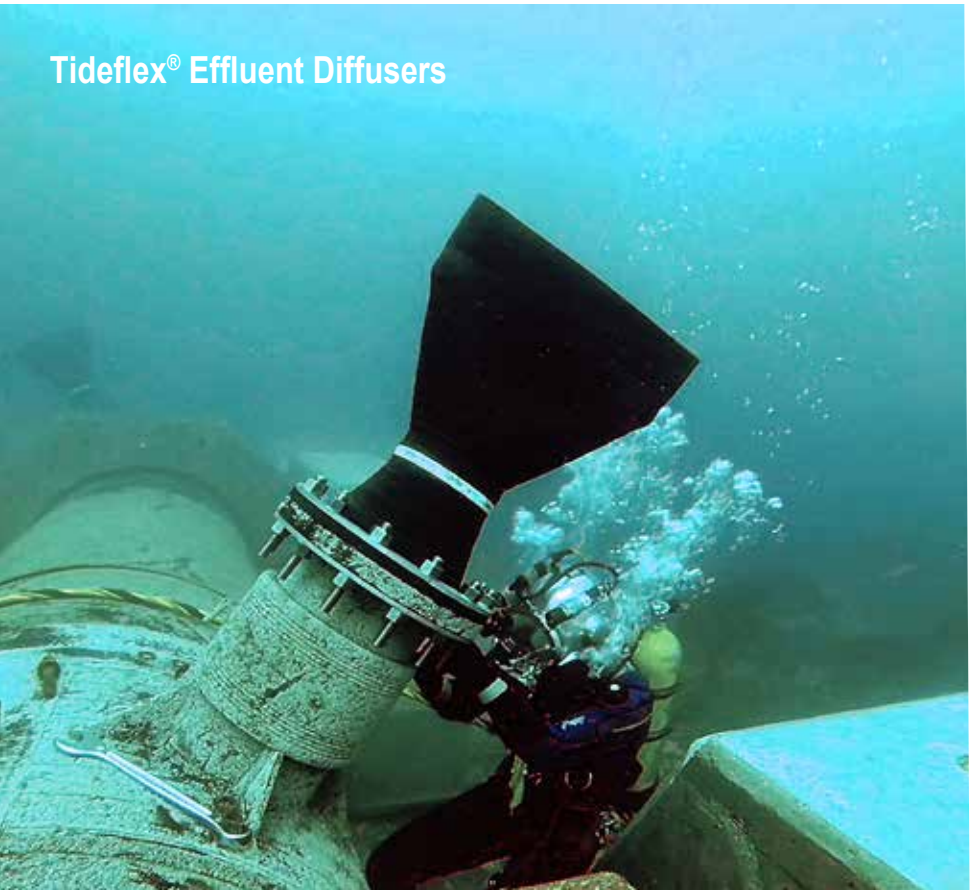
BROCHURE RV11.00-3
September 2024

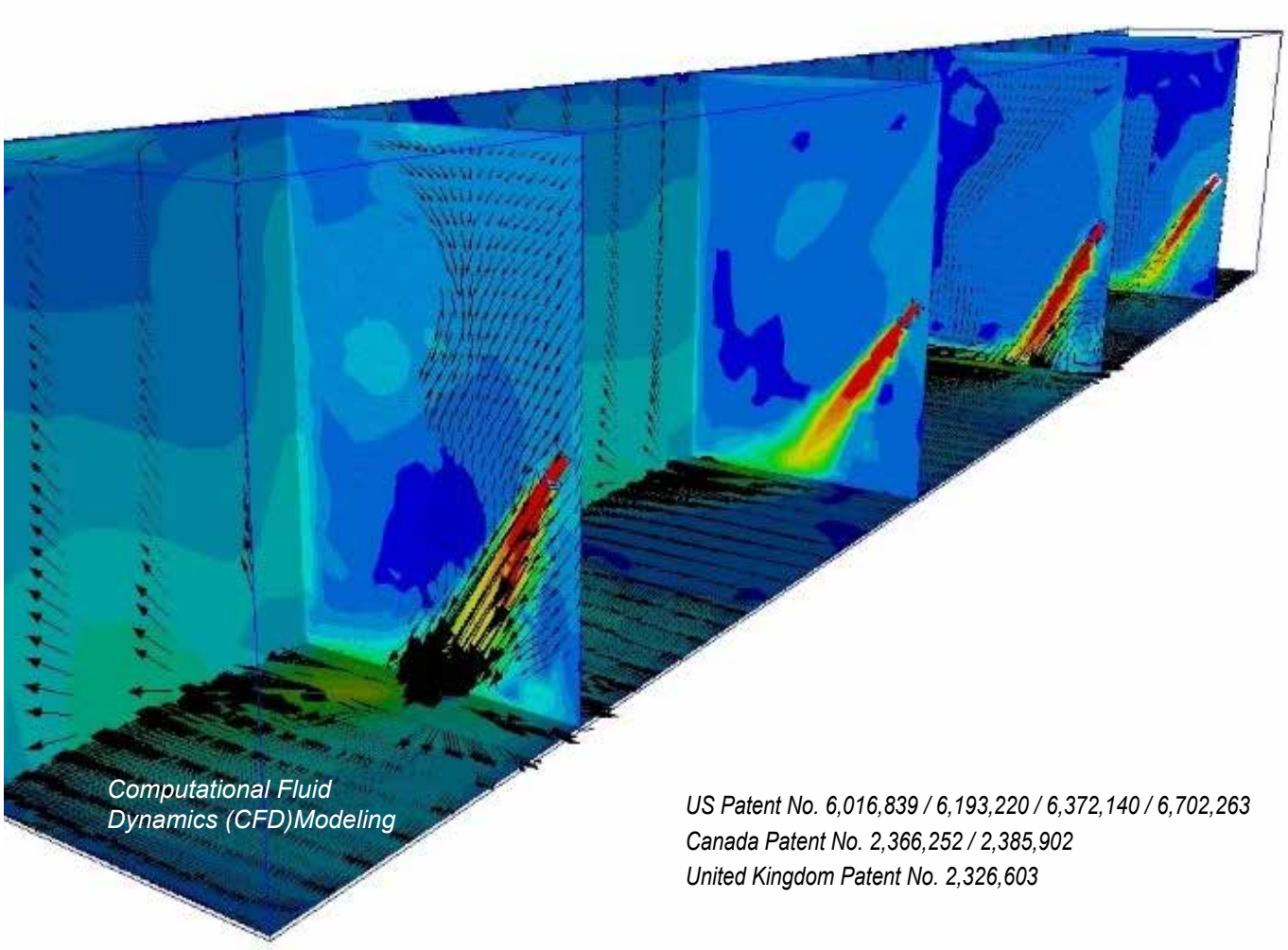

# Red Valve

## Tideflex® Multiport Mixing Systems





# Total System Solutions for Water and Wastewater Treatment Challenges



*Computational Fluid Dynamics (CFD)Modeling*

