

AQUA SHEAR® Drilling Fluids Mixing System

A Better Solution

FPT

Flow Process Technologies, Inc.



AQUA SHEAR®

The most effective and economical means of hydrating polymers... improved mixing with no product damage

Viscosity action of mud polymers is dependent upon the molecular length of the hydrated polymer chains. Mechanical shearing devices can break these fragile chains, *causing irretrievable loss of viscosity.*

The AQUA SHEAR mixing system utilizes hydraulic shear rather than mechanical. The system has no moving parts and operates at low pressure. The shear is provided by the interaction of opposed counter-rotating fluid streams entering a cylindrical chamber through precisely sized and positioned nozzles in the plates of each end of the mixing chamber.

The result is more thorough mixing with virtually no product damage.

Provides instantaneous dispersion and full hydration of clays

The AQUA SHEAR system provides better surface wetting of colloidal materials independent of particle shape. The AQUA SHEAR system eliminates the need for product settling in the mixing tank. The well dispersed mixture moves immediately from the mixing chamber, providing a fully uniform, blended product. With its thorough mixing and even distribution of additives, it speeds up the treatment process and provides full utilization of expensive additives.

Creates a tighter, more stable invert emulsion in oil-based/synthetic fluids

The high shear rate of the Aqua Shear allows it to immediately disperse invert emulsions into fine particles in the continuous phase. The Aqua Shear's counter rotational motion and superior agitation provide smaller droplets and result in a more stable emulsion.

Eliminates "fisheyes" and "angel hair"

The unique design of the AQUA SHEAR system provides hydration, dispersion, mixing, blending and shearing of additives at the point of introduction - before the clumps and "fisheyes" occur. Particle dispersion and wetting occur almost instantaneously. There is no need for a separate function or cycle to create proper mixing.

Users report that use of the AQUA SHEAR system completely eliminates the formation of "fish eyes" and "angel hair".

Significantly reduces mixing time and product usage

The superior dispersion capabilities of the AQUA SHEAR system prevent even micro agglomeration. This results in both reduced mixing time and reduced product usage. Actual users have reported *savings of up to 30% in polymer usage and reductions in mixing time approaching 50%.*

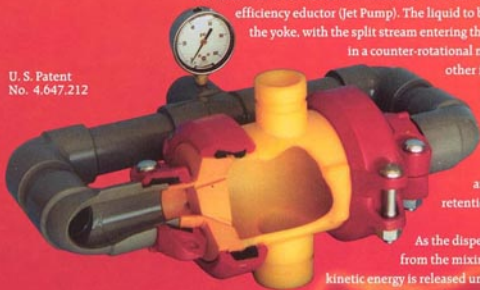


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The AQUA SHEAR[®] Mixer

U. S. Patent
No. 4,647,212



The materials to be added are introduced via a conventional hopper with an integral high efficiency eductor (Jet Pump). The liquid to be mixed is immediately divided at the yoke, with the split stream entering the mixing chamber through jet nozzles in a counter-rotational motion. The streams collide with each

other in a violent rush, producing a low pressure hydraulic shear which creates churning forces of high energy. The added materials are instantly combined with the liquid and accelerated into an energy amplified mixture which requires zero retention time in the mixing chamber.

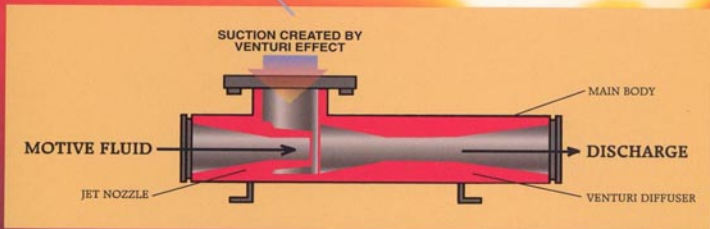
As the dispersed mixture moves immediately from the mixing chamber in a low shear motion, kinetic energy is released uncoupling molecules, producing a fully uniform blended product.



The most efficient mixing and hydrating for maximum additive performance

- Eliminates "Fish Eyes" and "Angel Hair" in Polymer Mixing
- Complete Mixing Efficiency
- Optimum Product Yield
- No Moving Parts
- Operates with Minimal Head
- Simplicity of Construction
- Minimum Maintenance
- High Volume
- Flexibility of Design

The FPT Eductor



The FPT eductor operates on the same basis as a jet pump. It utilizes "controlled entrainment" to provide optimum incorporation of polymers and other additives.

The operating medium, or "motive fluid" enters the eductor at high pressure, at which time it is directed through the jet nozzle. This converts it to a high velocity, low pressure stream.

The low pressure stream causes a negative pressure or vacuum at the inlet of the suction chamber. This pulls and

entrains the additive material into the flow of the moving fluid.

The driving jet momentum maintains the flow of the additive material. The two streams are mixed together in the "throat" of the eductor. The combined stream travels through the diffuser, accelerating the flow to a pressure that is greater than the additive pressure, but less than the motive fluid pressure.

