STS 'Best in class' M-750 Mixer vs. the Competition

Everyone has heard the old saying "you get what you pay for" and it is very true for drilling fluid mixers. Lots of companies claim to have "multiple shear, venturi/jet, vacuum-assisted hopper" mixers but the truth is these companies are simply trying to recreate the patented technology used on all STS mixers.

STS is a pioneer in this industry. We've designed and patented our process which means the competition cannot recreate our effective, efficient system.

If you pull out a critical part here or there, substitute inferior equipment or downsize to maximize profits, the quality of your mix deteriorates and you waste time and money.

The M-750 Mixer from Surface to Surface is the most popular model for the HDD industry. Every model produced by STS out performs the competitors for efficiency in time and money. You get the right mix, every time.

Let's look at a few of the competitors' claims and how they measure against the STS M-750 mixer.

Competitor #1 claims:

"Most efficient hopper performance in the industry"
This competitor's undersized 3" water pump and motor create 40 ft. of head pressure. The venturi creates vacuum at the hopper base to draw in the dry powder. The STS heavy duty 4" trash pump creates 75 ft. of head pressure. Our venture funnel accelerates the velocity at the venturi throat. It's obvious which mixer is drawing higher vacuum and therefore is more efficient.

"Bentonite particles are sheared multiple times – you get maximum yield from each bag"
Where the competitor alleges the shearing takes place there is nothing but an open tube discharging off-centre in the tank, agitating part of the bottom without uniformity. An inferior venturi sits in this spot, without the necessary shear filter, and flow is controlled by the single-vane impeller of the significantly-lower powered pump. This competitor machine's lack of the necessary shear filter results in product fisheye (dry clumps) and angel hair. Their 'dual shear mixing' comprises only the venturi and tank turbulence. What would you conclude?

The 3" general purpose centrifugal water pump specified for this product is coupled with a much smaller engine (Honda 9HP vs. STS engine options from 18HP to 23.9HP). At half, or even less, of the engine power, the performance doesn't come close. The STS 4" TSP pump can immediately chop through solids up to 2" and is best suited to handle highly abrasive product.

Let's learn some more about the STS design and function to get a better understanding why every STS mixer model is superior to the competitors'.

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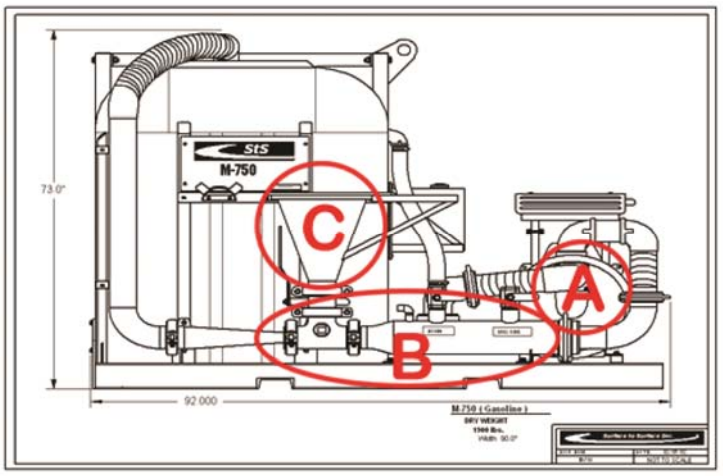
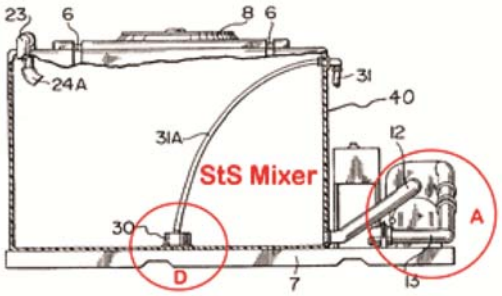
STS Mixers are superior in many ways.



(A) Engine and pump

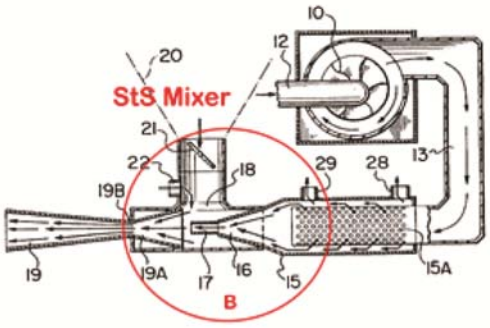
The reason we use a heavy duty 4" trash pump (with two-vane impeller and diffuser) instead of a general duty water pump is quite simply that *it works far better*, reducing the instance of plugging and significantly increasing shear. (How many times will you flush and unplug a cheap system before you have lost your cost savings?)