*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*

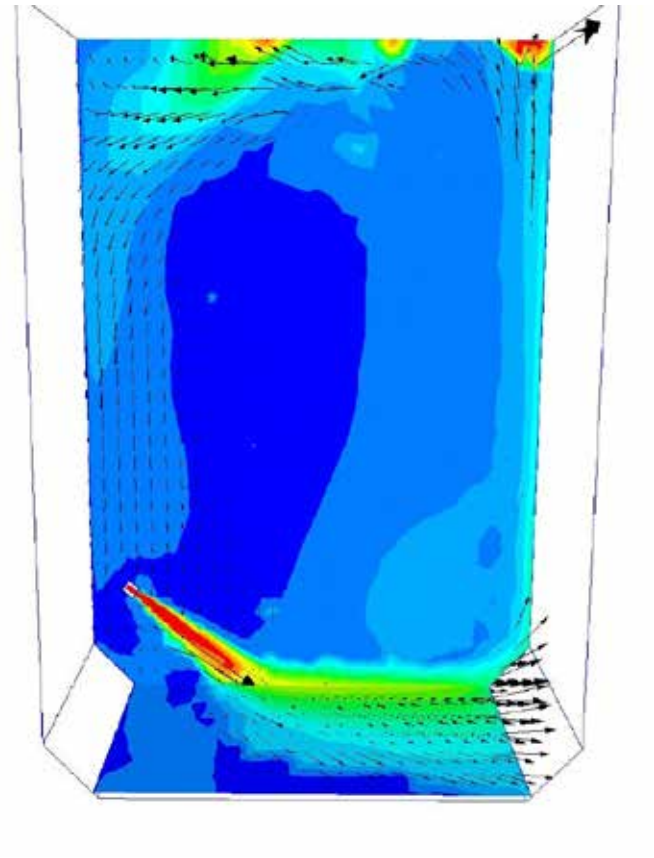
## Advanced Tools for Optimal System Design

Red Valve provides a total system solution for water and wastewater treatment plants and municipal collection and distribution systems. We provide 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.

