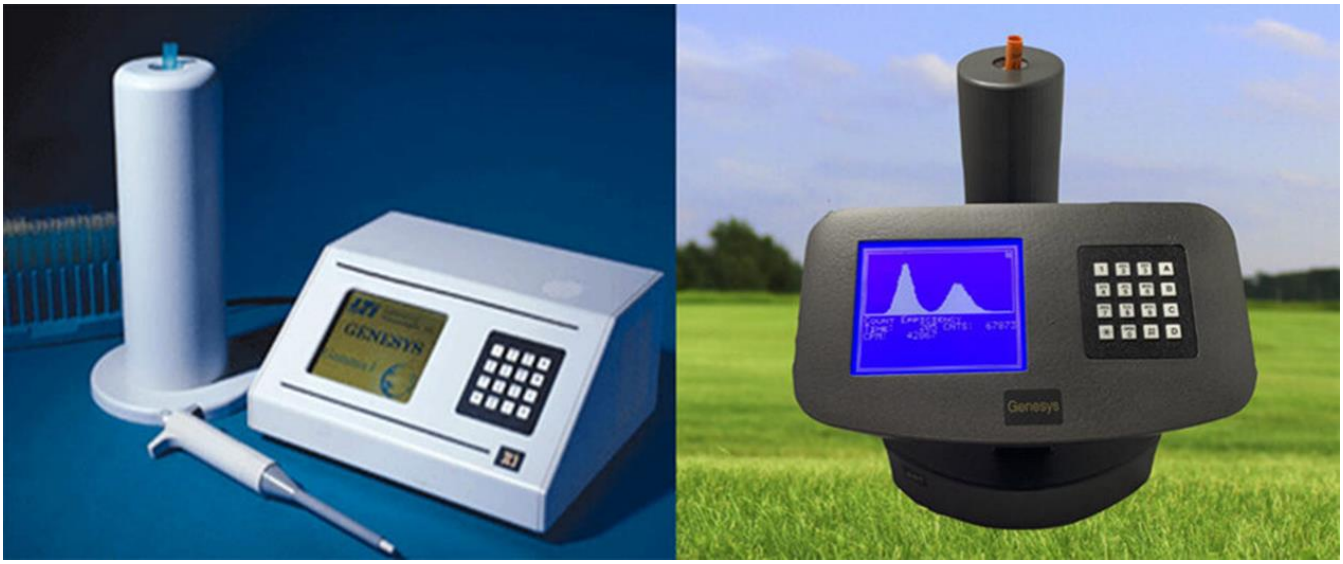
3D Printing PC Filament Innovated LTI's Manufacturing Design

Raise3D Case Study
https://www.raise3d.com/case/3d-printing-pc-filament-innovated-ltis-manufacturing-design/



Laboratory Technologies Inc. (LTI) is a leading manufacturer of laboratory radiation instruments. Since 1983, it has been a supplier of radiation instruments for laboratories in the United States and overseas. LTI's leading products include Genesys 100 series Gamma counters and Wiper Wipe Test Counters. Due to the complex structure, these two parts are difficult to manufacture and costly. LTI decided to purchase a Raise3D Pro2 Plus printer and use Polymaker polycarbonate (PC) to complete the complex shapes that are difficult to make with steel. For example, each corner is printed as rounded corners instead of the traditional sharp corners, and the new geometric shape improves appearance and safety.

3D Printing Allowed Smooth Product Development

Raise3D printers can be easily deployed and operated in office environment.

Due to 3D printing's ability to form any shape, LTI had a smoother process for their product development. Almost any outline and structure design were possible with 3D printing without additional tool changing.

The Raise3D Pro2 Plus is a smaller-sized large-format 3D printer, with a fully enclosed structure, and a 100-240V AC power supply. Therefore, the printer can be easily deployed anywhere using less space and power. LTI deployed Pro2 Plus directly next to its production line so the engineers could review any modification instantly.

With Raise3D's slicing software, ideaMaker, LTI refined numerous details in the 3D printing process for a few months, focused on achieving the best surface quality and dimensional precision. From ideaMaker's template library, LTI selected the option with 0.1mm layer height which produces a final printing result with very high resolution and a smooth surface. ideaMaker allows users to define the extrusion process from multiple perspectives such as differentiating extrusion-related value for different segments, as well as applying a particular value to compensate for shrink ratio.

The Right 3D Printing Material is Essential for A 3D Printed Product

A functional car jack printed by PolyMax™ PC

After testing different 3D printing materials, LTI found that polycarbonate (PC) was the best option. Polymaker's PolyMax™ PC is the top choice for mechanical performance due to its excellent impact resistance and high stiffness among existing engineering-grade 3D printing filaments. As a result, a PC printed part can absorb impact and prevent deformation or cracks. LTI immediately jumped at the chance to use Polymaker's PolyMax™ PC-FR after its launch. PolyMax™ PC-FR's has sufficient stiffness and impact resistance. Its ingredients are from world-leading polymer supplier, Covestro, which ensures both V0 performance in the UL94 flame retardancy test along with excellent toughness, strength, and heat resistance.

Finalizing 3D Printed Parts With Simple Post-Processing

The surface became nicely textured after simple post-processing.

LTI executed post-processing on printed PC parts as a last step of production. Once printing finished, parts were lightly sanded for 5-10 seconds to remove burrs and imperfections. All exterior parts were painted internally with a conductive nickel RF shielding paint, while external surfaces were primed to fill in the minor nooks and crannies resulting from printer extrusion. Once dried, they were again lightly sanded for 30-60 seconds and wiped clean. Then, a layer of hammered finish paint is used to give the parts a metal look.

3D Printing Enables Better and Cheaper Products

After months of development, LTI achieved remarkable product optimization by means of 3D printing. By redesigning structures, new exterior plate by Polymaker's PC was strong as previous design by CRS but 10 pounds (9.5kg) lighter. The reason is that PC density is only 1.2 gram/cm^3 while CRS weighs six times more as 7.8 gram/cm^3. In terms of cost, total cost of product from 3D printing process was only 25% of original process. This was mainly resulted by 94% cheaper parts from 3D printing compared to machined parts.

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For more information about Raise3D printers and services, browse our website, or schedule a demo with one of our 3D printing experts.