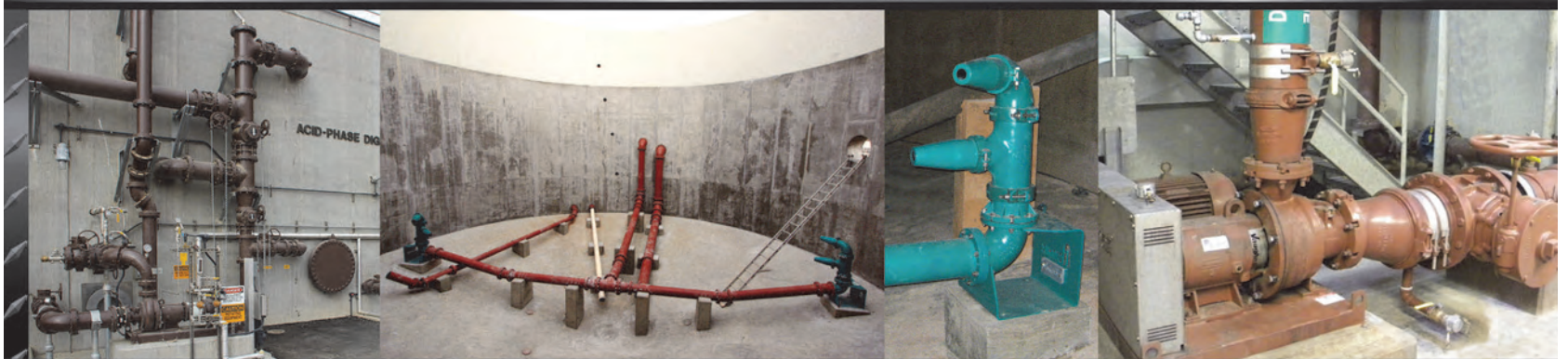




Rotamix[®]

Process Mixing Systems



Unmatched Reliability
Vaughan[®]

What is ROTAMIX[®]?

Vaughan's Rotamix[®] System is today's most cost effective means of mechanical hydraulic mixing, consisting of an engineered arrangement of floor-mounted nozzles fed by a Vaughan[®] Chopper Pump. Using custom engineering software, each application is analyzed and sized by Vaughan[®] in order to achieve the desired mixing effect. The Rotamix[®] system may be applied in circular, rectangular, oval tanks and basins and other unique process configurations such as egg-shaped digesters, CSO tunnels and pump stations.

The Concept

The Rotamix[®] System incorporates several basic principles of physics and hydraulics, including uniform field of flow, vortical field of flow, induced flow and surface contact. Combined together, this unique mixing system optimizes solids and bacteria contact while creating an even distribution of mixing energy.

Dual-Zone Mixing

- Uniform field creates velocity at outside perimeter
- Vortical field creates velocity at center, resuspending solids migrating towards the center of the tank
- Uniform & Vortical fields create "Dual-Zone Mixing"

Surface Contact

- Reduced solids size from Vaughan Chopper Pump enhances solids contact with helpful bacteria
- Increased VSR results in increased gas production

Why Choose Rotamix[®]

- Over 1000 systems installed since 2000
- Vaughan's[®] UNMATCHED RELIABILITY and expertise as a solids handling specialist since 1960
- Process expertise in understanding each application
- Engineering support using state of the art CFD software
- Process testing successes
- Chopping action increases exposed surface area and resulting biological contact for improved volatile solids reduction
- Dual nozzles provide multiple discharge points, reducing piping costs while evenly distributing sludges
- Actual sludge rheologies are used to produce the most accurate analysis and design
- Continued Service and Support