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, calculating 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 CFD Model



**Velocity Gradient Design**
Mathematical Modeling

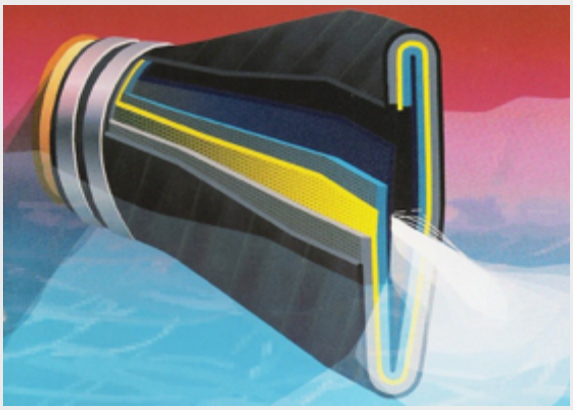
$$G = \sqrt{[\, P / (\mu * V)\,]}$$

G = Mean Velocity Gradient, 1/sec
P = Power Rate, ft-lbs/sec
μ = Dynamic Viscosity, lb-sec/sq ft
V = Liquid Volume, cu ft

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 refers to the applied energy. The variable is expanded for each type of mixing equipment to include all additional variables relevant to the specific 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



Tideflex® Check Valves and Nozzles are constructed of many layers of elastomer and fabric reinforcement. 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 head loss through the unit.

