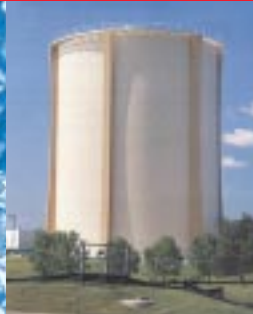


Tideflex

MIXING SYSTEM



FOR FINISHED WATER STORAGE FACILITIES



Red Valve

Tideflex® in Drinking Water Reservoirs Eliminate Stagnation

TIDEFLEX® MIXING SYSTEM

Finished water storage reservoirs have always had to contend with deterioration of water quality. Many reservoirs were designed solely to supply the required hydraulics of the distribution system, not necessarily to maintain water quality within the reservoir itself. The most common problem in reservoirs is the loss of chlorine or chloramine residual resulting from hydraulic short circuiting, poor mixing and circulation, poor turnover rate and excessive detention time. Stagnation and “dead spots” can lead to serious water quality issues such as the formation and multiplication of bacteria.

Reservoirs can be circular, rectangular or irregularly shaped with capacities from a few hundred gallons to 50 million gallons or more. Many of these reservoirs are designed with common inlet/outlets or inlets and outlets that are within close proximity to one another. In this case, water close to the inlet and outlet is turned over and has adequate residual, but hydraulic short circuiting leads to stagnation and dead spots outside the inlet/outlet area of influence. See Figure 1.

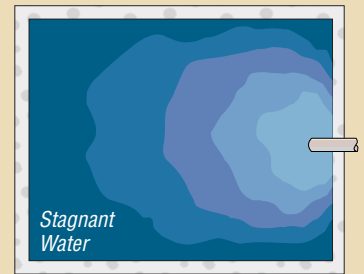
The Tideflex® Mixing System (TMS) was developed to eliminate stagnation and dead spots by preventing hydraulic short circuiting, improving mixing and circulation and optimizing turnover rate and detention time. See Figure 2.

The TMS is comprised of a manifold system with two sets of Tideflex® Check Valves. One set is used to fill the reservoir, and the second set is used to drain the reservoir. Tideflex® valves are completely manufactured of NSF-61-approved elastomers. The valves are passive, have no mechanical parts and require only differential head to operate — no outside energy source is needed. The Tideflex®, coupled with PVC, stainless steel, ductile iron or any other suitable pipe material, creates an effective mixing system that requires no additional equipment and requires little or no maintenance.

DESIGN ADVANTAGES

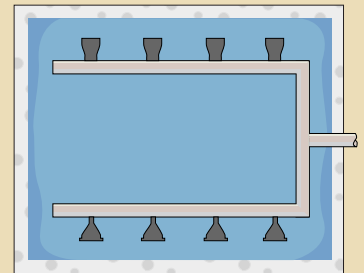
The TMS System can be installed in new or existing reservoirs without the need to modify the structure — no excavation and no taps into the reservoir. The TMS is simply connected to a single inlet/outlet on one side of the tank.

Figure 1 — Problem

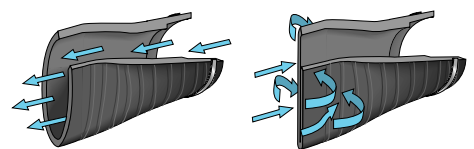


Red Valve CFD Modeling will demonstrate the fluid dynamics of the system.

Figure 2 — Solution

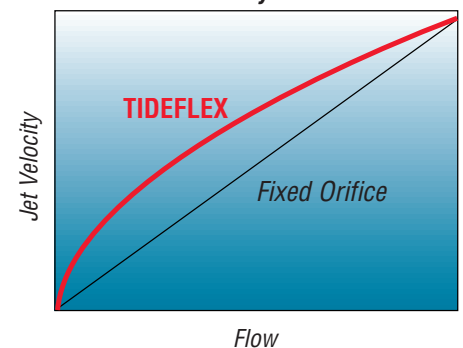


The entire TMS operates on differential pressure. The key is, this differential pressure is already in place and is used to fill and drain the reservoir. Compared to submersible mixers with high capital costs and high energy consumption, the TMS is very cost effective.



