

The final 3D printed machine replacement part produced using the Fortus 450mc 3D Printer.

Making Customization Profitable

Pack Line Ltd. Overcomes Low Volume Production Barriers with FDM Additive Manufacturing

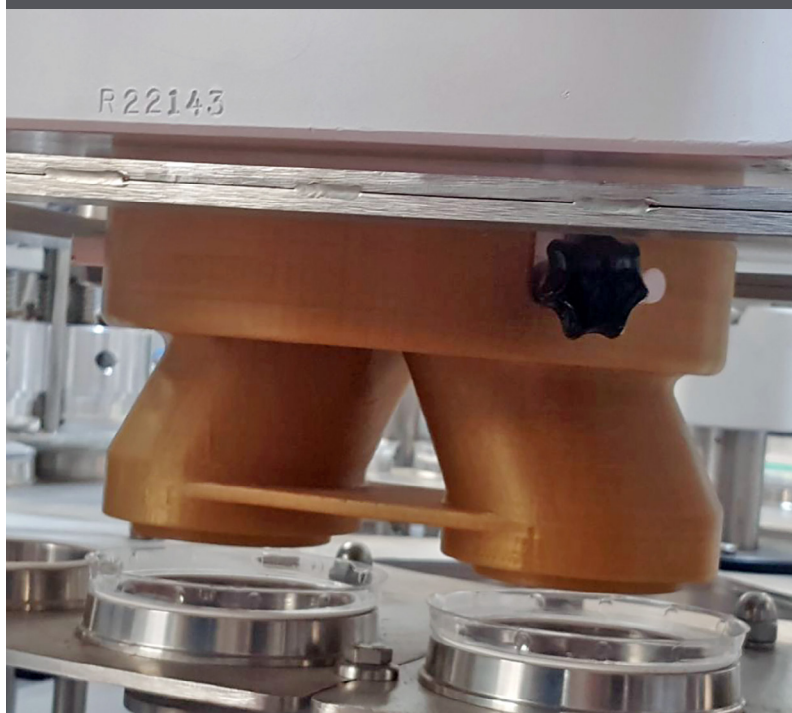
Established in 1994 and headquartered in Holon, Israel, Pack Line Ltd. (Pack Line) is a recognized world-leading manufacturer of packaging machines and supplier to some of the biggest names in the food, dairy and cosmetic industries. The company produces innovative linear, rotary filling and sealing machines, piston fillers and MAP systems that increase productivity and operating efficiency while lowering operating costs.

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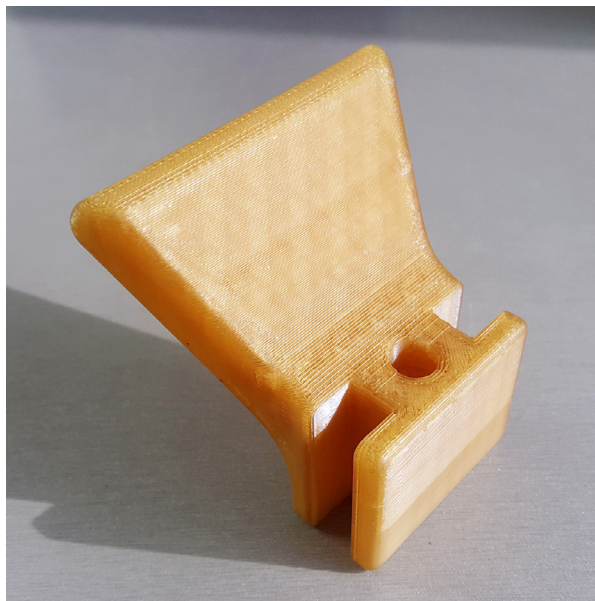
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Alex Karetny

Pack Line Ltd.



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ULTEM™ 1010 thermoplastic resin was used to make this final 3D printed machine part because of its superior strength, high chemical and thermal resistance.

