

QuEST Global

Simulation Balances Hydrodynamic Performance with Structural Integrity to Develop a Water Softener that Uses Less Salt



www.ansys.com

Culligan has been a leader in water treatment for 75 years and uses state-of-the-art analysis, engineering tools and testing facilities to develop the most advanced water treatment products in the world. On a recent project, Culligan partnered with QuEST Global, a company that provides a spectrum of engineering solutions to global leaders, to develop a new water softener.

TECHNOLOGY USED

ANSYS® CFX® and ANSYS® Mechanical™

BUSINESS CHALLENGES

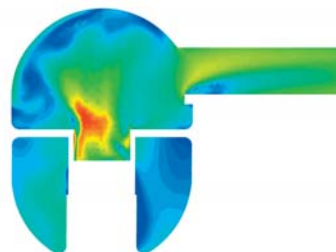
QuEST Global worked with Culligan to design a water softener that would use less salt than any other in the market, minimize water pressure losses and use the least amount of material possible.

ENGINEERING SOLUTION

- To achieve the goals of this project required use of both fluid dynamics and structural simulation. Software from ANSYS could be applied to both types of simulation.
- ANSYS geometry tools simplified the geometry, which decreased the time to obtain simulation results.
- Two-phase fluid dynamics capability was needed to model the movement of brine and water in the valve, which ANSYS CFX offered.
- Obtaining the brine draw rate required capturing the suction effect well while modeling a multi-component mixture consisting of raw water and brine solution.
- Pressure results from the fluid simulation were easily transferred to ANSYS Mechanical software to predict stresses and deflections within the valve.

BENEFITS / RESULTS ACHIEVED

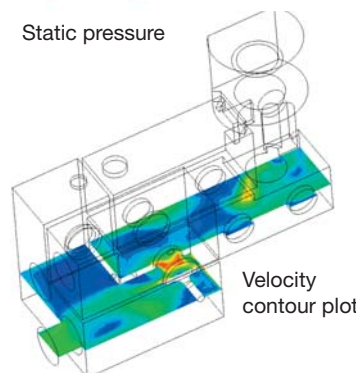
- The company was able to reduce the amount of salt usage, make the water softener more efficient and maintain the structural integrity of the unit.
- The results obtained using ANSYS CFX fluid dynamics software matched very well with the test data, giving Culligan confidence in the use of fluid flow software from ANSYS for design improvement.
- Using ANSYS geometry tools to simplify the geometry helped QuEST to perform many design changes quickly. The use of engineering simulation led to a significant reduction in design cycle time.
- The simulations enabled QuEST Global to balance design trade-offs between hydrodynamic performance and structural integrity before Culligan invested hundreds of thousands of dollars in injection molds.



Velocity



Static pressure



Velocity contour plot

COMPANY INFORMATION

Country: India

Industry: Engineering Services and Manufacturing

www.culliganmatrixsolutions.com
www.quest-global.com



Simulation with software from ANSYS enabled us to balance design trade-offs between hydrodynamic performance and structural integrity before investing hundreds of thousands of dollars in injection molds. When the valve was finally molded and assembled, the pressure drop was within 4 percent of that predicted by the fluid dynamics software and the valve passed its pressure cycling and burst testing on the first try.

Kerry Quinn
VP of New Product Development
Culligan

