

Tiny detail, central importance

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The UltraSpeed 6000 drilling and routing center for printed circuit boards is the flagship machine of Posalux SA. Each component of the UltraSpeed 6000 is designed to contribute its utmost to the total functionality of the machine, and the highly stressed workpiece clamps are no exception. To develop the workpiece clamps, the engineers at Posalux SA worked together with the plastic technology specialists at Angst+Pfister. In all developmental stages up to the start of series production, the collaboration enabled them to benefit from Angst+Pfister's extensive expertise and wide range of products.

Posalux SA was founded in 1943 in Biel in the Bernese lake region. Innovation, experience and the will to perfection have made Posalux the world's leading manufacturer of drilling and routing machines for the printed circuit board industry as well as microdrilling centers for the production of gasoline and diesel fuel-injection nozzles. The company generates around 80 % of its sales revenue in the Asian market. More than 180 excellently trained employees in development, production and maintenance guarantee the highest quality.

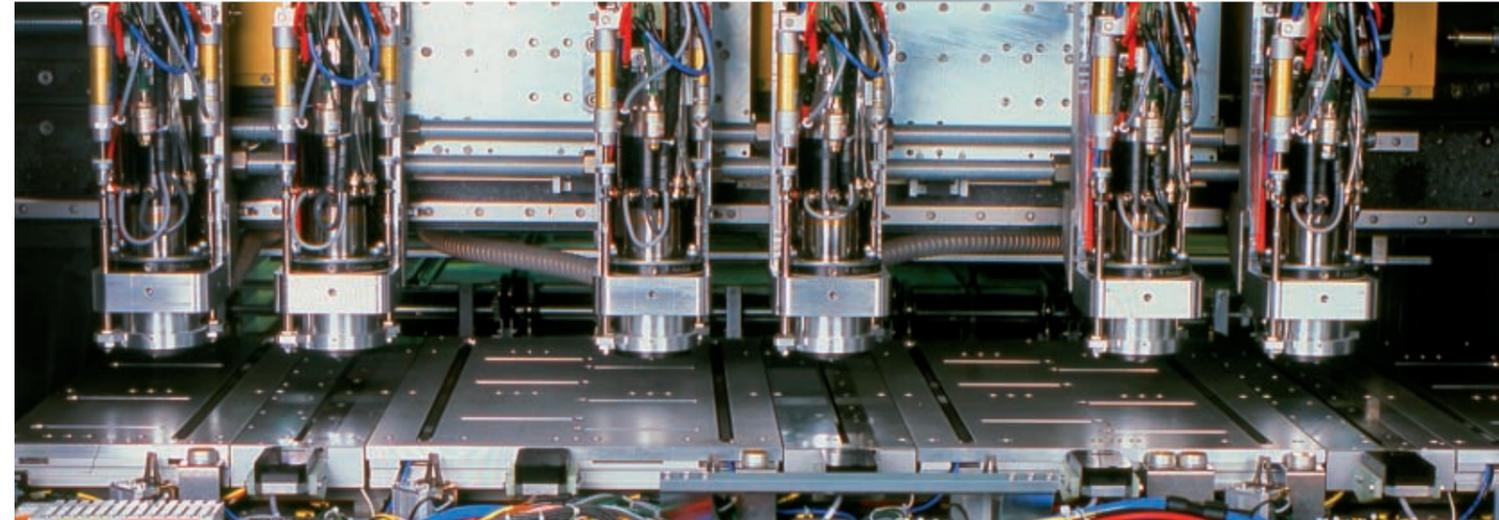
To manufacture printed circuit boards efficiently, precisely and in huge numbers, you need sophisticated technology – one that sets new standards in meeting the demands of the market. Just like in Formula One racing, "faster, more precise, more reliable" is also the slogan in Posalux AG's industry. The UltraSpeed 6000 drilling and routing center is the company's showpiece. It performs multi-layer processes on standard printed circuit board formats of 21" x 28" and 24" x 28".

When equipped with the maximum of six dual stations (each dual station consists of two drill heads), the UltraSpeed 6000 can perform 500 to 600 drillings per minute. Drillings can be made as small as 0.075 mm in diameter and with a minimum spacing of 0.3 mm. A printed circuit board can contain up to 300,000 drillings. The high-frequency spindle operates at up to 300,000 revolutions per minute. During positioning in the X/Y axes, the high acceleration of 20 m/s² exerts a strain force of 2 Gs.

To ensure the desired productivity, quality and precision when drilling the holes, the multilayer printed circuit boards must be pressed firmly against the support surface during the process – a small but eminently important detail. The required pressing force of 100 to 120 N per drill head is directly exerted at each high-frequency spindle by a replaceable plastic insert. A wide range of demands are placed on the inserts, which are made by Angst+Pfister. These include relatively high forces, the high frequency of the swelling pressure loads, the required smallest possible dimensions, wear resistance and gentle handling of the printed circuit boards.



Insert made of PA6 (GRILON® BK-30)



Dual stations with two spindels each working in parallel

Initially, plastic semifinished parts were machine processed into prototypes, and then pilot batches made of POM-H were manufactured. The prototypes and pilot batches confirmed the functionality of the components. To further optimize the inserts up to series-production readiness, the development engineers at Posalux worked in close cooperation with the plastics specialists at Angst+Pfister. The material, the geometric design and the quantity structure were reevaluated. For the material, GRILON® BK-30 – a 30 % glass bead reinforced polyamide 6 – was chosen as the definitive solution, and injection molding was selected as the lowest-cost method of large-batch serial production. Through injection molding, the impact-resistant, wear-resistant and form-stable GRILON® BK-30 inserts can be efficiently produced in large batches with optimal component geometry. After the injection molding process, Angst+Pfister fits an O-ring to the insert to seal off the outlet air, thus furnishing a completely ready-to-install part.



High-frequency spindle with insert

The main advantages of injection molding are:

- very-low-cost molding process for large batches
- very high repeat accuracy and process safety
- wide possible range of component shapes
- minimal material consumption
- many material variants are available on the market

The extensive range of services that Angst+Pfister offers in the area of plastics technology enables customer support in all phases of product development, from the selection of the materials, development and design of parts and prototyping, to small- or large-batch series production. For every customer-specific task, there is a suitable method of processing plastics, such as machine processing of semifinished parts, cold and hot forming, deep drawing, molding in PUR and PA, or extrusion and injection molding of thermoplastics.

Make use of our experience and entrust your problems to our specialists – preferably in the design phase of your device. We look forward to every new challenge.



UltraSpeed 6000 LZ