Pack Line has packaging machines installed at customer locations worldwide and ensuring they operate efficiently is essential. Any issues can hinder a company's daily throughput, which often leads to avoidable and costly production line downtime. Each machine Pack Line designs is customized to specific industry or customer requirements resulting in a low volume of required parts. However, the traditional methods of designing these machines and replacing any necessary parts down the line was time consuming and costly. Producing low quantities with traditional manufacturing comes with high costs and long lead times – a major pain point that Pack Line sought to overcome.

To avoid these bottlenecks, Pack Line turned to local Stratasys partner SU-PAD for a rapid and cost-effective solution. As specialists in the

supply of 3D printing technology, highly advanced machines and other related equipment, SU-PAD provides practical solutions for production line problems, from initial idea to implementation.

Overcoming Time and Cost Barriers

Traditionally, Pack Line relied on techniques like metal forming or CNC machining to create replacement parts for all its machines. But the lead time to produce complex, customized parts, as well as sourcing replacement parts proved extremely costly, especially considering Pack Line's extensive international customer base.

For a solution, Pack Line worked with SU-PAD to implement [Stratasys FDM® additive manufacturing](#). "To produce a complex metal machine part using CNC would cost at least \$100 per unit and we'd always be obliged to purchase at least four units," says Alex Karetny, Engineering Department Manager at Pack Line. "However, by using the [Stratasys Fortus 450mc™](#), the cost is reduced to around \$80 per unit. Not only do we enjoy a cost saving, but thanks to the ability to 3D print a customized part on-demand, there is no minimum order requirement. On certain orders we are witnessing cost savings of up to 55%."

Cost savings isn't the only benefit. CNC or metal-formed replacement parts also need to be outsourced and due to low quantities, typically take a minimum of one week to produce. In contrast, the Fortus 450mc can produce a replacement part in only two hours – a huge time savings for customers. Pack Line also benefits from this time savings in the initial design stage, enabling them to deliver customer machines faster. Simultaneously, any production line downtime caused by malfunctioning parts can be dramatically reduced.



This 3D printed food packaging machine replacement part was 3D printed in ULTEM™ 1010 resin material on the Fortus 450mc 3D Printer.

Greater Design Freedom

The Fortus 450mc also gives Pack Line greater design freedom. This was demonstrated when the team was tasked with producing a hopper for a food packaging machine. The hopper is assembled inside a metal detector which means it cannot be made from metal. Pack Line chose to make the hopper from ULTEM™ 1010 resin material.

“This is an application for which we have always had to be creative; the geometry of the part is very complex and often created a bottleneck in designing and manufacturing a replacement part,” explained Karetny. “The Fortus 450mc offered us the means to design a more functional part. Not only did this reduce the time associated with producing this part, but as with our other applications, the ULTEM™ 1010 material is resilient and lightweight, meeting our customers’

demands and matching the performance of metal replacements. We simply couldn’t have designed such a functional part without additive manufacturing.”

3D Printed Thermoplastic Replaces Metal Production Parts

Additionally, Pack Line needed to produce machine parts that were not only cost-effective and time efficient, but strong and reliable.

“Initially, we were sceptical if a 3D printed part would be strong enough to withstand the force of the packaging machine, while also complying with specific and varying industry regulations,” explained Karetny. “One customer required replacement pushers for a coffee capsule pushing machine, so the part had to be strong and resilient in order to perform.”

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The solution was [ULTEM™ 1010 thermoplastic resin](#), one of the strongest FDM materials available, that also offers high chemical and thermal resistance. Produced on the Fortus 450mc, the pushers were 3D printed and returned to Pack Line for testing.

“The strength of the part was instantly clear,” says Karetny, “It withstood all the tests on the machine, and its durability was impressive. Now our customer is using six of these replacement pushers on its machines to huge success.” Pack Line also credits the material’s capabilities for the part’s longevity. As Karetny explained, the team expects the performance of these 3D printed parts to surpass 5-6 million cycles.

Moving forward, Pack Line intends to increase its use of additive manufacturing for parts with complex designs and geometries. Stratasys 3D printers and materials will be integral for this effort to produce on-demand, efficient replacement solutions for its customers.



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