

Sector:	Electronics
Technology:	SLA® system

Stereolithography gives ERU Elektroinstallation the means to deliver in just eight months functioning prototypes for design review and testing by its customers.

The Challenge

ERU Elektroinstallation RuNa GmbH, a manufacturer of electrical consumer products, had less than a year to design, test and ready for production a set of products consisting of 27 different parts. ERU's customer intended to pre-test the product in accordance with European electrical and safety standards before building actual production tooling. The company also wanted the option of models to making last-minute changes to the product line right up to the start of production.

The product set consisted of universal and multi-circuit switches, two-way control and illuminated switches with and without child safety features, single and dual receptacles with and without side and center ground contact, and a combination of single-switch receptacles. The product variations would require 17 multi-sectional molds.

The Results

ERU Elektroinstallation RuNa GmbH turned to the rapid tooling and prototyping services of Schilling + Partner Engineering. Using stereolithography (SL), Schilling designed and turned around prototypes of the 27 different components in two months. ERU, in turn, delivered the prototype to its customer for design review and approval.

Two months after receiving customer approval, ERU and Schilling delivered 50 stereolithography product sets for electrical and safety testing according to European industry standards.

While gearing up for production, Schilling, in order to reduce tool-making time, now used the tested and approved prototypes as master patterns for molding production tooling. Calculating the necessary mechanical and thermal properties, Schilling built tooling constructed of epoxy resin reinforced with metal powder. This rapid tooling approach allowed Schilling to cut tool-making by 60% and costs by 90%. SL rapid tooling allows ERU to:

- Cut tool-making costs by 90%
- Dramatically reduce tool-making time by 60%
- Test and verify product designs before building production tools
- Use prototypes to reduce reliance on up-to-date engineering drawings

"Customers no longer talk to us about design drawings or timelines for their completion. Instead, we use models to communicate. 'Grasping' an idea is easier when you can 'touch' it."

- Dr. Martin Schilling, Schilling + Partner Engineering



The Process

Managers at Schilling + Partner Engineering decided against conventional steel molds. Steel tooling would be impractical due to the expense and complexity of the required tooling and time constraints. Schilling engineers opted to apply rapid tooling methods with stereolithography prototype parts as master patterns from which to mold epoxy-based tooling.

Schilling engineers designed the 27 different surface-mounted parts using Pro/Engineer CAD software. ERU-approved CAD models were then downloaded to the SLA machine at Schilling. Just two months after placing its order, the customer was provided SL prototypes of the product set for design review.

Once approved, pre-production of additional prototypes began. In two months, the customer received 50 product sets for formal testing to VDE and KEMA electrical and safety standards. The products were industry approved before actual production had even begun.

Schilling designers now used the VDE- and KEMA-approved SL prototypes as master patterns to build production tooling. Designers used Pro/MOLDESIGN software to calculate mechanical properties and shrinkage factors, as well as mold-parting lines, and built production tooling of epoxy resin reinforced with metal powder from the SL masters.

The rapid tooling method delivered production tooling in 4 weeks at a cost of DM 16,000 (\$11,000 USD) Conventional tool-making methods using steel molds would have required 12 weeks at a cost of DM 160,000 (\$110,000 USD).

Rapid tooling benefited both Schilling and ERU. SL models were available to verify every aspect of product development, eliminated the need for engineering drawings, and cut tooling costs by 90% and delivery times by 60%.

Company Profile

ERU Elektroinstallation RuNa GmbH (ERU), Thuringia, Germany, is a manufacturer and marketer of electrical and electronic systems and components. Schilling + Partner, based in Sondershausen, Germany, provides rapid development services to translate ideas and concepts into designs. Its services include generating models and prototypes using stereolithography, designing tools, creating NC data and production of rapid tools and patterns.



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