

Evolution In Change Can Mixing – The Next Millenium

During the last decade of the 20th century, we have seen a steady trend toward higher viscosities in virtually all industries. Environmental regulation aimed at reducing VOCs have forced many processors to reduce or eliminate the solvents in their products – which naturally produces a gain in solids content and viscosity.

Meanwhile, manufacturers in many industries are reformulating their products purely to meet consumer demand for improved performance, and they are simultaneously raising viscosity. For both the processor and the equipment manufacturer, the move toward higher viscosities has marked a dramatic shift in equipment purchases toward more powerful and sophisticated machines. High-viscosity materials often present special requirements for process control and material discharge. In many cases they also demand special engineering to provide customized drive systems, specially reinforced mix vessels, and agitators capable of sustaining the high horsepower and torque required for high viscosity applications.

This is why mixing equipment buyers and manufacturers are now collaborating on the entire mixing *system*, with a view upstream and downstream of the mixer itself. They are also trying to anticipate *future* requirements on the process line. Viscosities will continue to rise – and so will the need for faster production and a safer plant environment. World class mixer manufacturers like Ross must be ready to meet this challenge.

Guidelines for mixer selection

Many variables influence the choice of a mixer for high viscosity materials – including the *peak* viscosity anticipated during the mixing cycle, the power needed to move the material, the level of shear required, and the material's tolerance to heat. The following guidelines provide a useful rule of thumb, but testing is always recommended before the equipment purchase to confirm your selection and perfect the *technique* that will optimize your process-line results. Be sure to test in a laboratory with a wide

variety of mixing equipment and analytical instruments capable of quantitatively assessing your test results.

Multi-agitator, anchor-based mixers

Multi-agitator mixers like the VersaMix shown here combine the work of two or three separate agitators to offer process flexibility and economy for materials on the

Multi-agitator mixers like the Ross VersaMix offer outstanding efficiency and versatility over a wide range of viscosities.



low end of the "high viscosity" range. A three-wing anchor agitator revolves slowly around the periphery of the mix vessel. Often equipped with Teflon® scrapers, it wipes material from the vessel wall and generates radial and axial flow. Vigorous flow promotes efficient mixing action and heat transfer, since material is prevented from forming a static layer against the vessel wall.

The effectiveness of this mixer relies heavily upon the inherent flow characteristics of the material being mixed, since the anchor simply moves the material toward the agitators. Yet with an independent drive on each agitator, the mixer can be configured for a surprising variety of materials. Using various combinations of agitators, the mixer handles many types of epoxies, high-solids coatings, pharmaceuticals, cosmetic creams and lotions, salad dressings, toothpastes and shampoos.



What's In This Issue

Evolution In Mixing1
 High Shear Mixing Systems1
 A Turntable That Boosts Production3
 The Next Generation of Soft-Wired Controls3
 Worldwide News Briefs4



Visit Ross at our NEW Website – with animation and more answers to your processing questions!
www.rossmixing.com

A New Look At Integrated High Shear Mixing Systems

Recent breakthroughs in high-shear mixing technology – like Ross's new vacuum mixer homogenizers and the new low-profile X-Series Mixer Emulsifiers – have captured the imagination of manufacturers in industries from pharmaceuticals and cosmetics to foods, chemicals, coatings and adhesives. The new generation of high-shear mixers have already delivered tremendous gains in production and end-product quality, and as they continue to evolve they will become even more powerful.

But many manufacturers are finding that the best decision is *not* to choose any one of these new mixers. The Ross R&D team has shown that a *combination* of mixers – working in an integrated system – can often deliver even greater production and process-line versatility.

The Olsa Vacuum Mixer Homogenizer (sold and supported by Ross in North America) provides an excellent example of this principle in action. In its most common

Evolution In Change Can Mixer Design

(continued from page 1)

Double Planetary mixers.

For kneading viscous pastes and putty-like materials, the Ross Double Planetary mixer is recognized worldwide for its outstanding efficiency. As viscosity increases



Since Ross invented the Double Planetary Mixer, this has been the world leader for more than 50 years – and it is still evolving. New engineering, especially in low-rpm drive systems, has made it an even more versatile workhorse for high viscosity materials.

it delivers increasing shear and hastens the process of tearing apart agglomerates to promote rapid dispersion. This is due partly to the tight tolerances between each blade and the vessel wall and bottom, and between the blades as they pass continually within the vessel. The orbital mixing pattern ensures that the planetary stirrers cover every point within the vessel quickly and achieve homogeneity regardless of the flow characteristics of the mix.



Today, innovative engineering is making the Double Planetary mixer even more versatile. This mixer is extremely powerful, and with a variable-speed drive it can be configured to deliver high torque even at very low rpm. Low-speed configurations are especially important for many manufacturers who are making high performance composites, silicones and epoxies, rubber additives, confectionery products, dental composites, hot melts, metal and ceramic powders.

PowerMix: A planetary blade and disperser combined.

By incorporating an orbiting high speed disperser with a planetary blade



The unique combination of a high-speed disperser and a planetary blade enable the PowerMix to apply intense shear and mix extremely heavy materials.

