

# Electrolux Customers Demand Accelerated Development

Sector:	Consumer Products
Technology:	SLA® system

*Vacuum cleaners and their accessories are among the most common items in our everyday life, and like all domestic appliances they should perform their function reliably.*

## ***Ergonomics in the design play an essential role.***

An exotic or user-friendly design and appearance will strike a chord throughout a broad spectrum of purchasers. These facts require the development and manufacture of multifunctional parts and components with the use of minimum resources, and at the same time also demand an accelerated development time. Domestic products in particular require a rapid time-to-market, so uneconomical alterations and modifications may determine the timing of a product's entry into the market, and thus also its success.

## ***Time-to-market cycles and costs can be reduced with innovative development tools and a comprehensive range of solutions.***

Electrolux, based in Huskvarna, Sweden, is one of the world's leading manufacturers of domestic appliances. For the development of its new Clario vacuum cleaner, the company employed an innovative production chain in which, according to Bo Svensson, the Rapid Prototyping Manager, particular prominence was given to rapid prototyping. In his opinion, the extremely tight timescales for the development of the new vacuum cleaner could not have been maintained without stereolithography modelling. For the Clario vacuum cleaner, for example, a mere fifteen weeks were available to produce the necessary prototypes.

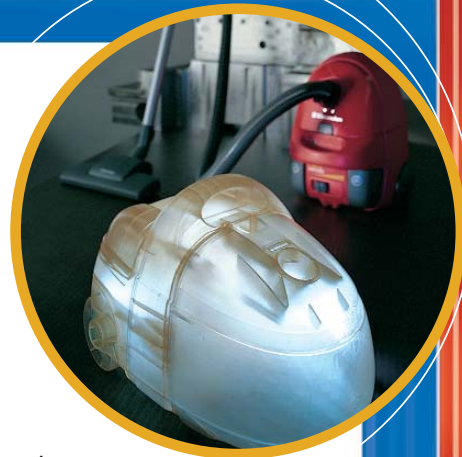
At the same time as the design and construction of the individual vacuum cleaner components, work had to start on the construction of a functional model to be used in the design analysis of noise level, filtering efficiency, performance and handling. The sound model produced by the design department was digitized and converted to a CAD system. The corresponding CAD surface data was processed and a data control model was made for comparison studies with the designers.

*"Stereolithography is now a permanent feature in our development strategy and I would recommend this innovative process to anyone."*

*- Bo Svensson  
Rapid Prototyping Manager, Electrolux*

## ***After further details, such as the cable and accessories compartments and the lower part of the protective strip had been finalized, the design team started on the detailed construction.***

At this early stage, stereolithography prototypes had already been produced based on the 3D-CAD data. Prototypes were made of all the plastic parts of the Clario vacuum cleaner, including the upper and lower shells, controls, handle, switches, cable roller, trim for the microfilter screens, and catches. All parts were made in duplicate on an SLA® 500 machine from 3D Systems. Initial design reviews for marketing purposes as well as construction valuations and installation checks were carried out using these prototypes. In addition, a small number of vacuum cleaners were manufactured by vacuum casting.



Rapid Prototyping

***This parallel operating procedure enabled a considerable reduction in the overall development time.***

The project schedule allowed about two weeks for the digitization of the model. The CAD surface design and fabrication took about four to five weeks. The manufacture of the individual vacuum cleaner components took another eight weeks. The data control models, stereolithography parts and the vacuum casting parts were produced at the same time.

Bo Svensson was unable to say exactly how much time and money Electrolux had saved by using this procedure. However, rapid prototyping meant that the subsequent stages were substantially reduced and were more reliable. The design engineers were able to incorporate tooling aspects as early as the component manufacturing stage and were therefore able to concentrate on the moldcharging, cooling and mold removing processes as well as the resulting consequences. Tool construction, and in particular, injection casting tool construction for vacuum cleaners, is complex and constitutes a decisive cost factor. Unplanned tool modifications have an effect not only on costs, but also on development time, so the Electrolux design team endeavored to plan the manufacturing and assembly stages in advance and thus keep modifications to a minimum.

Stereolithography prototypes are a valuable aid in managing this. Thanks to the prototypes, the development team was able to collate and incorporate all the information from the groups involved in the development process at an early stage of development.

***As Bo Svensson confirmed, the SL prototypes were the decisive factor.***

The SL prototypes enabled all the design and technical facilities such as CAD modelling, analysis and the design knowledge of the construction team to be combined, thereby raising product quality and reducing production costs. This also allowed Electrolux to implement effective cost management at an early stage of the manufacturing process and to plan production flows and supply logistics in advance.

"With the SL prototypes we are able to handle all unforeseen factors in advance, which means that the whole process from the initial design stage up to series production can be shortened. In the future, we will never carry out such time-critical projects without using SL prototypes", says Bo Svensson, emphasizing the advantages once again.



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