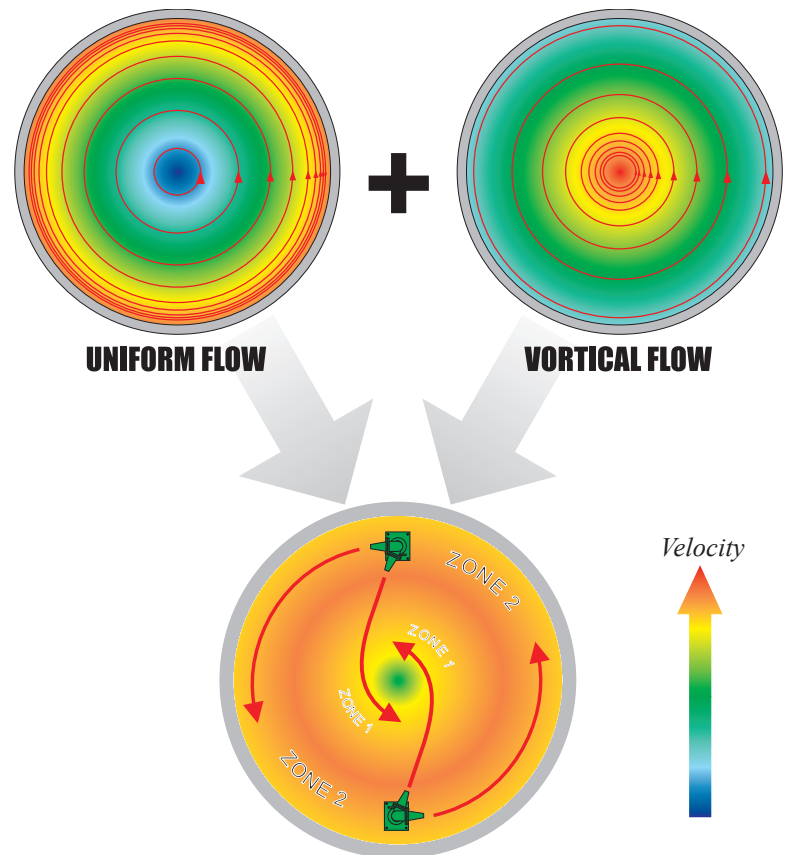


Figure 1 - Dual-rotational zones

SYSTEM COMPONENTS

ROTAMIX® MIXING ASSEMBLIES

- Offered in single and double nozzle configurations
- Designed for permanent fixed installation - no moving parts in the tank
- 1" thick glass lined nozzle barrels protect against effects of abrasion, corrosion and struvite formation
- All mixing assembly components are glass lined with 73 Rockwell C hardness
- Exterior coated with 3M Scotchkote Fusion Bonded Epoxy
- Mixing assemblies include a 10-year full warranty
- Stainless Steel and High Density Polyurethane materials available for corrosive applications



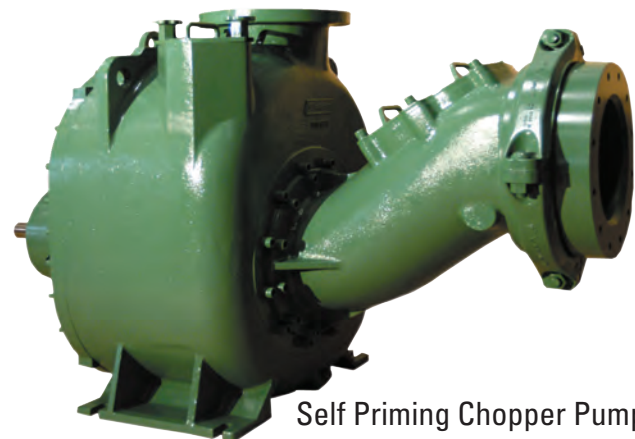
VAUGHAN® CHOPPER PUMPS

- Reliable chopping action reduces solids size
- Oversized shafting and bearings extend pump life
- Conditioning of solids increases surface contact and enhances volatile solids destruction
- Over 50 years of expertise behind every pump

AVAILABLE PUMP CONFIGURATIONS

Pumps are available in configurations to fit site specific applications:

- Horizontal or Pedestal end suction
- Submersible (with available recirculation feature)
- Self Primer
- Vertical Wet Well





PROCESS MIXING SYSTEMS

Wastewater

- Anaerobic Digesters
- Sludge Storage Tanks
- Sludge Blend / TWAS Tanks
- Bio-Solids Blend Tanks
- FOG Reception & Blend Tanks
- Acid Phase Digesters
- Egg Shaped Digesters
- Equalization Basins
- Influent Channels
- Pump Stations
- Skimmings & Wasting Pits
- CSO Tunnels
- Anoxic Zones
- Septage Receiving Tanks
- Thermal Hydrolysis Tanks



Water

- Alum Sludges
- Lime Slurry Storage
- Ground Water Storage

Industrial

- Anaerobic Digesters
- Pulp & Paper Black Liquor
- Refinery Waste Containment, API Sludges
- Textile Waste
- Mining Fine Solids Suspension
- Biowaste / Renewable Energy

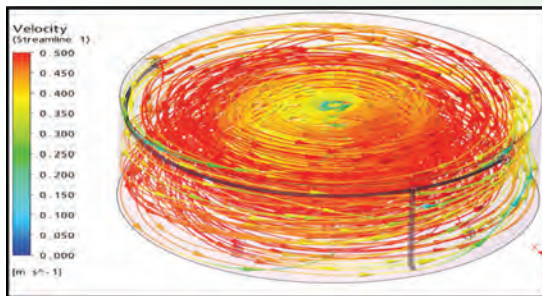
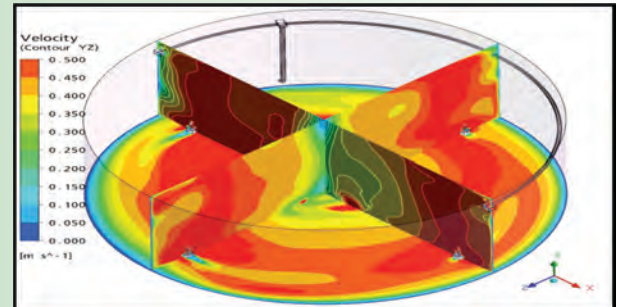


APPLICATIONS



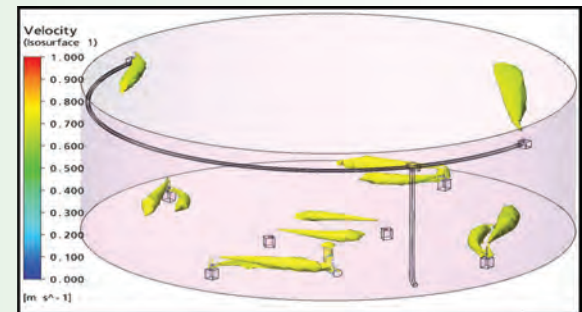
COMPUTATIONAL FLUID DYNAMIC (CFD) ANALYSIS, computer flow simulations generated in-house with over 1,000 wastewater and bio-solids systems evaluated since 2001. Analyses are based on specific customer requirements and sludge rheologies. Vaughan® Company CFD Analysis can also include a Tracer Washout Testing simulation for digesters, proven to be over 97% accurate when evaluated against actual field testing.

VELOCITY PLOTS shown as cross sections through quadrants of this tank indicate evenly distributed mixing energy throughout the tank.



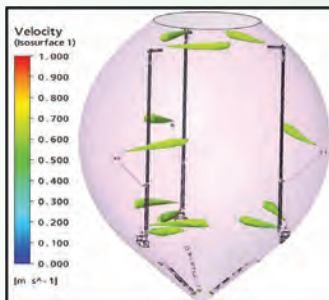
PATHLINE PLOTS illustrate the actual path of flow for a particle starting at any given point, confirming both horizontal and vertical movement generated in the pattern.

