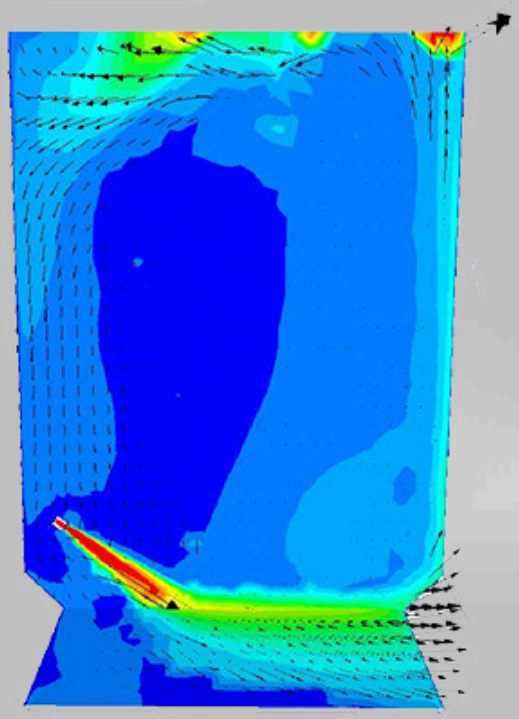
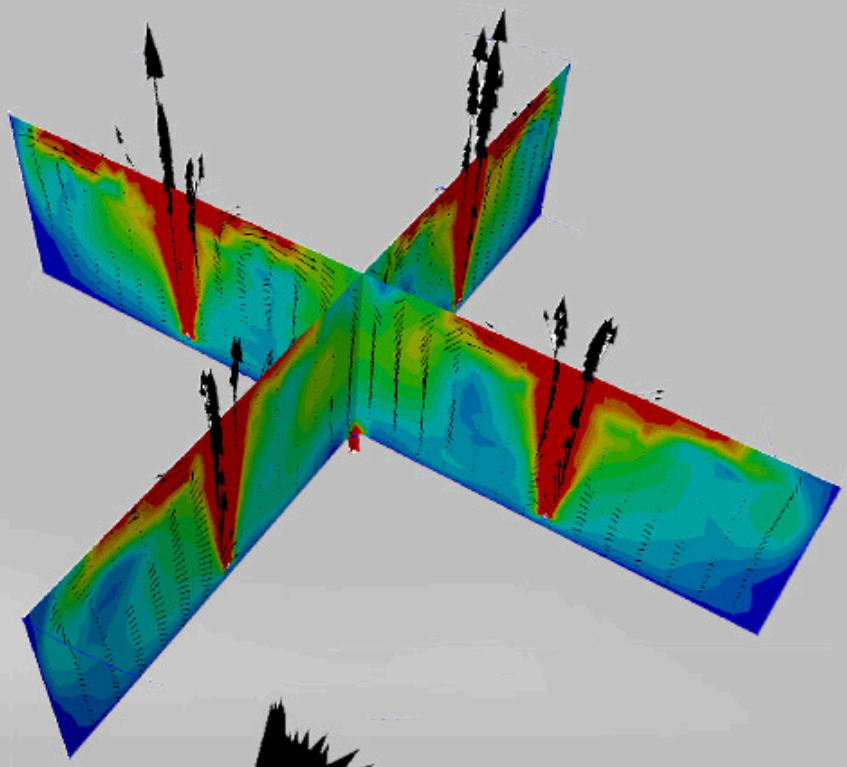
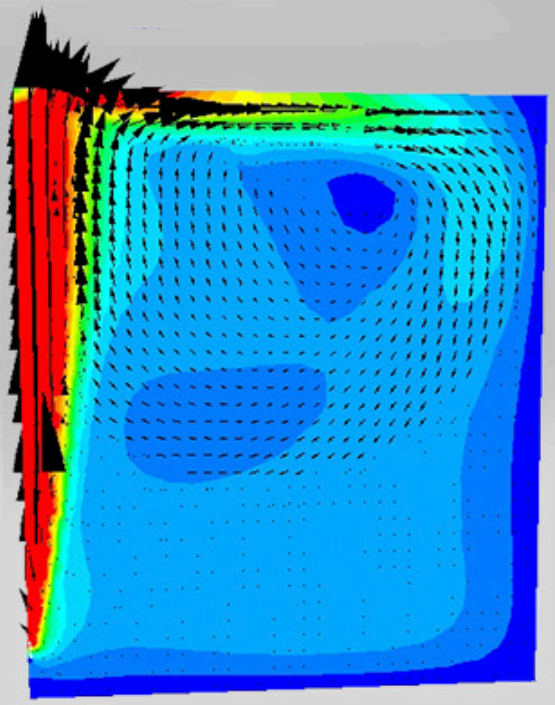
Red Valve®

