ForuMix™

High-Efficiency Mixer

Featuring advanced modulated inline mixing technology, the ForuMix multiphase mixer simplifies and enhances crude-water mixing and separation operations. It evenly disperses uniform drops of injection fluid into the main process flow to support high-efficiency mixing and flow homogeneity. This dramatically enhances mass transfer between flows and aids in downstream flow separation.

The ForuMix is designed to be flexible, compact, and low-maintenance with a low-pressure drop. It effectively reduces chemical, energy, and water consumption, delivering a high return on investment.

ForuMix offers the oil and gas industry's most advanced and adjustable multiphase mixer, designed explicitly for dual-fluid mixing.

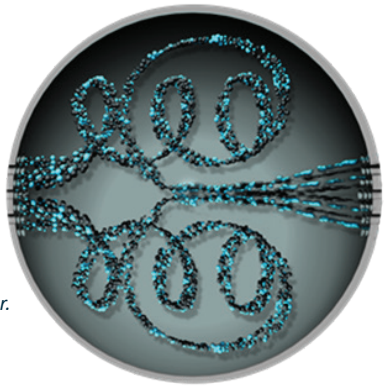
What makes ForuMix unique?

The unique design of ForuMix creates homogeneous, adjustable shear force over the entire cross-section of process flow. Holes arranged on the mixer's inlet and outlet generate even droplets that significantly increase interfacial contact area, enhancing mass transfer between different flows. It also generates moderate, efficient turbulence inside the internal mixing sphere, which improves mixing efficiency and flow homogeneity with a low-pressure drop.

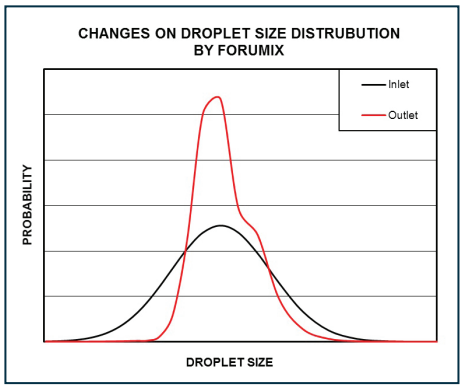
The highly adjustable internal sphere can automatically or manually rotated to open/close the holes. This accommodates flow fluctuations and regulates mixing/pressure changes while producing an optimal droplet size range—maximizing mixing and separation to produce uniform mixing and better downstream separation.

How does ForuMix compare with traditional mixing technologies?

Traditional inline mixing technologies inherently produce extreme, non-homogeneous local shear forces. Unlike traditional inline mixing technologies, such as static mixers, mixing valves, or dynamic mixers, ForuMix utilizes process flow momentum along with its unique structure of internal mixing element to produce evenly sized droplets and symmetrical turbulent eddies inside the internal mixing sphere to achieve homogeneous flow condition with no dead mixing space. Traditional mixing technologies yield higher pressure drops combined with non-homogeneous shear forces, which generate undesired stable emulsions and inefficient mixing.



Flow path inside the ForuMix high-efficiency mixer.



ForuMix technology utilizes the main process flow momentum to create turbulent eddies inside the internal mixing sphere. These eddies efficiently enhance the mixing process, creating evenly sized droplets with little power consumption.

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ForuMix Benefits

- Adjustable degree of mixing
- High-efficiency mixing throughout the whole operation range (high turndown)
- High-efficiency multiphase mixing
- Low emulsion formation and high-efficiency separation
- Reduced pressure drop (25%-60% lower than traditional mixing devices)
- No dead mixing space
- Reduced chemical/water consumption
- Orientation-free installation
- Compact design with a small footprint
- Low installation cost and high return on investment
- Low maintenance

Applications

ForuMix adds value to any process that needs homogenous mixing or increased contact surface area between two or multiple mixing fluids (e.g., absorption, extraction, dispersion, and drying).

Crude Desalting and Dehydration

Wash water injection/mixing into crude oil is at the core of the desalting/dehydration process. ForuMix efficiently utilizes wash water and chemicals, enhances salt content removal, and improves crude water separation. During the desalting process, salt mass transfer between the oil-water phases is maximized, and separation is improved, leading to less carryover of basic sediment and water, oil-in-water, and salts.

Liquid-Liquid Mixing

ForuMix provides moderate but effective mixing of two liquid streams, such as oil-oil, oil-water, or water-water, to produce a homogeneous mix at any phase of the process.

Chemical Injection

By providing high fluid exposure among different flows, ForuMix improves the performance of production chemicals—emulsion breakers, scavengers, inhibitors, and others—typically found in the crude oil treatment train. It also greatly mitigates overdosing, thus lowering operating expenses and improving the overall downstream process.

Multiphase Mixing

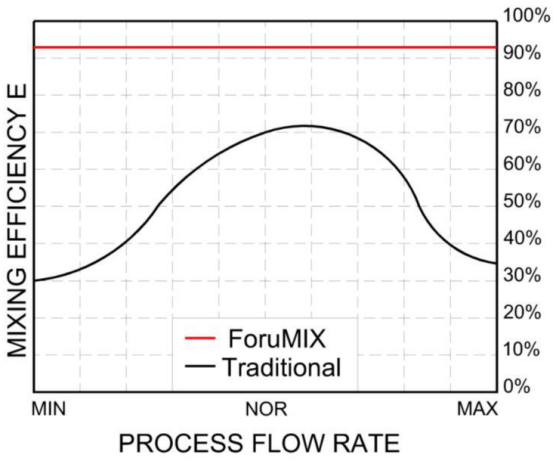
In addition to one-phase (oil-oil, water-water) or two-phase (liquid-liquid, oil-water) flows, ForuMix also efficiently mixes multiphase flows (oil, water, gas). Homogeneous multiphase mixing is essential for accurate sampling in quality control and production monitoring activities. It can also enhance gas injection performance into the liquid flow, such as induced-gas flotation units in the produced water treatment chain where gas is injected and mixed with water flowing into a flotation tank. The homogeneous mixing between gas and water makes the even bubble distribution and surface areas required to collect water-suspended matter.

Standard Features

- Carbon steel (A105N) body
- Stainless steel (A182-F316) internals
- Easytork® vane actuator (EVA)
- Size range: 4-36 inches
- Process flow range: 20,000-400,000 BPD
- Pressure rating: 150#-600#

Custom Features

- Size range: 4-42 inches
- Pressure rating: 150#-4500#
- Extensive range of materials: stainless steels including austenitic, Alloy 20, Alloy 990, duplex/superduplex; MONEL®, INCONEL®, INCOLOY®, nickel, titanium, HASTELLOY® B/C, zirconium



Mixing Efficiency vs. Flowrate Graph

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