(instead of a simple anchor), this patented hybrid mixer applies intense shear and handles materials of viscosities up to 1-2 million cps. Both the planetary blade and the disperser turn on their own axes while they both orbit the vessel, and the planetary blade literally carries material from the vessel wall to the disperser.

The high speed disperser applies shear while it orbits through the material and also contributes to flow within the vessel. So, the PowerMix also relies upon the natural flow characteristics of the mix material, though to a much lesser degree than the anchor-based multi-agitator mixer.



The new Ross TTMS-40 Turntable Mixing System is the latest development in automated mixing systems. Charging, mixing, discharging and vessel cleaning are virtually hands-free operations. Yet a flexible control system allows easy process changes at any time.

This design is particularly appropriate for processes that begin with high speed, low-viscosity dispersion and finish with a non-flowable end-product. This includes a wide variety of products such as plastics, adhesives, thick film inks, pharmaceutical granulations, food dispersions and specially engineered gasketing materials.

Automatic discharge systems and interchangeable mix vessels

Since heavy materials are always difficult to discharge by hand, many process managers rely on an automatic discharge system to handle the output from one or several mixers. The mix/discharge system consists of a separate discharge unit and interchangeable mix vessels, which are called "change cans."

When the cycle is complete, the change can is simply rolled away from the mixer. Once the change can is positioned under the discharge unit, a platen is driven by a hydraulic piston down into the can. Under pressure, the material is forced through a discharge valve into bulk containers or product packaging.

Meanwhile, another vessel rolls into the mixer to start the next batch immediately. So, in addition to reducing operator contact, the discharge system reduces the downtime associated with manual discharge from a fixed tank.

Putting it all together - a new integrated turntable mixing/discharge system pushes production even higher

For many manufacturers, the flexibility possible with change-can mixing is the key to faster mixing cycles, easier process-line changeover, and higher production. But

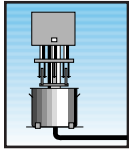
for others, an automated turntable mixing system offers an even more powerful tool for boosting production.

As the turntable indexes, each batch quickly cycles through a sequence of charging, mixing, discharging and vessel cleaning. With a full control system and material handling package, operator intervention can be

continued on page 4

ON THE PROCESS LINE

By Tom DiGiannurio, Engineering Manager



A turntable that boosts production without sacrificing versatility.

Automation on a process line can be a powerful tool for improving plant safety and product consistency, increasing throughput, and reducing labor costs. But the long-term value in automating a process can eventually turn into a long-term loss if you don't allow plenty of room for process changes.

When we were designing Ross's new turntable mixing system, our primary goal was to recover the time and manpower that is normally wasted in repetitive charging, mixing, discharging and cleaning



mix vessels. We were also determined to avoid the trap of building an inflexible system dedicated to only one narrow process function on a process line.

This is why the Ross TTMS-40 turntable mixing system operates with standard change cans and with any of our standard change can mixers. Whether you require the mixing action of a Dual Shaft Mixer, a triple-shaft VersaMix, a Double Planetary Mixer or a PowerMix, the advantages of an automated turntable system are now available without the cost of custom engineering.

The standard change cans used on the turntable are mounted on special pallets that are accurately controlled by the turntable's positioning systems. Any vessel on the turntable can easily be traded for another - to take advantage of a different jacket or valve, for example.

continued on page 4

A New Look

(continued from page 1)

configuration, an outer anchor agitator continuously removes material from the vessel wall and generates a combination of inward radial flow and upward axial flow. Meanwhile a set of coaxial, counter-rotating blades generates contrasting, downward axial flow. An external, bottom-mounted homogenizing turbine imparts intense shear and quickly reduces median droplet size to the sub-micron level.

For certain applications, Ross R&D engineers have substituted a multi-stage Mixer Emulsifier for the homogenizing turbine. Mounted externally on the lower end of the vessel, the high-speed Mixer Emulsifier applies intense emulsifying and shearing action. It also offers these additional advantages:



1. Powders can be vacuum-injected directly into the high-shear zone and wetted out immediately.

2. With external recirculation to the top of the vessel, the flow is closely controlled and top-to-bottom homogeneity is achieved rapidly.

3. The product can be mixed quickly and in extremely small quantities with no loss in accuracy. Especially when mixing high-value materials, this can produce a substantial savings as waste is sharply reduced.

"Laboratory testing is necessary to fine-tune the system for each application," according to Doug Cohen, Ross VP Technical Services. "Using such instruments as a laser diffraction particle size analyzer, we can quantitatively assess our results on site and quickly identify both the equipment and the technique that will optimize production."

The Ross Test & Development Center is equipped with many varieties of mixing systems for process-line simulations and equipment testing. To test the Olsa Vacuum Mixer Homogenizer or any other Ross mixer or blender, call Ross today to discuss your application.



INPUT/OUTPUT

Control System News

By Rob Lanham, General Manager

The next generation of soft-wired controls - fast delivery and low cost.