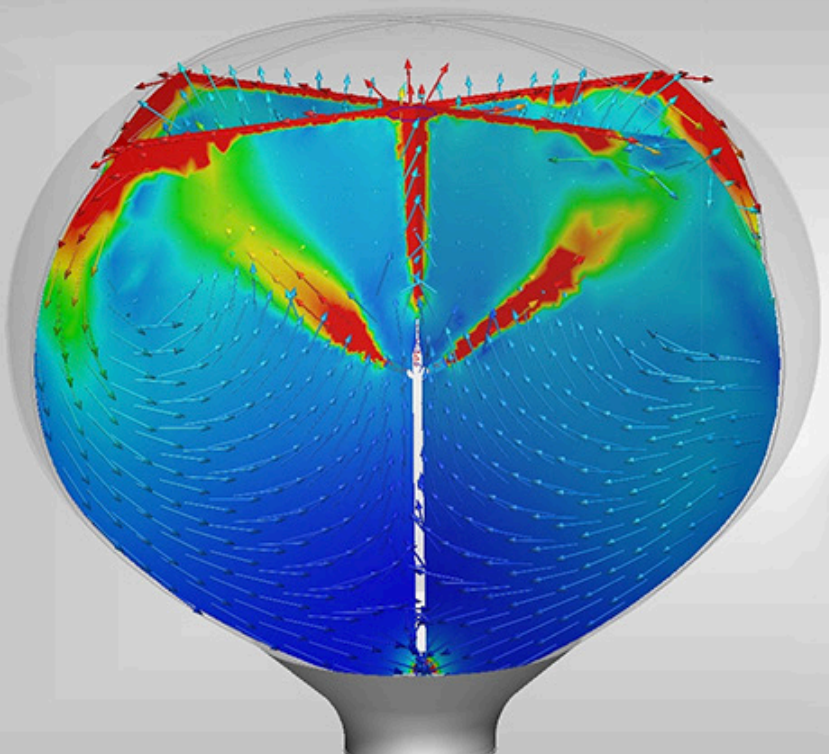
TIDEFLEX® MULTIPORT MIXING SYTEMS

Four High-Performance Mixing Systems



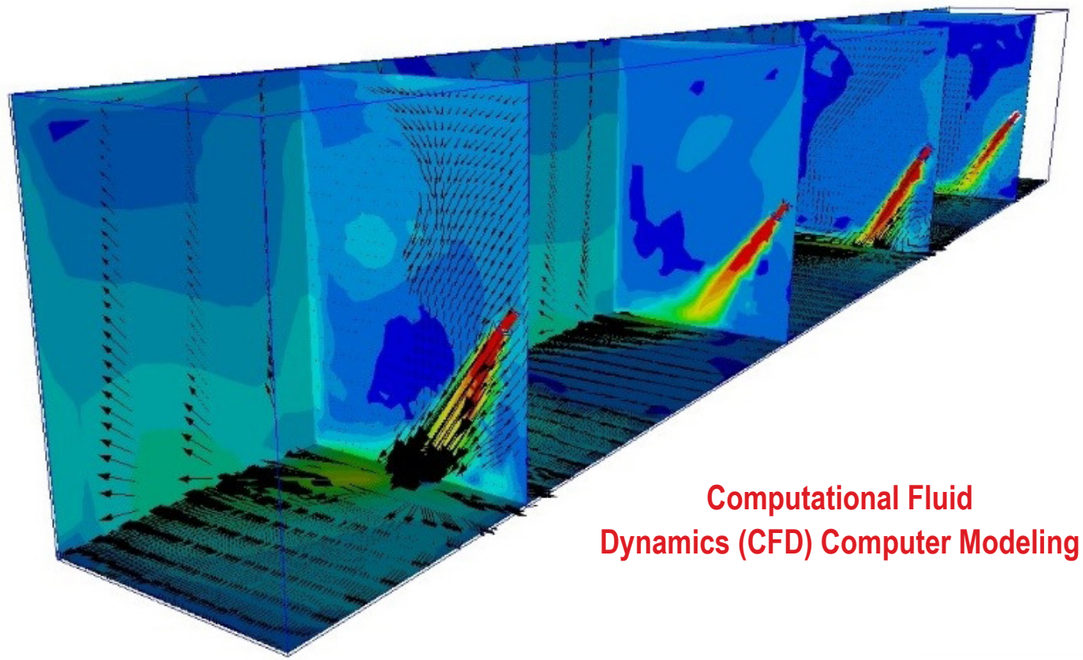






Red Valve Company, Inc.

Applying State-of-the-Art Tools for Optimal Tideflex® Mixing Systems Design



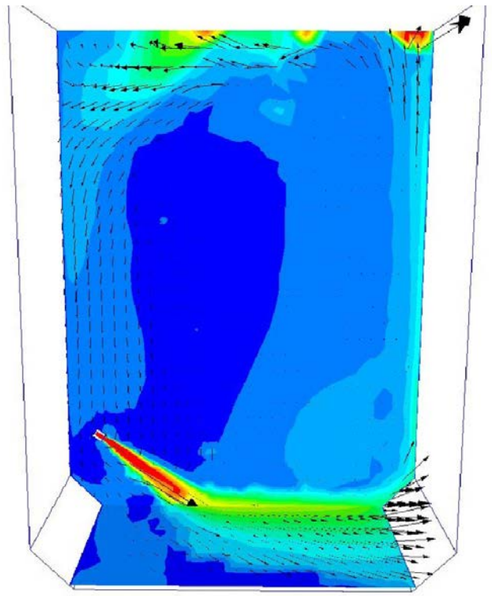
Computational Fluid Dynamics (CFD) Computer Modeling

Variable Orifice Nozzle Technology

The Tideflex® Mixing Systems all utilize Computational Fluid Dynamics (CFD) computer modeling to confirm the hydraulic design and multi-port configuration of the system. This technology is applicable to both high-rate and low-rate mixing applications. A CFD model is accurate if the characteristics of the fluid body are applied and reflective of the intended application.