ISO SURFACE PLOTS illustrate the effect of the high velocity nozzle plumes as they drive tank mixing. Dual nozzles provide multiple discharge points to create even mixing.

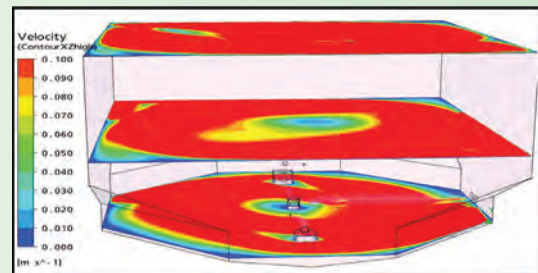


OTHER GEOMETRIES

EGG SHAPED DIGESTERS in spite of their height are effectively mixed at all levels by Rotamix®.



RECTANGULAR TANKS usually require additional mixing energy depending on the rheology of the sludge in each application.



Foambuster / Foam Suppression System



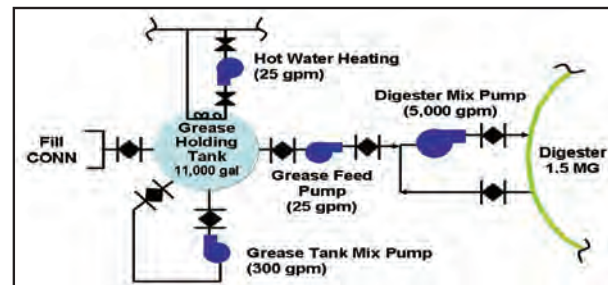
FEATURES / BENEFITS

- Evenly disperses droplets over moving surface in anaerobic digesters
- Helps to control digester upsets
- Optional scum nozzle re-suspends floatables & prevents stratification
- Use with Rotamix® or add to existing mixing systems to minimize foam and/or scum buildup



FOG (Fats, Oils and Grease) Enhanced Digestion System

“JET FUEL FOR DIGESTERS” is how it’s described. Using the Rotamix® System, food waste from restaurants (fats, oils, grease and waste produce) is received, blended and fed to anaerobic digesters. Increased methane production and subsequent cogeneration can satisfy the electrical needs of the plant without having to purchase outside power. The added benefit? Waste that would normally end up in the landfill is utilized to produce power.



Assured Quality and Performance

- Quality mixing and solids handling experience since 1960
- **Guaranteed Performance***
- **10 year full nozzle warranty ***
- Verifiable with CFD modeling
- Passes chemical dispersion tracing (Lithium, Aluminum Chloride) and other performance tests including temperature profiling analysis and total solids concentration profiling

Rotamix® System Advantages

Energy

- Ability to intermittently mix tanks after long periods of storage, offering power savings
- Allows intermittent operation of conventional process systems, further reducing energy costs
- FOG Systems enhance methane production for cogeneration
- Reduced energy alternatives (using variable frequency drives) can provide additional energy savings and process control

Operation

- Complete system conditions solids for better digestion
- Efficient mixing optimizes chemical consumption in sludge dewatering applications
- Operates without liquid level dependency
- Meets or exceeds requirements for high rate digester designs

Maintenance

- No scheduled nozzle assembly maintenance required
- No rotating equipment within the process
- Vaughan® Chopper pump with flushless seal, eliminates costly seal water stations
- Reduces confined space entry into tanks for maintenance
- Hardened parts throughout provide protection against abrasion

Capital Costs

- Ability to mix multiple tanks using only one pump
- Ability to fill, mix and transfer using only one pump
- No access walkways, platforms or hoists required
- Complete installed Rotamix® System typically costs less than equipment alone for other types of mixing systems
- Potentially reduces aeration requirements
- Easily retrofits into existing tanks
- Ability to work with flat floor design reduces construction costs
- Optional assemblies to control scum and/or foaming

* Contact Vaughan® for further details.

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For all current patents, please see <http://www.chopperpumps.com/patents.html>



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