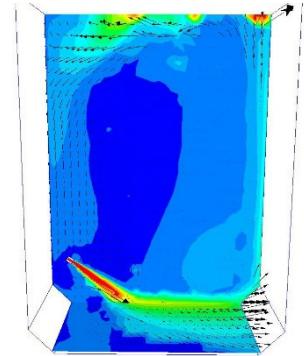


### HYDRAULIC RECIRCULATION & MIXING SYSTEM (HRMS)

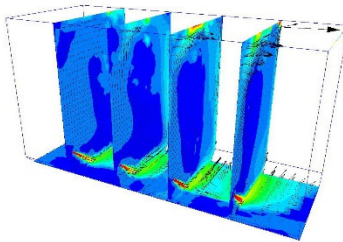
#### “Utilizing Multi-Port Distribution Systems to Optimize High Rate Mixing within Wastewater Treatment Processes”

A very effective method of achieving a completely mixed system within a process vessel is to re-circulate the fluid and induce momentum through velocity enhancement. This is most beneficial when mixing with diffused air is not desirable due to the resulting transfer of oxygen into the process fluid. The two best methods of determining the energy required to achieve complete mixing as well as the most effective arrangement of influence points is to utilize Computation Fluid Dynamics (CFD) models and Velocity Gradient (G) models in combination.



The most important aspect to understand when injecting a fluid into another fluid (of the same density) is that the resulting discharge plume velocity decays at a rate which is inversely proportionate to the distance it travels. A discharge plume with an initial discharge velocity of 30 ft/sec will decay to a velocity of 1 ft/sec after a 30 foot distance. Therefore, applying a single (or limited quantity) port system can result in inadequate mixing across the entire liquid volume. Multi-Port distribution systems are more able to maintain the required mixing velocities across the entire area of the process vessel.

Process fluids containing solids that have tendencies to conglomerate and bridge through the recirculation system must be considered in the design of the discharge nozzle. Fixed orifice nozzles are limited to an allowable diameter to pass the largest expected solids discharge velocity achievable or the recirculation flowrate. The variable orifice nozzle, which can normal operation and are flexible design diameter solids. Tideflex rigidities to produce the required

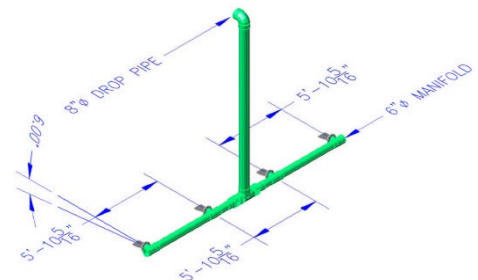


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#### Unique Performance Features

- Variable Orifice Design Optimizes Velocity & Prevents Clogging
- Multi-Port System Provides Optimal Coverage
- Systems based on CFD & Velocity Gradient Technology
- Nozzles can be Constructed to Produce Specific Velocity Required

*Tideflex Technologies / Red Valve Company holds the patent for elastomer duckbill diffusers and their incorporation into a multiport diffuser piping system. Any suppliers of systems incorporating duckbill diffusers would need authorization from Tideflex Technologies / Red Valve Company. Soliciting of systems incorporating Tideflex diffusers by others without the consent of Tideflex Technologies constitutes intent to violate the patent protection of this product and is subject to the penalties defined within the Patent Protection Laws of the United States.*



US Patent No. 6,016,839 / 6,193,220 / 6,372,140 / 6,702,263  
 Canada Patent No. 2,366,252 / 2,385,902; United Kingdom Patent No. 2,326,603