CFD modeling also provides dynamic mixing models that show mixing over a designated time period; this calculates the total amount of time to reach a completely mixed, homogeneous state. The two primary applications for CFD modeling are 1.) maintaining solids suspension (high-rate mixing) and 2.) eliminating short-circuiting and thermal stratification (low-rate mixing).

Solids Mixing Computation - CFD Model



Velocity Gradient Design
Mathematical Modeling

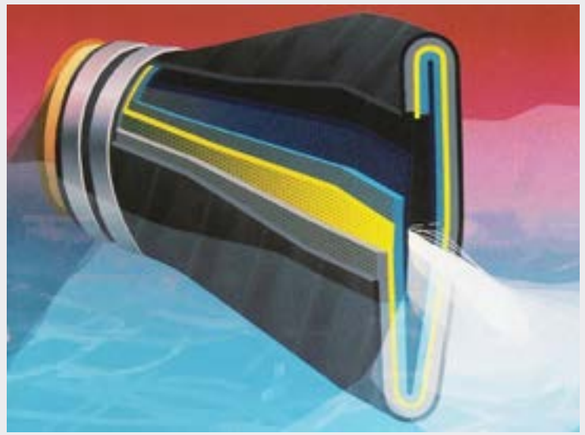
G = SQRT [P / (μ * V)]
G = Mean Velocity Gradient, 1/sec
P = Power Rate, ft-lbs/sec
μ = Dynamic Viscosity, lb-sec/sqft
V = Liquid Volume, cuft

The Velocity Gradient equation evaluates energy applied to a liquid volume and calculates the resulting effect to particles in the fluid. The fluid characteristic is defined by its viscosity (resistance). The Power Rate is the applied energy; this variable is expanded for each type of mixing equipment to include all the additional variables relative to the equipment type.

