

COMPANY

forteq Group

LOCATION

Nidau, Switzerland

SOFTWARE

Autodesk® Simulation Moldflow

Down to the last detail – manufacturing precision plastic parts

For more than 10 years, forteq Nidau AG has achieved successful results with Autodesk Simulation Moldflow

We have been using Autodesk Simulation Moldflow for about ten years. Back then, it was the only sensible product on the market. Today, it is basically the standard tool for simulations.

—**Beat Schiegg**
Head of R&D
at forteq Nidau AG



Exterior view of forteq Nidau AG headquarters. © Forteq Nidau AG

forteq Nidau AG, part of the forteq Group, is based in Nidau in Switzerland. The company started off as a manufacturer of metal – and later plastic – gears, mainly for the automotive industry. The forteq Group has eight locations across Switzerland, Italy, Czech Republic, UK, Netherlands, USA, and China. Nidau is home to the forteq Group headquarters and for many years now, the Health Care division, where approx. 100 employees develop custom solutions for medical devices and medication.

In 1997, the pharmaceutical company GlaxoSmithKline inquired about the possibility of creating a dose counter for an asthma inhaler that would count each spray and display the number of remaining doses. The resulting counter consists of three springs and nine small plastic components of which the smallest weighs a mere 0.027 grams. Meanwhile, forteq Nidau AG produces the counter for customers in America and the whole of Europe – shipping up to several tens of millions in peak years. The business is since well-known for its ability to manufacture small precise plastic parts with high cavity counts and zero waste.

Since 2000, forteq Nidau AG has had its own internal development department. Besides manufacturing, the company now also develops products to customers' individual specifications. All injection molding simulations that subsidiaries in the automotive, tooling, or thermoset processing business may need are carried out in Nidau.

Predetermining mold properties

Using Autodesk Simulation Moldflow for product development is basically a matter of course at forteq, because it helps identify important specifications at an early stage, e.g. the ideal injection point, materials, and wall thickness. The software allows developers to leverage CAD models from design systems, generate FE meshes, and simulate and analyze the flow properties of a material in various molds and under various conditions. Potential problems are detected well in advance and long before the respective injection molding tool is manufactured, thus saving both time and money. Simulations also help determine the ideal compromise between material use, cycle time and stability for a particular mold. Previously,

Autodesk Simulation Moldflow helps find the optimum balance between material use and stability

designers would rely on their personal experience and often decide in favor of thicker walls to be on the safe side. Thick walls cool slower, which leads to longer cycle times, which in turn leads to a drop in efficiency as well as requiring more material. Moldflow helps developers find the optimum balance between material use and stability. "We have been using Moldflow for about ten years. Back then, it was the only sensible product on the market. Today, it is basically the standard tool for simulations," says Beat Schiegg, Head of R&D at forteq Nidau AG. "In many cases, customers themselves request that we use it."

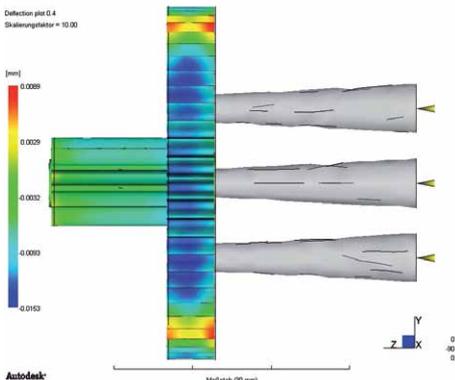
Finding the ideal injection point

forteq Nidau AG has recently been working on the development and production of an electric scalpel. Roughly the size of a ball-point pen, it has a long core that can only be supported on one side. For this project –and other similar projects – Moldflow was deployed at a very early stage of the development process. Based on the very first draft, the injection molding process was simulated to gather information regarding feasibility, shrinkage and warpage. Precise software analyses provide answers to important questions about the flow behavior within the mold: Does the material flow evenly throughout the mold? Does it cool evenly? Are there any inclusions or sink marks? "Moldflow is particularly useful for more complex parts. For example in cases where the pressure exerted on the core is irregular, or where a tool has a loose core," Beat Schiegg explains. "Simple parts do not require simulation, but as soon as

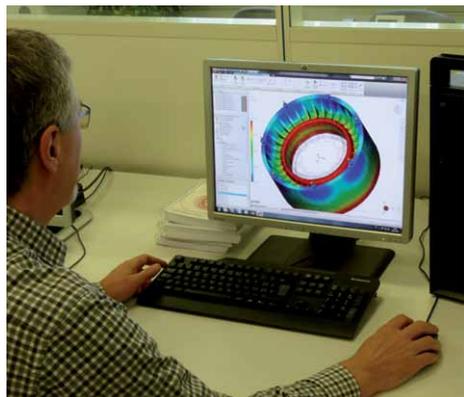
things get complicated, it is good to learn a little more about the component." For the electric scalpel, forteq calculated the core offset using Moldflow and discovered that the originally planned injection point would cause problems. Based on the Moldflow simulation, the injection point was repositioned to ensure that the injection pressure is applied to the side on which the core is supported. Otherwise the material would have flown between the core and the support. Thanks to this new solution, the injection mold was immediately ready for use. Without the preceding simulation, the problem with the wrong injection point would not have been detected until production had commenced. This would have caused significant delays and costs, because the whole tool would have had to be developed from scratch, not to mention the waste of material for the first, imperfect prototype.

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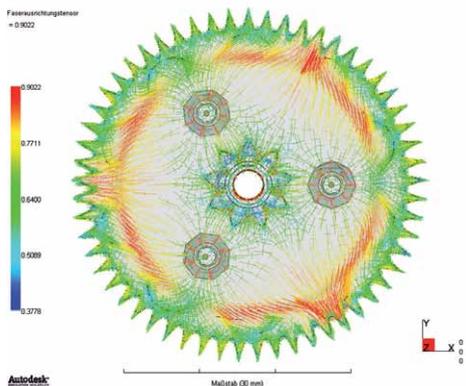
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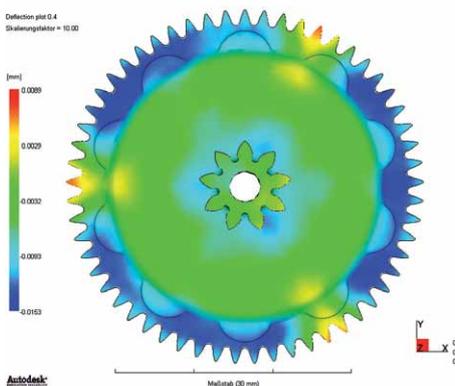
Side view of gear warpage.
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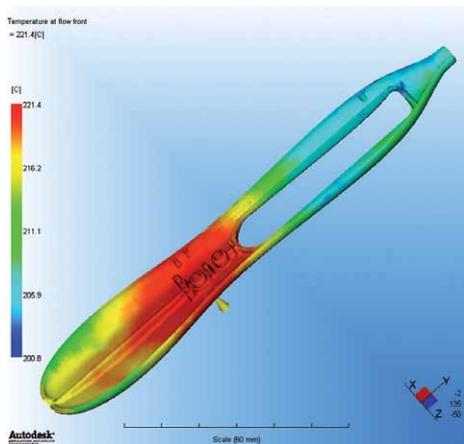
Employee working with Moldflow at the Lenovo ThinkStation. © Forteq Nidau AG



Front view of gear fiber orientation.
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Front view of gear warpage.
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Temperature distribution after injection.
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