# Rotamix Computational Fluid Dynamics

The CFD (Computational Fluid Dynamics) software used at Vaughan Co., Inc. for analysis is among the top programs available in the world for this type of detailed computer flow modeling work. The problem is solved using techniques similar to finite element stress analysis. Essentially, the fluid volume is broken down into hundreds of thousands of volume elements to be analyzed. Final results can be plotted in various formats including vector, velocity and streamline, on various tank configurations including cylindrical, rectangular and oval.

All Rotamix designs are supported by CFD analysis, either by standard modeled geometries, or using customized models individualized to meet specific application parameters on a consultation basis.

Vector Plots

Vector plots use arrows to show direction of fluid flow, verifying flow patterns as well as velocities.

Vector plots also show flow patterns and velocities around objects such as support columns, verifying ability to mix while predicting potential "dead spots".
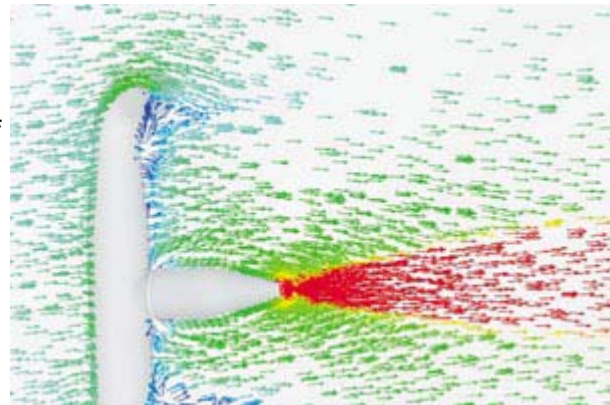
Velocity Plots

Velocity plots show variations in velocity as blended solid colors. Velocity plots have proven that small diameter nozzles producing high velocity provide more complete mixing than larger diameter low-velocity nozzle designs using equal amounts of energy. Higher velocity allows flow patterns to travel farther, while inducing significantly more entrained fluid.

In a theoretical comparison, larger-diameter low-velocity nozzles would be required if used with standard non-clog pumps, in an attempt to keep from plugging the nozzle openings with whole solids.
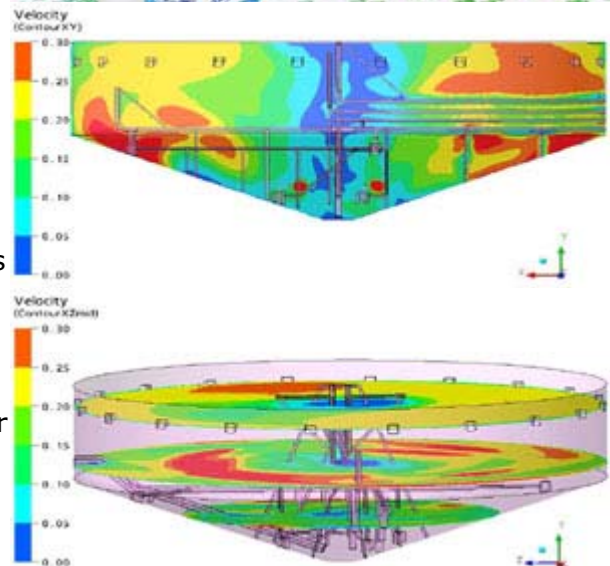
Streamline Plots

Streamline plots predict the path of flow for a particle starting at any given point. The plotted path shows the actual movement of the particle around the tank, confirming both horizontal and vertical movement within the mixing pattern.

This image shows a streamline plot for a particle at steady state (a period of time determined long enough to create a steady state of mixing within the tank). This plot proves not only that the rotational mixing has both horizontal and vertical movement, but also that a vertical-axis vortex is created.