Until recently, manufacturers anxious to step up to a PLC-based control system had to weigh the value of greater process-line flexibility with the cost of prolonged software development. Even a comparatively simple "soft-wired" system requires weeks of software engineering, and although the long-term advantages of a soft-wired system are tremendous, many couldn't afford a delay in the delivery of their equipment.

Ask for a copy of our recent newsletter article on soft-wired systems



Ross SysCon has just eliminated this predicament with a new system that provides PLC-based control and turnaround as fast as a comparable hard-wired system.

The new Ross HMI Control System is unlike ordinary soft-wired control systems. It's modularized to make production fast. Since it comes with the most popular control capabilities already built in, we've cut software development to a minimum.

Here's a great bonus. Because we've been able to streamline production, we've also been able to price the new system far below other soft-wired systems.

Here are some standard features on the new Ross HMI Control System:

- Color GUI (graphical user interface)
- PLC control and complete "soft-wired" flexibility to make easy process changes at any time
- Speed indication for each agitator
- Load indication for each agitator
- Cycle timer for each agitator
- Powerful data acquisition capability

continued on page 4



WORLDWIDE NEWS BRIEFS

Ross introduces a new line of heavy duty Double Planetary Mixers.

Originally introduced by Ross in the 1950s, Double Planetary Mixers are most often used for high viscosity products that would otherwise require a more expensive sigma blade mixer. The new Double Planetary line enables manufacturers to mix even higher viscosity materials in batches to 400 gallons.

The new machines are supplied with specially built gearboxes designed to handle the increased torque of the higher viscosity applications. They also include new dual-post air/oil hydraulic lifts to provide added rigidity and strength.

Standard options include vacuum or pressure construction, jackets for heating

or cooling, scrapers to maximize heat transfer, and internal machining of the mix can and the blades for close blade-to-bowl clearance.

Pioneering rotor/stator mixer receives patent approval. Ross has announced another dramatic advance in ultra-high-shear rotor/stator mixing. The new "Mega-Shear" mixer is revolutionary, says Doug Cohen, Ross VP Technical Services, thanks to a new concept in rotor/stator generator design. An adjustable outlet allows the operator to adjust flow rates, residence times, and shear intensity *while the machine is running*. The Mega-Shear mixer offers a unique combination of extremely high shear rates and process-line versatility.

On the Process Line

(continued from page 3)

What will your mixing equipment be doing 10 years from now?

In the next millenium, all manufacturers will be moving faster than ever to remain competitive. Products will evolve faster. New markets will open worldwide, and new competitors will emerge. As your process needs change, your processing equipment will have to adapt to keep up.

If you want your mixing equipment to be as productive in 2010 as it is today, take a hard look at the mixer and control system you are planning to buy. No one can predict all the process-line changes ahead. But the best way to protect the long-term value of your new equipment is to make sure that plenty of process-line flexibility is designed in!



Evolution In Change Can Mixer Design

(continued from page 2)

virtually eliminated. Consistency can be improved – and off-spec product reduced. Plant safety can be improved, too, as operator contact with the product is minimized.

The system is self-contained and platform-mounted. With a small footprint, it can ease crowding on the plant floor while it boosts production. Since the system can operate with any change can mixer, it can serve virtually any batch-oriented process line.

Looking ahead toward the new millenium.

The trend toward higher viscosities is bound to continue, and mixing equipment will continue to evolve. But the essential principles of change-can mixer selection will remain the same:

1) **Think more broadly than just in terms of the mixing action in the vessel and the material being processed.** Heavy materials require a *system* approach, with special attention focused on every element from the control system to the final discharge and downstream piping.

2) **Think ahead.** Creative engineering alternatives can help you anticipate changing needs on your process line. Flexibility designed into your system today can help ensure that it will operate efficiently long into the future – when your product is a lot thicker, heavier and much harder to handle!



Soft-wired Controls

(continued from page 3)

Now for the high-performance options that tailor the control to your application specifically:

- Automatic vacuum control
- Automatic temperature control
 - Discrete fluid control
 - PID fluid control
- Provision for speed indication via tachometer or encoder
- Lift control
 - Air/oil lift
 - Ball screw lift (1-3 hp)
 - Ball screw lift (5-15 hp)
 - Reversing gear lift (1-3 hp)
 - Reversing gear lift (5-15 hp)
- Single batch recipe automation
- Multiple batch recipe automation
- Continuous process recipe automation
- Raw material introduction automation
 - Metering pump control
 - Pump/flow meter control
 - Weigh feeder control
- Mix/age tank control...

"Soft-wired" flexibility and efficiency is now affordable!

The new Ross HMI controls are available now for any Ross mixer or blender. They can be installed on new systems or retrofit on a unit you're using now. Call us or your local Ross sales representative to discuss the capabilities you need – and the process-line flexibility you can now afford!



Charles Ross & Son Company

710 Old Willets Path, PO Box 12308
Hauppauge, New York 11788-4193

Overseas call: 516-234-0500

Fax: 516-234-0691

www.rossmixing.com

800-243-ROSS