This design method does not produce a profile of the energy distribution, but rather an average energy applied to the entire fluid body. For more detailed evaluation of the mixing system, CFD modeling is required. The Velocity Gradient evaluation is good for use as a pass/fail evaluation.

Tideflex® Nozzle Construction

Application-Specific Construction



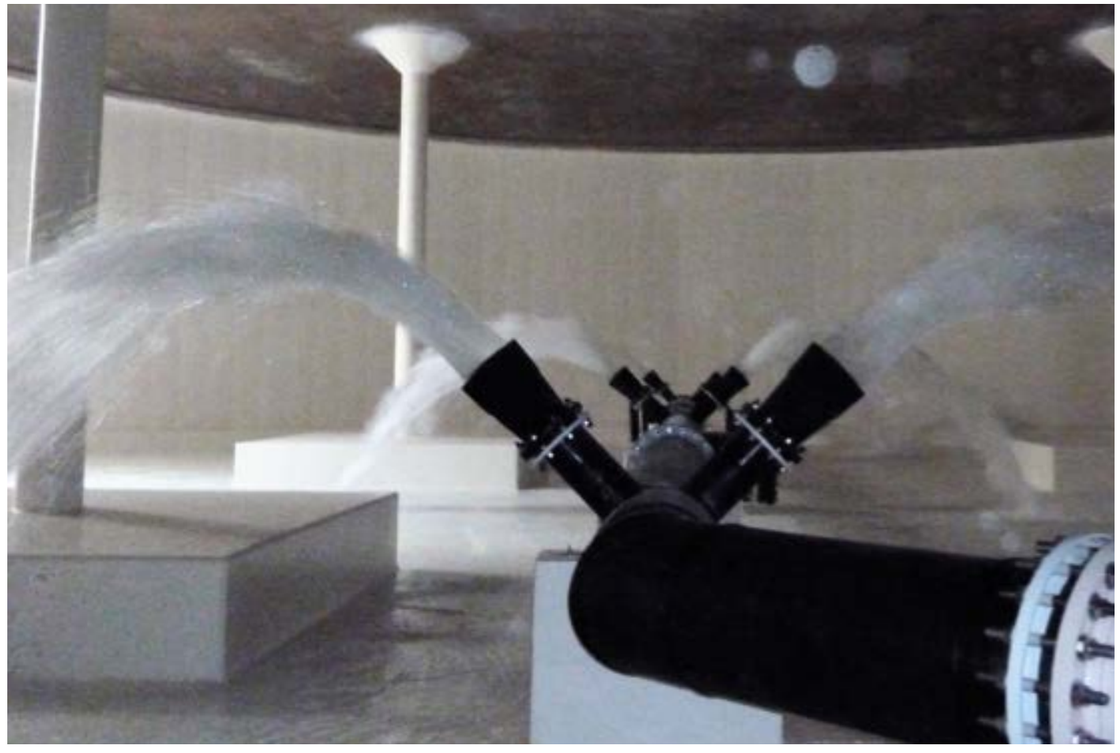
Tideflex® Check Valves and Nozzles are constructed of multi-layers of elastomer and fabric reinforcing. Each nominal size Tideflex® can be constructed in at least 50 different hydraulic variations by changing geometry and stiffness. This flexibility allows for specific valve (nozzle) design to optimize discharge velocity, back-pressure capacity, and flow headloss through the unit.

Tideflex® Hydraulic Testing

Certified Hydraulic Testing by Independent Laboratories
- NSF61 Testing for Drinking Water
- ASCE Testing for Oxygen Transfer

Tideflex® Mixing Nozzles are variable orifice discharge devices, therefore their discharge curves do not reflect the curves for rigid nozzles. Variable orifice nozzles optimize the discharge velocity through the whole range of applied flow for the specific nozzle. Independent laboratory testing was conducted to measure this flow range as well as determine the dynamics of the nozzle at these rates (percent open area).