Engineered rubber check sleeves have memory: forward hydraulic pressure opens valve, and reverse pressure seals the valve and prevents backflow.

Jet Velocity vs. Flow



Tideflex variable orifice enhances jet velocity at all fill rates, optimizing mixing.

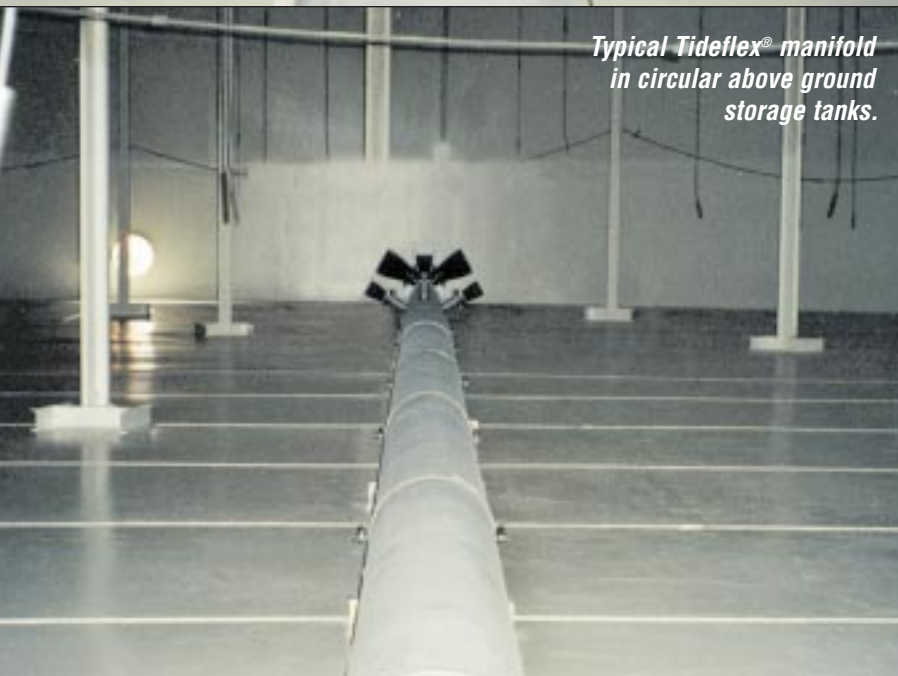
TIDEFLEX® MIXING SYSTEM (TMS)



*City of Antioch, Calif. —
3MG ground level steel
reservoir, (2) 12" Series 35 for
filling reservoir and mixing.*



(3) 4" Series 35 for mid-tank mixing.



*Typical Tideflex® manifold
in circular above ground
storage tanks.*

- Eliminates short circuiting, stagnation, and “dead zones.”
- Minimizes the amount of pipe and fittings required for a separate inlet and outlet.
- Improves mixing and circulation.
- Improves turnover rate.
- Utilizes the variable orifice of the Tideflex® valve to maximize jet velocity and mixing at all flow rates.
- Can be used with recirculation and rechlorination systems.
- Uses Tideflex® valves fabricated from NSF-61-approved elastomers.
- Operates on differential pressure; no external energy source required.
- Can be designed for new and retrofit applications, standpipes and elevated tanks.
- Flanged, slip-on or custom configuration. Systems 1/8"-96".

PROVEN PERFORMANCE ON:

- Circular reservoirs.
- Rectangular reservoirs.
- Elevated storage tanks.
- Standpipes.

OPERATION OF TMS RECTANGULAR RESERVOIRS

The Tideflex® Mixing System was designed to be simple, reliable and cost effective. The system makes use of the patented Tideflex® Check Valve and a simple piping manifold. This reduces cost by minimizing the amount of pipe and fittings required for a separate inlet and outlet. By discharging water from one side of the reservoir and draining from the other, the system ensures that the water supply is constantly “turned over” to avoid stagnation and dead zones.