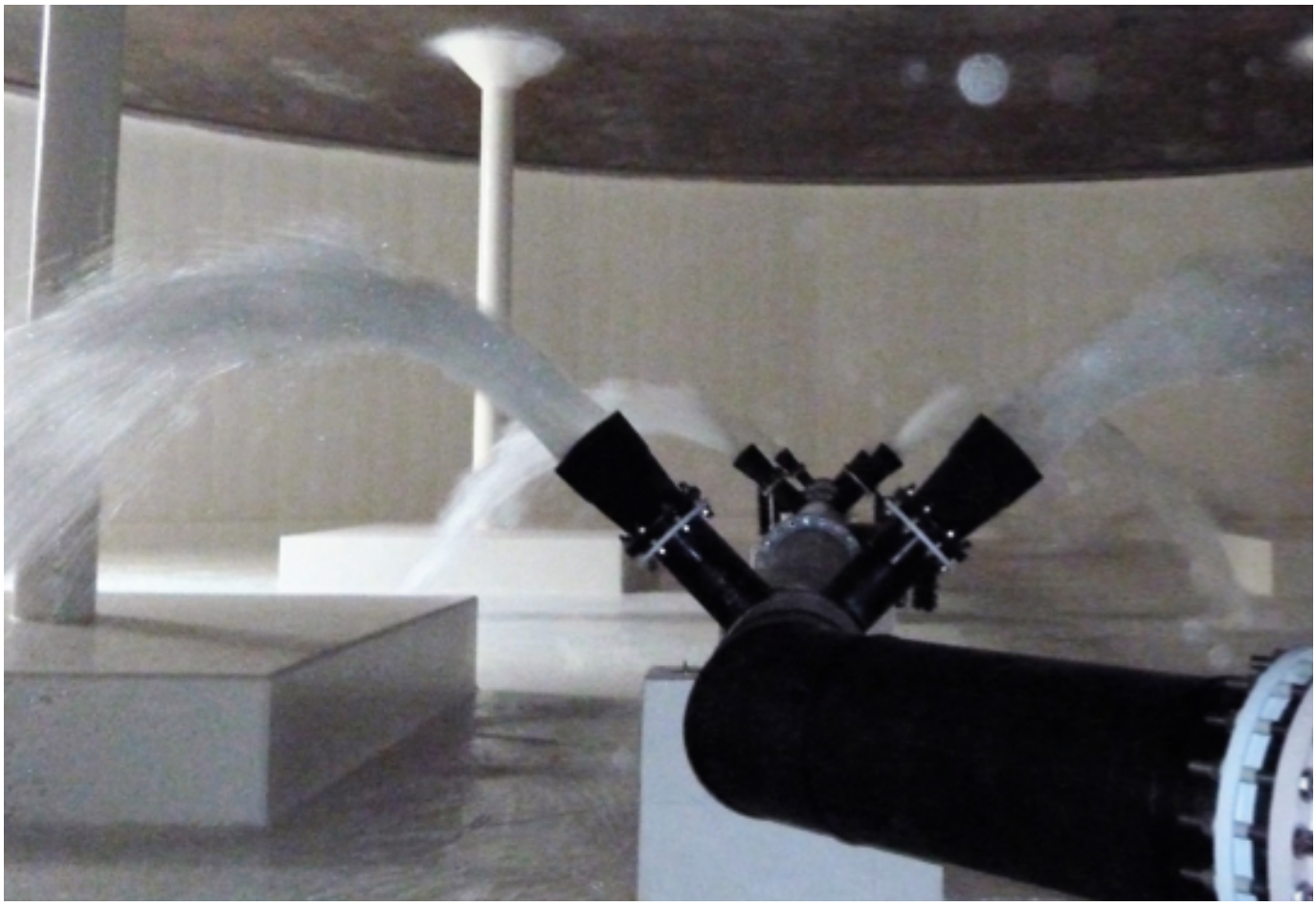
## Tideflex® Hydraulic Testing

Certified Hydraulic Testing by Independent Laboratories:

- NSF/ANSI/CAN 61 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 discharge velocity through the whole range of applied flow for the specific nozzle. Independent laboratory testing measured flow range and the dynamics of the nozzle at these rates (percent open area).

# Tideflex® Mixing Systems (TMS)



## Tideflex® Mixing Systems Eliminate Thermal Stratification and Stagnation in Potable Water Storage Tanks

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, requires virtually no maintenance, and has an average 30-year life span. It operates on existing differential pressure when the tank is fluctuated. For every tank and reservoir, Red Valve 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.

- For drinking water storage tanks
- Complete mixing and thermal stratification elimination
- Passive energy system
- Hydraulic mixing process; G = 10
- NSF/ANSI/CAN 61 certified
- Modeling method: CFD and scale models
- Benefits: higher disinfectant residuals, reductions of DBPs

*To learn more, download the Tideflex® Mixing System Brochure*

# Tideflex® Effluent Diffusers

## Tideflex® Effluent Diffusers for Mixing Treated Effluent Discharge into Receiving Water

The primary purpose of Multiport Effluent Diffusers is to mix effluent discharge with a receiving water body and achieve a target dilution within a designated mixing zone. Effluent Diffusers are designed with Tideflex® Nozzles to 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 an average 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, download the Tideflex® Effluent Diffuser Brochure*

# Tideflex® Aeration Mixing Systems

## Tideflex® Aeration Mixing Systems Provide Near Floor Discharge for Complete Mixing of Fluids with Settleable Solids

Tideflex® Aeration Mixing Systems are coarse bubble diffusers that 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 an average of 50%. Tideflex® Aeration Mixing Systems are virtually maintenance-free in high solids applications.

- Wastewater treatment (industrial and municipal)
- Oxygen transfer and supply system
- Active energy system (Blower)
- Air-lift mixing process; G = 130
- Modeling method: ASCE for O2, CFD for mixing
- Benefits: economical mixing method


*To learn more, download the Tideflex® Aeration Mixing Systems Brochure*

# Tideflex® Hydraulic Recirculation & Mixing Systems

## 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 and municipal)
- Anoxic and anerobic mixing systems
- Active energy system (recirc pump)
- Hydraulic mixing process; G = 40
- Modeling method: velocity gradient and CFD
- Benefits: mixing for anoxic and anerobic processes


*To learn more, download the*
*Tideflex® Hydraulic and Recirculation Mixing Systems Brochure*

*Red Valve offers a worldwide, world-class custom service network. With corporate offices in Pittsburgh, PA, manufacturing facilities in Gastonia, NC, and a network of sales representatives around the globe, Red Valve has the sales engineering team to help you select the best choice of valves and related products for your applications.*

Red Valve®

The World Leader in Pinch and Check Valve Technology™

750 Holiday Drive, Suite 400, Pittsburgh, PA 15220 | 412.279.0044 | support@redvalve.com | RedValve.com