AQUA SHEAR®

Field Proven Worldwide

Take a look at what some of our customers are saying:

Application: KCL/KHPA Fluid

Comments: *The AQUA SHEAR reduced mixing time of the polymers from approximately two hours per 300 barrel batch to thirty minutes. My recommendation would be to utilize the AQUA SHEAR on all PHPA and/or polymer mud systems. It is simple, reliable, cost effective and performs as promised.*

Application: PHPA

Comments: *Drilling mud costs were reduced by an average of 27.4% as a result of improved dispersion and hydration of all drilling fluid components. Total elimination of "fisheyes" and shake blinding enhance mud program efficiencies.*

Application: Mixing gels and polymers in drilling fluids

Comments: *Mud mixing efficiencies improved dramatically with weight material and LCM being added while the unit was in "by-pass" mode and in normal operations we achieved maximum dispersion and hydration in building gels or other chemicals.*

Application: Mixing gels, polymers, and chemicals

Comments: *The first three wells drilled through the same formation (without AQUA SHEAR) had drilling (mud) costs of \$39.45, \$38.80 and \$35.69 per foot respectively. The mud costs per foot on the next well after installation of the AQUA SHEAR was \$18.48 per foot, reflecting a 48% mud cost reduction.*

Application: Water based mud system

Comments: *The AQUA SHEAR was used to our full satisfaction. During drilling the well, there was no sign of any loss of undissolved materials across the shakers. We recommend the use of the particular equipment in any case when dissolving chemicals in the mud system is crucial for an effective mud system.*

Application: Seawater/gel/polymers, SSW/starch/polymer

Comments: *The AQUA SHEAR is very cost effective and should be specified equipment on all drilling operations where powdered mud additives are used. It would also be very efficient for use with systems requiring shear to form emulsions such as oil muds and packer fluids.*

Application: PHPA Mud System

Comments: *I have actually done some studies and calculations since you were here, and I can positively reveal that the use of the AQUA SHEAR system, whilst using PHPA mud system, including the rig time saved through not having to slow down, circulate the system until up to temperature, actually saved approximately \$35,000.*



Depend on the professionals at FPT for solutions to your mixing problems

Comprehensive rig surveys

Prior to installation, experienced technicians from FPT will provide a comprehensive, on-site evaluation of your mixing system. The modular design of the Aqua-Shear mixer lets us customize the system to both your mixing and rig requirements. The result is more efficient, cost effective mixing designed specifically to meet your application.

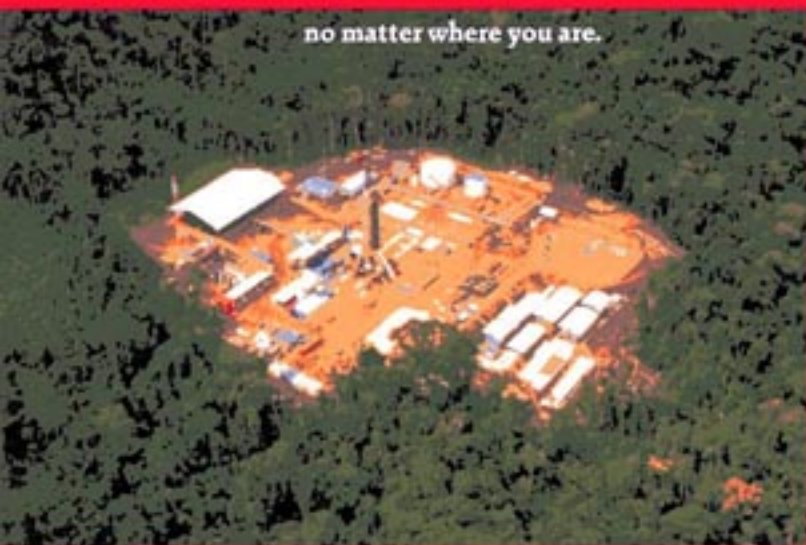
Training for your personnel

At the time of installation, we'll provide on-site training for your rig crew and mud engineers - with instruction in the proper operation and maintenance to ensure that the operator obtains the maximum economic benefits from the system. Our technicians are also fully trained in safety procedures, so you can be assured of both an efficient and safe operation.

Easy to operate. Simple to maintain

With its simplicity of design and no-moving-parts construction, the Aqua Shear system provides superior performance with minimum maintenance. Operation requires no special expertise and can be easily handled by all rig personnel. If you ever do require assistance, FPT parts and service personnel are only a phone call away, 24 hours a day...

no matter where you are.



COMPANY PROFILE

FLOW PROCESS TECHNOLOGIES, headquartered in Houston, Texas, designs and builds specialty mixing products to meet our customers' specific process requirements. The sales and engineering staff is committed to helping customers select and apply the proper mixing equipment for the job. Since 1990, FPT has produced high-quality fluid, slurry, and solids mixing process equipment packages to many segments of industry including mining, water treatment, utilities, food, OEM manufacturers, offshore oil & gas, etc.

PRODUCTS AND SERVICES

- Dry Polymer Mixing & Feeding Systems
- Emulsion Polymer Systems
- Foaming Systems
- Mud Mixing Systems
- Volumetric Chemical Feeders
- Chemical Injection Systems

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