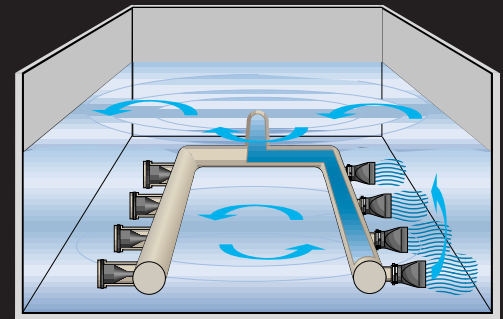


12" TF-2 discharging.

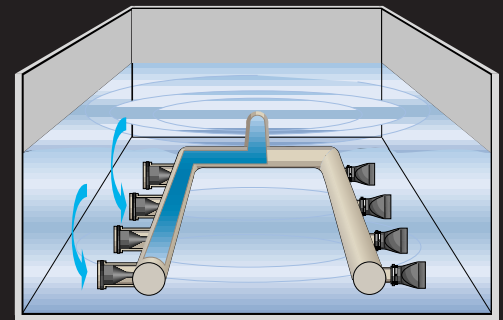
The mixing system works in two phases. When the reservoir is being filled (Figure 2a), the pressure of the water in the manifold forces the TF-2 or Series 35 “discharge” valves to open, and holds the Series 37 “drain” valves closed on the opposite side. When the reservoir is drained (Figure 2b), the head pressure above the manifold holds the discharge valves closed and forces the drain valves to open. This two-stage system ensures that the water is continually cycled.

The simplicity of the system makes it reliable, with no moving parts, electric motors, bearings or seals to maintain. There is no additional energy consumption and no equipment exposed to the elements. The system can be fitted as part of a new construction or easily retrofitted to an existing reservoir.

Figure 2



(a) Filling Sequence



(b) Draining Sequence

OPERATION OF TMS CIRCULAR RESERVOIRS

In circular reservoirs, a manifold pipe is extended across the reservoir to the far side. On the far side, TF-2 or Series 35 Check Valves are installed that open during filling of the reservoir and are closed during draining of the tank (Figure 3a). Tideflex® Check Valve is a variable orifice which discharges a high-momentum jet compared to open-ended pipes. Also, Tideflex® valves discharge an elliptically

shaped jet, not circular. The elliptical jet creates a strong sheer plane which also improves the mixing.

Since the reservoir is circular, the high-momentum jets discharged from the Tideflex® create turbulence that is carried around the circumference and across the entire cross section of the tank.

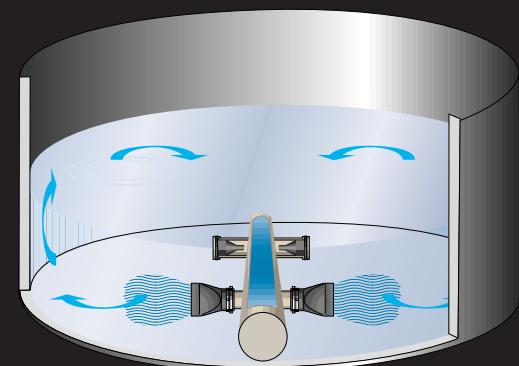
Draining is accomplished from the near side of the reservoir where the pipe enters. On this side, a “tee” is installed whereby multiple Series 37 Tideflex® valves are installed. These valves are closed during filling of the tank and open during draining of the tank (Figure 3b).

Figures shown are general representations. Custom designs are required for individual reservoirs based on tank design and operating conditions.

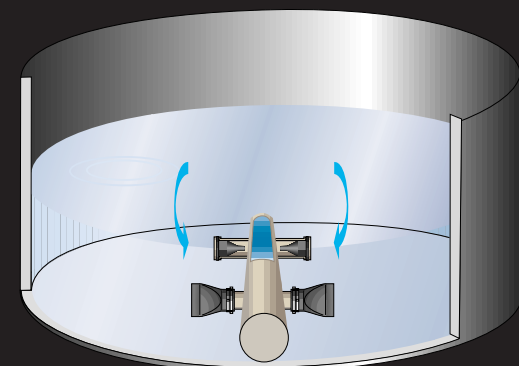


(2) 16" Series 37 as drain valves.