Mixing Systems for Elimination of Thermal Stratification



Tideflex® Mixing Systems for Eliminating Stagnation within Potable Water Storage Tanks

The Tideflex® Mixing Systems (TMS) for water storage tanks are extensively CFD modeled, scale modeled, and field validated to improve storage tank water quality by eliminating short-circuiting, stratification, and achieving complete mixing in all sizes and styles of storage tanks. The TMS does not require an outside energy source, does not require maintenance, and has a 30-year life. It operates on existing differential pressure when the tank is fluctuated. For every tank and reservoir, Tideflex® engineers select the optimum multiport TMS configuration and provide a mixing and water age analysis that ensures the exact amount of turnover required to completely mix the tank.

- Drinking Water Storage Tanks
- Complete Mixing and Thermal Stratification Elimination
- Passive Energy System
- Hydraulic Mixing Process; G = 10
- NSF61 Certified
- Modeling Method: CFD and Scale Models
- Benefits: Higher Disinfectant Residuals, Reductions of DBPs

To learn more, please request a copy of our Tideflex® Mixing System Brochure

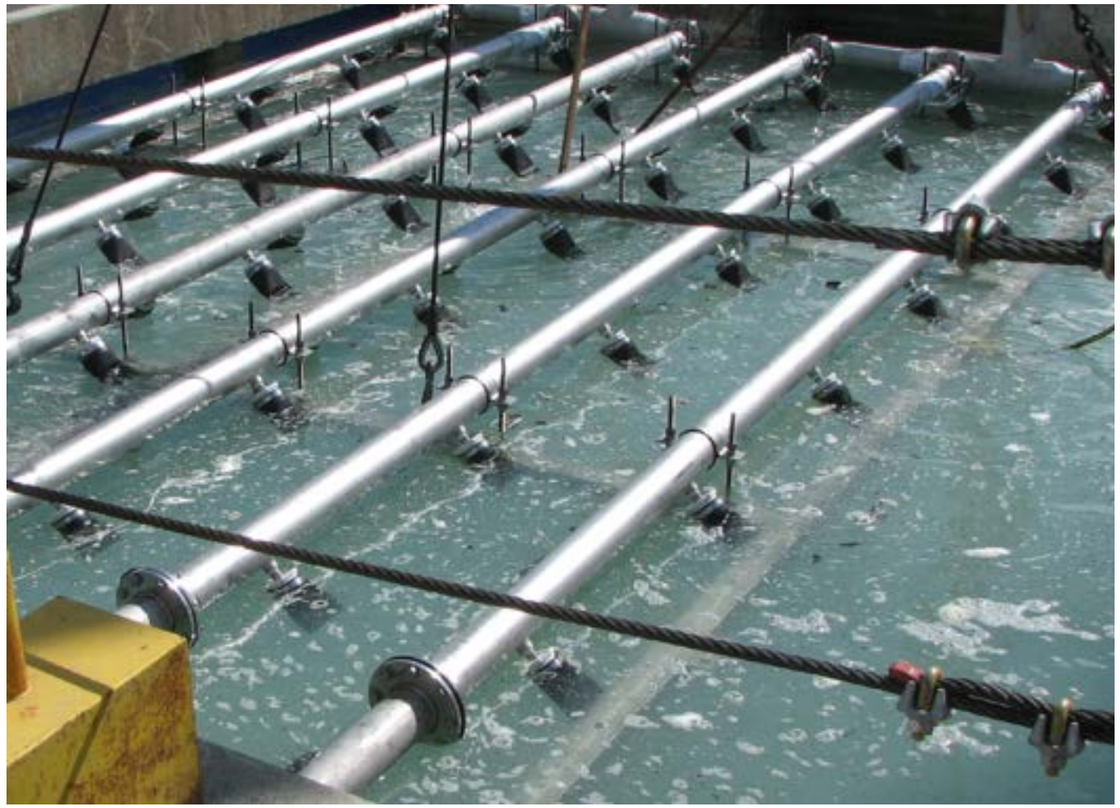
Tideflex® Nozzles for Effluent Diffuser Systems Mixing Effluent Discharge into Receiving Water Bodies

The primary purpose of a multi-port Effluent Diffuser System is to mix the effluent discharge with the receiving water body and achieve a target dilution within a designated mixing zone. Effluent Diffuser Systems designed with Tideflex® Nozzles prevent backflow of sand, sediment, and salt water into the outfall and eliminate detrimental effects produced by single-port outfalls such as concentrated plumes, thermal stratification, color concentrations (plumes), and temperature differentials. These systems have a 30-year life expectancy.