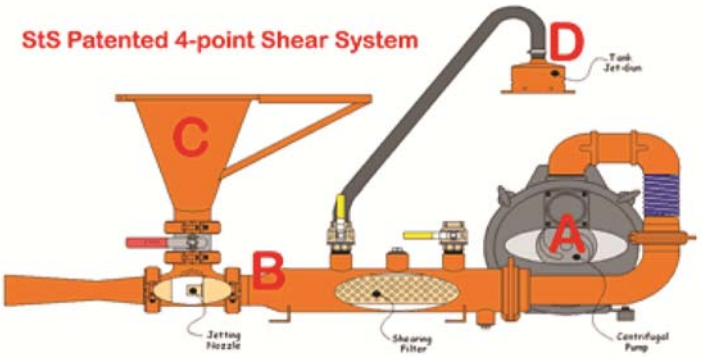
With about twice the head pressure, our design is much better equipped to move the yielded product to the drill so the mixer can be more conveniently located at the job site. The competitor's lawnmower-sized gas tank means you are constantly filling the fuel tank. What if you preferred electric, hydraulic or diesel power? *We have these options.*



(B) Venturi and shear filter

We cast our own venturis because our experience has shown that just any venturi doesn't do the best job. Our venturi is coupled with a stainless steel sheer filter. This screen filter provides maximum bentonite shear and fastest yield; we can simply remove it to prove just how much the performance degrades without it. It is such a big difference that it renders the competitors' products vastly inferior. One of the many great attributes of the shear filter cartridge is it immediately removes large particle material and prevents blockage of any openings in the nozzles, etc. Our quick-couplers make it simple and easy to access the cartridge which is specifically designed for the particular product and mixer.





Forcing the slurry through the large number of perforations in our shear system provides vastly greater shear than just a venturi. The shearing holes in our shear screen ensure the bentonite won't fisheye. No competitor can truthfully claim this. This patented shear is one of the most critical components of a mixer and nothing else in the industry comes close to its ability.

Our venturi was deliberately designed for this process as a result of years of research and development. The nozzle intake funnel (16) is specially engineered for this application and creates both the maximum velocity to form vacuum at the hopper base, and the fastest hydration of the product. Our intake port (22) is engineered to be the optimal point for the addition of water, reclaimed mud (such as from our all-hydraulic SAC-4 Reclaimer) or primary source liquid additives. This allows you to prepare mixtures from starting components, from partial or used mixtures with make-up components added as required. A great benefit is the product outlet (28) is designed to be a smaller size than the circulating stream size so, as final product is off-loaded, more mixture is still being circulated, made-up, filtered, etc. This combination may be operated in a continuous mode or in a batch mode as desired. You're not restricted to an either/or function as with our competitors' products.

(c) Our vacuum-induced hopper

In the drawing on the previous page, you see our hopper at (C). If we have higher flow at the venturi (B), it is intuitive that we have higher vacuum at the base of the hopper. While you may be wasting time and money throwing out damp bags of bentonite with a competitor's machine, our customers rave that clumps or even rainy days don't hinder them with our equipment. Our 'often-copied, never-equalled' hopper stands alone.

(D) In-tank multi-jet nozzles

The reason we use multi-jet shearing nozzles at the bottom of the tank is because we have to to deliver best results. It is not sufficient to simple discharge into the tank; we can prove just how much shearing action and agitation is lost by removing it. Properly sized and positioned jets (both vertically and horizontally) ensure the contents of the tank achieve superior mixing and better, faster yield. Are you going to achieve the most consistent mix from a hose somewhere over to the side of the tank or through aimed multi-directional high pressure jets right in the middle of the tank's bottom which are engineered to fully turn the tank's contents? Compare our results to the competitors' with a Marsh funnel. Then equate the yield differential to the money you waste using a competitor's product.

More competitor observations

Competitor #2

Shearing System

This product relies on a simple venturi and eductor nozzles and mixes by continuous recirculation of the pump. **It has no shearing component** comparable to the STS shear filter and therefore is a low-shear recirculating system. Because of the lack of a functional shearing component, vigorous in-tank movement must be maintained as the viscosity rises. This is attempted by the roll jet (eductor nozzles).

