LM™ (Linear Motion) Mixer

Mixing in Wastewater Applications

Key features & benefits

- Unbeatable payback times compared to legacy mixing technologies
- Can be designed to mix the more viscous fats, oils, and greases
- Applicable to anaerobic digesters, sludge holding tanks, and equalization basins
- Eliminates cavitation and vortexing
- Easily retrofitted into existing vessels
- Resuspends grit and reduces foaming and scum formation
- Shearing effect lowers viscosity of thick sludge

How we create value

- Up to 70% less power required than conventional mixers
- Significant maintenance savings, requiring less man-power
- Efficient mixing in any tank geometry
- Flexible design to suit all applications
- No need for multiple units or baffles for deep tanks
- Installation costs are a fraction of legacy mixing systems

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The Problem
Mixing technologies are challenged to their limits throughout the wastewater industry, but especially in the area of sludge handling. Anaerobic digestion tanks (containing sludge full of grit, rags and other extraneous materials) are expected to receive thorough and complete mixing to ensure uniform temperature, solids distribution and microorganism contact with incoming sludge to increase gas production and destruction of solids. Sludge storage tanks are also challenging to design, because it is necessary to avoid stratification and thixotropic conditions of the digested sludge over lengthy storage times. Many existing plants would like to receive fats, oils and greases (FOG), requiring an upgraded mixing system to convert the more viscous sludge to energy. The LM™ mixer is designed to mix these viscous slurries.

Achieving good mixing under these conditions typically requires supplying sufficient equipment to create multi-point mixing areas of influence. However, this results in higher power expenditures. The LM mixer uses up to 70% less energy than these conventional mixers.

How it Works
LM mixers offer solutions to the challenges of mixing wastewater in both thin sludge and thick sludge applications.

Independently run and reported full lithium chloride tracer test studies and Computational Fluid Dynamic (CFD) analyses have shown that LM mixers provide homogeneous mixing by creating a turbulent liquid-core of micro and macro eddy currents. These currents are accelerated rapidly through the central opening of an oscillating ring shaped hydro-disk. This disk moves up and down through the mixed liquid and creates the distinctive linear motion displacement-mixing action of the LM mixer.

The frequency, stroke and size of the hydro-disk control the force and velocity of the liquid core. The LM mixer oscillating motion produces a flow pattern that approaches nearly isotropic (uniform) mixing and does not display the turbulence intensity or vortices of rotary mixers. Additionally, LM mixers operate by using pulsating pressure waves in conjunction with the oscillating velocity. In this type of concurrent action the oscillating pressure wave and velocity are coupled together to enhance mass transfer and produce a uniform mixture of the tank's contents.

The LM mixer can be custom designed to meet a variety of mixing demands by varying the frequency, stroke and disk size.

Creating Value

LM™ Mixers Save Energy
LM mixers feature an innovatively engineered internal cam design, which helps to transmit energy from the drive motor to the liquid extremely efficiently. Unlike conventional mixers, which require large gear boxes or heavy balanced drive shafts, all LM mixers are designed to use available gear boxes with output speeds specific to each application. The LM mixer's efficiency allows the use of smaller motors, significantly reducing annual energy usage and operating costs.

LM™ Mixers are Operator Friendly
The LM mixer is designed with ease of maintenance in mind by allowing safe and easy access to the hydro-disk and drive shaft. The disk and shaft can easily be removed, changed, cleaned and repositioned without interfering with the drive mechanism housing. The main mechanical elements of the drive mechanism are easy to access, as there are no components located below the mounting plate. Wear on those items is reduced by the close alignment of all pieces of equipment, minimizing the torque forces applied to them and ensuring a long service life.

The LM mixer stroke, frequency, disk size and location are all pre-set to provide the most efficient mixing at varying liquid levels. Due to the LM mixer's durable, light-weight construction no damage will occur to the electrical or mechanical system during dramatic and unexpected liquid level fluctuations.

The LM mixer is available in various sizes, ranging from a 10 inch (254mm) stroke length up to a 24 inch (610mm) stroke length. Disk sizes range from 72 inches (1829mm) outside diameter (OD) to 96 inches (2,438mm) OD. Longer strokes are available for very deep tanks. Wetted parts can be fabricated from either epoxy-coated mild steel or stainless steel, and are precision machined to ensure long lasting, reliable service.

The Result of a Partnership
Ovivo is the exclusive licensee of this worldwide patented technology, owned by Enersave Fluid Mixers for the North America municipal sludge market.

Enersave has improved and developed the LM mixer through mixing applications in mining, industrial and municipal industries. Ovivo now utilizes their experience to deliver this innovative solids mixing technology.

Ovivo specializes in the design and supply of equipment used in the treatment of municipal and industrial water and wastewater (including water reuse), as well as large scale water intakes for the power and desalination markets. Our products include MBR, screening, sedimentation, filtration, aerobic and anaerobic digestion, as well as aeration systems and equipment that are recognized and used around the world. The water and wastewater industry has trusted our products for over 100 years through the use of our different brands, such as Eimco Water Technologies (EWT™), Enviroquip®, Brackett Green® and J+A™.

Features and Benefits

LM™ mixers provide the following benefits:

- Design flexibility to meet the most demanding mixing applications
- Excellent for retrofits in existing applications and digesters
- Avoids the issue of cavitation and vortices found in other systems
- Uses up to 70% less power than conventional mixers
- Design tested in sludge mixing applications
- Mixes with less energy, providing significant energy savings
- Employs a strong, light-weight, reliable design
- Can be modeled by CFD analyses

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