Figure 3



(a) Filling Sequence



(b) Draining Sequence

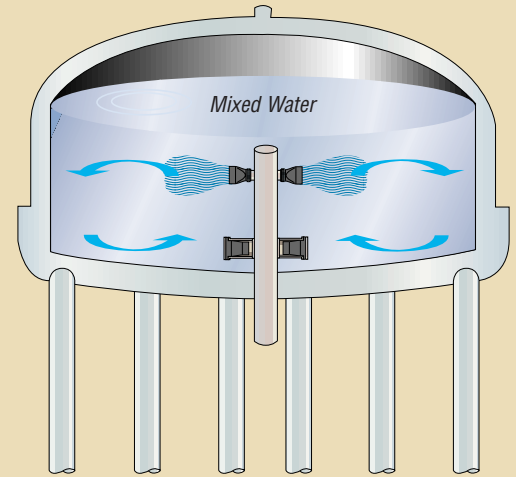
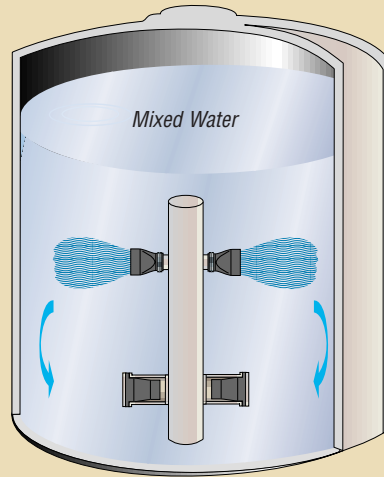
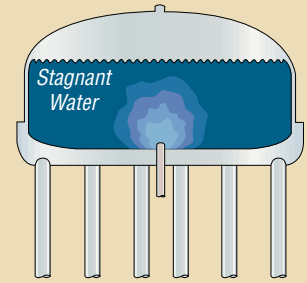
STANDPIPES AND ELEVATED STORAGE TANKS

Standpipes and elevated storage tanks also have potential problems with stagnation when they are filled and drained from a single location. Red Valve designs custom mixing arrangements for elevated storage tanks.

A TMS system can be supplied with conventional pipe materials, or it can be completely fabricated of wire-reinforced rubber similar to the construction of a truck tire. The rubber option is extremely useful in regions where freezing is a concern. Ice can easily damage plastic or even metal pipe. An all-rubber TMS remains flexible and cannot be damaged.



Custom "T" configuration for tank mixing.



TANK OVERFLOW PROTECTION

Tidflex® valves are installed on overflow pipes to prevent birds, insects and rodents from entering the storage tank and contaminating the water supply.

The Tidflex® all-rubber construction will not freeze, ensuring proper operation in all climates, including sub-zero temperatures.

Conventional flapgate valves have a history of freezing in the open or closed position due to temperature and/or corrosion, and they cannot be mounted in a vertical pipe without the aid of a spring.

The Tidflex® valve can also be supplied with an integral proximity switch to signal overflow events. The switch can be easily incorporated into SCADA systems.



Tideflex® Discharge

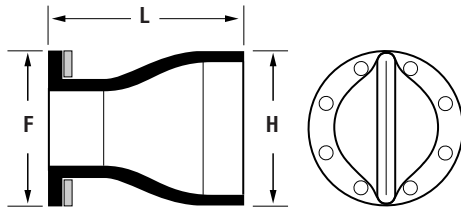
- ▶ 100% elastomer construction eliminates maintenance
- ▶ Will not warp or freeze open or shut
- ▶ Custom-built to customer specifications
- ▶ Lowest headloss
- ▶ No springs or moving parts
- ▶ Will not rust or corrode

Materials of Construction

- ▶ NSF-61-approved elastomer
- ▶ Stainless steel retaining ring or mounting band



