

Shaw Aero Use FloEFD Simulation Software

FloEFD Helps Shaw Aero Reduce Valve Prototype Development Time from 3 Months to 1 Day

Design Challenge

Shaw Aero Devices designs, develops and manufactures a wide range of products in the areas of fuel, oil and water/waste systems and components. A customer was interested in purchasing a large quantity of a solenoid valve similar to one of their standard products. The catch was that the customer specified a pressure drop of 0.75 pounds per square inch (psi) at a flow rate of 4.45 gallons per minute (gpm) while Shaw's standard valve measured out at 6.09 psi. In the past, this would have required building and testing at least three prototypes, each of which would cost \$3000 and take one month, in an effort to eliminate constrictions with no guarantee of success. One of the weaknesses of the build and test approach is that physical tests determine the pressure drop of a design iteration but provide very little additional information that provide assistance in diagnosing a problem such as determining which areas of the valve are constricting fluid flow.

Solution and Results

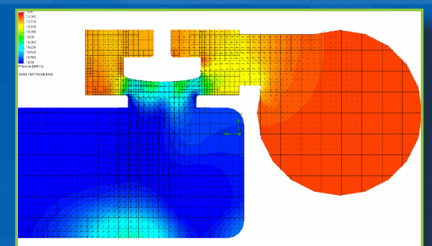
Rob Preble, Project Engineer for Shaw, created the original design in AutoCAD from Autodesk and simulated it using FloEFD computational fluid dynamics (CFD) software from Mentor Graphics. FloEFD's use of native 3D CAD data, automatic gridding of the flow space, and managing the flow parameters as object-based features eliminates the need for engineers to understand the computational part of CFD and instead enables them to focus on the fluid dynamics of the product which is already their responsibility to understand and master. The CFD results provided insight into how the design could be improved. Preble created several new software prototypes and identified one that provided the required performance without the need to build a single prototype. The final design has a pressure drop of 0.71 psi, 88% less than the original design.

MECHANICAL ANALYSIS
Engineering Fluid Dynamics

Customer Testimonial

" CFD simulation dramatically reduced the time needed to meet our customer's demanding specifications. Without CFD, we would have had to go through a minimum of three prototypes, more likely several more. With CFD we moved from the beginning of the project to the development of an acceptable software prototype in only one day. "

Robert Preble, Project Engineer



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