for many tasks. At Visual, that is why they decided on an SP 500 CO₂ laser. With its 1250 x 710 mm working area, it can cut large displays or templates from the raw cardboard. Thanks to the large pass-through area, the laser can execute surfaces as large as door panels very well. Managing director David Ditcher describes the advantages of this solution: "A very flexible machine is decisive when cutting the wide variety



Fig. 3. Small 3D tabletop displays require very narrow cutting radii and precisely cut edges.

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of products that we finish. The laser system enables us to cut out all contours from small countertop displays with edges approx. 5 cm long, to displays the size of a table top or a door panel. Printed displays in particular have to have a contour-sharp cutting edge along the printed surface. The laser beam can do tiny cutouts for which a milling head would simply be too large."

The Art of Cutting

To create 3D effects with printed cardboard, various cutouts often have to be combined with each other. Precise laser

cutting allows the individual parts to fit together perfectly and makes them easy to disassemble. Very fine lines are possible for other tasks, such as cutting out templates for color marking. "Since it is relatively simple to set up the laser, different patterns can be combined and/or oddments and larger cutouts can be worked up for smaller products. This lowers the costs as well as the amount of waste enormously," Ditcher adds. "We are now even more flexible to create artistic exhibition objects or striking advertising objects, and can also respond even quicker to customer wishes." Since practically no waste remains from cutting, and materials utilization is very good, laser production also protects the environment and cuts costs, too. ■

Info

Text

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