Without the shear filter, the particles tend to agglomerate when water is added. The washing action of recirculation mixers cannot break these down effectively. Low-shear recirculation mixers do not produce sufficient shear to reduce particle size and activate the gelling effect. Extra mix tanks maybe required to allow the bentonite to pre-hydrate. This process can take hours to fully hydrate.

This product is currently available only in gas or diesel power options. It doesn't have hydraulic or electric counterparts. However, without the shear filter, it doesn't really matter.

Competitor #3

When coupled with this manufacturer's 710 gallon tank option, this system is roughly the same size as the STS M-750 system. As a stand-alone compact shear mixer only, our M3 and M4 series far outpace its performance and durability.

Shearing System

This product relies on a simple jet fitting and four tank jets, mixing by continuous recirculation of the pump. **It has no shear filter** and is therefore a low-shear recirculating system. Because of the lack of a functional shearing component, vigorous in-tank movement must be maintained as the viscosity rises. This is attempted by the tank jets.

Without the shear filter, the particles tend to agglomerate when water is added. The washing action of recirculation mixers cannot break these down effectively. Low-shear recirculation mixers do not produce sufficient shear to reduce particle size and activate the gelling effect.

Currently only available in gas options. No diesel, hydraulic or electric.

Competitor #4

When coupled with this manufacturer's 500 or 1000 gallon option, this system is reasonably comparable to the STS M-750. As a stand-alone compact shear mixer only, our M3 and M4 series far outpace its performance and durability.

Shearing System

This product relies on a simple venturi and pump impeller, mixing by continuous recirculation of the pump. **It has no shear filter** and is therefore a low-shear recirculating system.

Without the shear filter, the particles tend to agglomerate. The washing action of recirculation mixers cannot break these down effectively. Low shear recirculation mixers do not produce sufficient shear to reduce particle size and activate the gelling effect.

This product is currently available only in gas options, with a 500 or 1000 gallon tank. It does not have diesel, hydraulic or electric counterparts. However, without the shear filter, it doesn't really matter.

Competitor #2 Pump and Circulation	Competitor #3 Pump, motor and circulation	Competitor #4 Pump, motor and circulation
Relying almost entirely on circulation, the shear effect of a pump which moves product through in the flow direction is minimal. Without the rigorous slicing of bentonite plates by the inclusion of a shear screen, this product significantly underperforms in comparison to the STS product line. The 3" pump specified for this product is a semi-open cast iron impeller pump designed for water, not for mud, sand or silt. Why is it being used for mud then? Compare this with the STS equipment which uses a 4" TSP pump that can immediately chop through solids up to 2" and is best suited to handle highly abrasive product. How often do you want to replace pump seals?	Relying almost entirely on circulation, the shear effect of a pump which moves product through in the flow direction is minimal. Without the rigorous slicing of bentonite plates by the inclusion of a shear screen, this product significantly underperforms in comparison to the STS product line. The 3" general purpose centrifugal water pump specified for this product is couple with a much smaller engine (Kohler CS12, 12 HP versus STS engine options from 18 HP to 23 HP). At a little over half the engine power, the performance doesn't come close and the lawnmower-sized gas tank needs constant attention. Compare this with the STS equipment which uses a 4" TSP pump that can immediately chop through solids up to 2" and is best suited to handle highly abrasive product.	Relying almost entirely on circulation, the shear effect of a pump which moves product through in the flow direction is minimal. Without the rigorous slicing of bentonite plates by the inclusion of a shear screen, this product significantly underperforms in comparison to the STS product line. The 3" general purpose centrifugal water pump specified for this product is couple with a much smaller engine (Honda GX390-QDW9 13 HP versus STS engine options from 18 HP to 23 HP). At a little over half the engine power, the performance doesn't come close and the lawnmower-sized gas tank needs constant attention. Compare this with the STS equipment which uses a 4" TSP pump that can immediately chop through solids up to 2" and is best suited to handle highly abrasive product

Is it any wonder we patented our system? That's the reason that parts necessary to achieve maximum shear are missing from competitors' products – we own the patent. Making a product that looks like ours doesn't make it ours. The truth is we take mud to a fully yielded form faster and more consistently than any competitor, and with less waste.

Our line of mixers is available in gas, diesel, electric and hydraulic. They are even customizable to meet the needs of your logistics. With a development team with over 40 years experience in horizontal boring, HDD and micro-tunnelling, STS has the depth of knowledge and the product line to meet your drilling accessory needs.

The right mix, every time.

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