Series 35



Series 35

| FLANGE SIZE (ANSI)* | FLANGE O.D. (F) | LENGTH (L) | BILL HEIGHT (H) |
|---------------------|-----------------|------------|-----------------|
| 1 | 3 1/2 | 2 1/2 | 1 1/2 |
| 1 1/2 | 5 | 6 | 3 |
| 2 | 6 | 6 | 4 |
| 2 1/2 | 7 | 8 | 5 |
| 3 | 7 1/2 | 9 | 5 1/2 |
| 4 | 9 | 12 | 7 |
| 5 | 10 | 15 1/2 | 9 |
| 6 | 11 | 16 | 10 1/2 |
| 8 | 13 1/2 | 16 1/2 | 13 |
| 10 | 16 | 21 1/2 | 17 |
| 12 | 19 | 26 1/2 | 20 1/2 |
| 14 | 21 | 26 | 22 |
| 16 | 23 1/2 | 26 | 27 |
| 18 | 25 | 30 | 29 |
| 20 | 27 1/2 | 33 | 33 |
| 22 | 29 1/2 | 36 | 33 |
| 24 | 32 | 39 | 37 |
| 30 | 38 3/4 | 42 | 50 |

* Larger pipe sizes available to 96".
Numbers indicate maximum dimensions in inches.

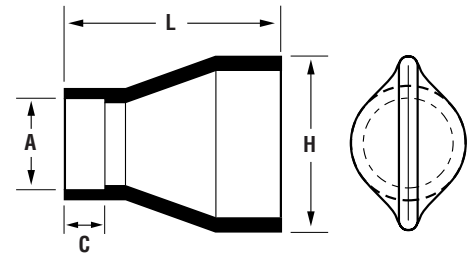
Two discharge valve options are available for the TMS: the Tideflex® TF-2 Slip-On Check Valve and the Series 35 Flanged Check Valve. Both offer extremely low headloss to keep pumping costs at a minimum. Both offer all-rubber construction for unsurpassed corrosion protection, resistance to freezing and maximum service life.



TF-2

The TF-2 is designed to slip onto the end of the discharge ports. The cuff of the TF-2 is constructed to exactly match the outside diameter of the pipe. Solid stainless steel bands are provided to secure the valve to the pipe. Additional pins can be installed for added security.

The Series 35 is provided with an integral flange, constructed entirely of rubber so no additional gaskets are required. Stainless steel backup rings are provided for a secure connection. The flange of the Series 35 can be drilled to ANSI or metric specifications, and special oversized and square flanges are available for retrofit applications.



TF-2

| PIPE O.D.* (A) | LENGTH (L) | BILL HEIGHT (H) | CUFF LENGTH (C) |
|----------------|------------|-----------------|-----------------|
| 3/4 | 3 | 1 1/2 | 1 |
| 1 | 3 | 1 1/2 | 1 |
| 1 1/2 | 6 | 3 | 1 |
| 2 | 6 | 4 | 1 |
| 2 1/2 | 8 | 5 | 1 |
| 3 | 9 | 5 1/2 | 1 1/2 |
| 4 | 12 | 7 | 1 1/2 |
| 5 | 15 1/2 | 9 | 2 |
| 6 | 16 | 10 1/2 | 2 |
| 8 | 16 1/2 | 13 | 2 |
| 10 | 21 1/2 | 17 | 3 |
| 12 | 26 1/2 | 20 1/2 | 4 1/2 |
| 14 | 26 | 22 | 4 |
| 16 | 26 | 27 | 5 |
| 18 | 30 | 29 | 6 |
| 20 | 33 | 33 | 8 |
| 22 | 36 | 33 | 8 |
| 24 | 39 | 37 | 8 |

* Larger pipe sizes available to 96".
Numbers indicate maximum dimensions in inches.

Tideflex® Drain

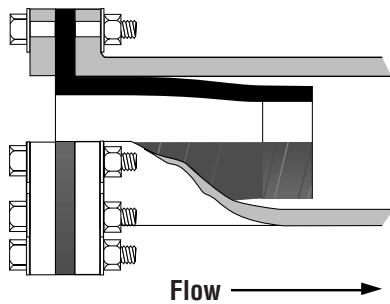
- ▶ Features unique maintenance-free, one-piece elastomer check-sleeve design
- ▶ ANSI Class 125 Flanges, DIN PN6, PN10, PN16
- ▶ 100% elastomer construction
- ▶ Will not rust or corrode
- ▶ Will not warp or freeze open or shut