- Treated Effluent Mixing in Receiving Water body
- Rapid Dilution and Thermal Stratification Elimination
- Passive or Active Energy System
- Hydraulic Mixing Process; G = 10 to 40
- Modeling Methods: CORMIX, VISUAL, PLUMES
- Benefits: Reduction of Stratified Plumes, Color Dissipation and Acute Toxicity

To learn more, please request a copy of our Tideflex® Effluent Diffuser Systems Brochure

Mixing Systems for Fluids Containing Solids



Tideflex® Diffused Aeration Mixing Systems for Applications with Settleable Solids

Tideflex® Coarse Bubble Diffusers provide one-way flow operation, discharging gas into a fluid when the system is operating, and providing backflow prevention of the fluid into the piping system when the discharge gas is off. This provides the option of ON / OFF aeration mode where blower operating cost can be reduced by 50%. Tideflex® Coarse Bubble Systems are maintenance-free in high solids applications.

- Wastewater Treatment (Industrial & Municipal)
- Oxygen Transfer & Supply System
- Active Energy System (Blower)
- Air-Lift Mixing Process; G = 130
- Modeling Method: ASCE for O2, CFD for Mixing
- Benefits: Most Economical Mixing Method

To learn more, please request a copy of our Tideflex® Aeration Mixing Systems Brochure

Tideflex® Hydraulic Recirculation and Mixing Systems for Applications with Settleable Solids in Anoxic and Anaerobic Processes

Hydraulic Recirculation and Mixing Systems pull the fluid through a pumping system and re-inject it at high discharge velocities. This increase in energy results in mixing of the entire fluid body as well as maintaining suspension of solids contained within the fluid. These systems are ideal for applications where mixing with oxygen transfer is detrimental to the biological or physical treatment process.

- Wastewater Treatment (Industrial & Municipal)
- Anoxic Mixing System
- Active Energy System (Recirc Pump)
- Hydraulic Mixing Process; G = 40
- Modeling Method: Velocity Gradient and CFD
- Benefits: Mixing for Anoxic Processes

To learn more, please request a copy of our Tideflex® Hydraulic and Recirculation Mixing Systems Brochure

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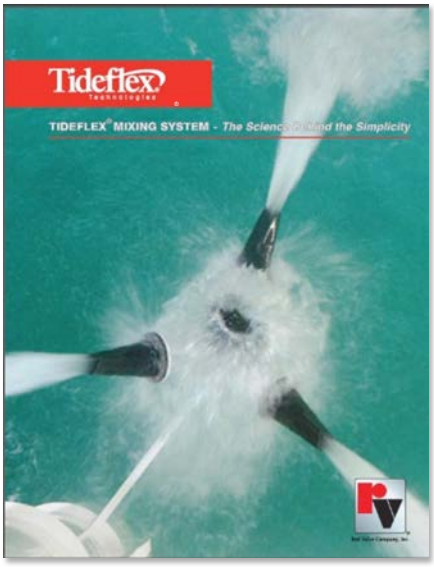

"Rely on Red" for a Total System Solution to Your Water and Wastewater Treatment Challenges

No other company can match Red Valve's "Total System Solution" for water and wastewater treatment plants and municipal collection and distribution systems.

Since 1953, Red Valve has provided products for each phase of collection, distribution, separation, aeration, treatment and final discharge. Our complete product line provides customers with one source for on/off and control valves, check valves, pressure measurement, expansion compensation, air diffusers and effluent diffusers. All Red Valve products are designed to handle the rigors of raw sewage, sludge, scum and grit with abrasion-resistant, non-clogging designs.

Contact us today for a free copy of our Tideflex® TMS Mixing Systems Brochure, Hydraulic Recirculation & Mixing System Brochure, Aeration Mixing System Brochure or Effluent Diffuser System Brochure.

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 No. 2,326,603