Materials of Construction

- ▶ NSF-61-approved elastomer
- ▶ Stainless steel retaining ring



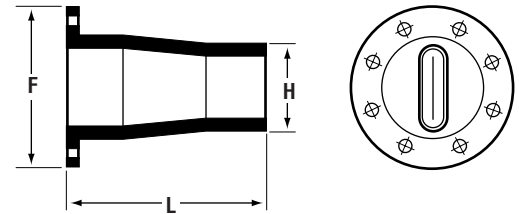
Series 37



The drain valve of the TMS is the Series 37 Inline Check Valve. The Series 37 features all-rubber construction, no moving parts and the patented Tideflex® “duckbill” design for maximum back-flow prevention.

The bill of this valve is designed to slip inside of the drain port, secured by an integral flange. Stainless steel backup rings are provided to complete the installation. The flange can be drilled to ANSI or metric specifications.

The pressure drop of the Series 37 is increased due to the smaller inside diameter required to fit the valve inside of the pipe. Red Valve recommends increasing the diameter of the drain ports to compensate.



Series 37

| PIPE I.D.* | BILL HEIGHT (H) | LENGTH (L) | FLANGE O.D. (F) |
|------------|-----------------|------------|-----------------|
| 2 | 1 7/8 | 4 3/4 | 6 |
| 3 | 2 7/8 | 5 3/8 | 7 1/2 |
| 4 | 3 7/8 | 7 1/8 | 9 |
| 6 | 5 7/8 | 11 | 11 |
| 8 | 7 7/8 | 12 1/4 | 13 1/2 |
| 10 | 9 7/8 | 15 1/4 | 16 |
| 12 | 11 7/8 | 18 1/4 | 19 |
| 14 | 13 3/4 | 21 1/2 | 21 |
| 16 | 15 3/4 | 22 3/4 | 23 1/2 |
| 18 | 17 3/4 | 23 3/4 | 25 |
| 20 | 19 3/4 | 31 3/4 | 27 1/2 |
| 24 | 23 3/4 | 37 | 32 |
| 30 | 29 3/4 | 40 1/4 | 38 3/4 |

* Larger sizes available upon request; actual pipe I.D. must be specified for proper fit. Numbers indicate maximum dimension.



Red Valve

The World's Leading Manufacturer And Supplier Of Pinch Valves



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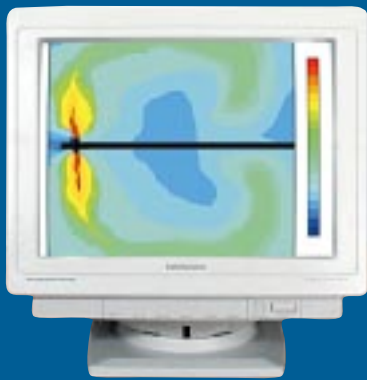
RECYCLABLE PAPER

RVTMS-7789 6/2000 5M

3D COMPUTATIONAL FLUID DYNAMIC MODELING (CFD)

The Red Valve engineering team can provide charts with manifold design and CFD Modeling for Tideflex® Mixing Systems. The modeling will reveal the limitation of the existing system and demonstrate the mixing dynamics.

- ▶ Feature particle tracks showing overall flow pattern of reservoir
- ▶ Contain plots of velocity and pressure distribution
- ▶ Velocity vector plots show the direction and magnitude of flow



Are you currently designing a reservoir project?

- Reservoir — New
- Reservoir — Retrofit
- Standpipe
- Elevated Storage Tank

- Have a local representative contact me.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

E-mail _____

Tideflex® Product Line

Check Valves

- ▶ Maintenance-free design
- ▶ Seal around debris
- ▶ Long service life



Effluent Diffusers

- ▶ Prevent intrusion of debris
- ▶ Increase initial dilution
- ▶ Maintain peak performance



Air Diffusers

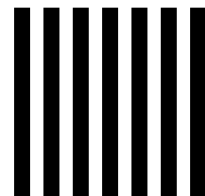
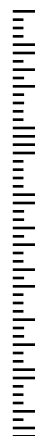
- ▶ Non clogging designs
- ▶ Fine or coarse bubble
- ▶ Improve mixing action



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