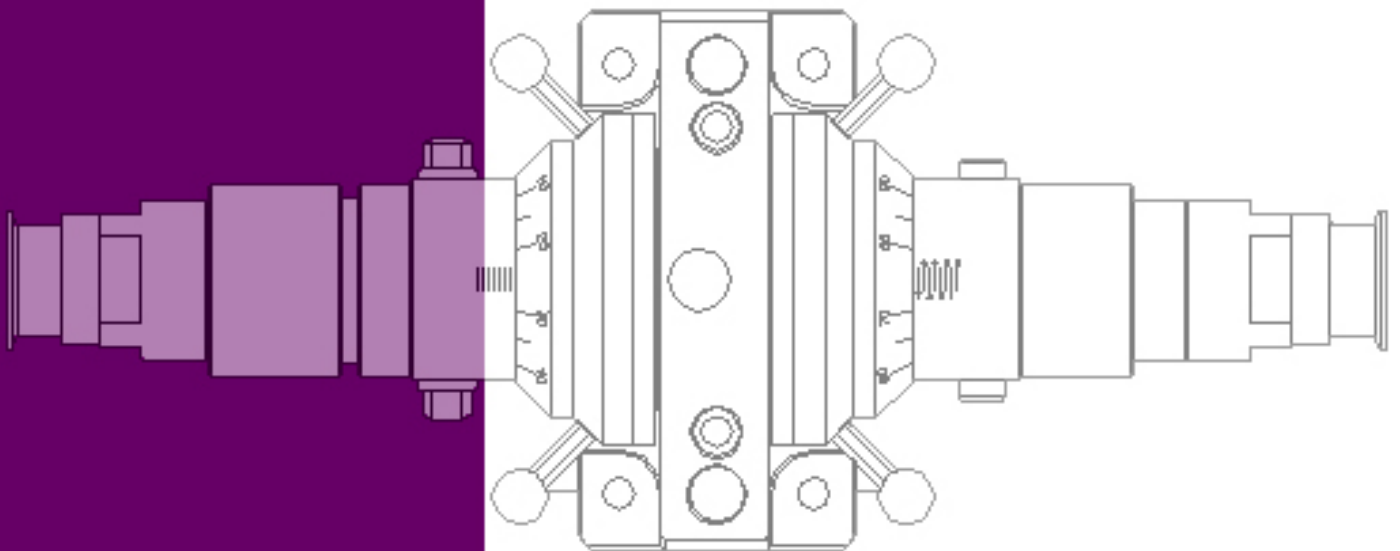


Mixing and Process Equipment
2004 Sonolator Homogenizing Catalog

(203) 375-0063

<http://www.sonicmixing.com/>



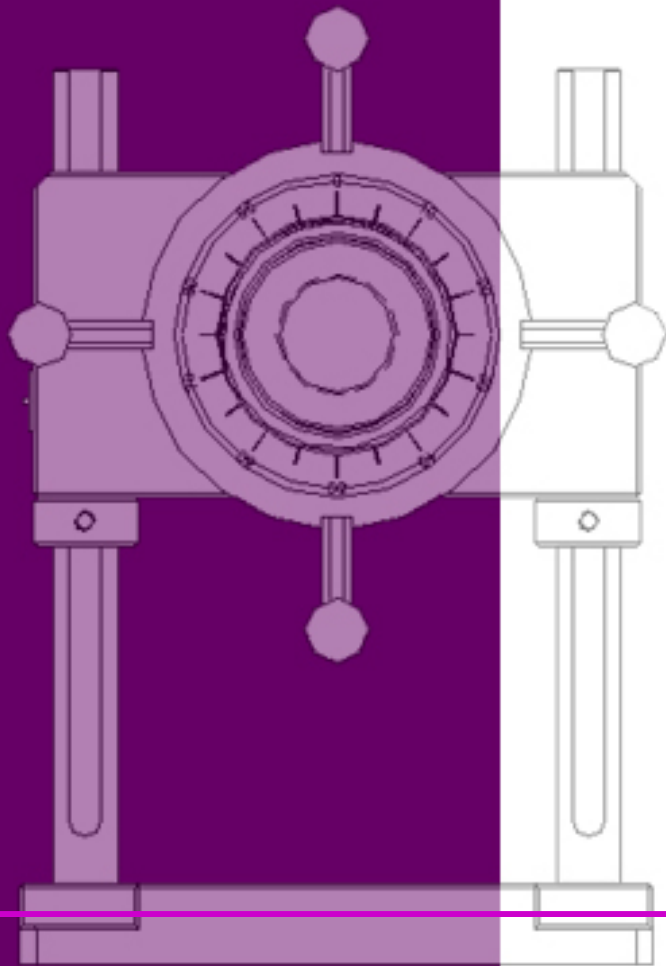
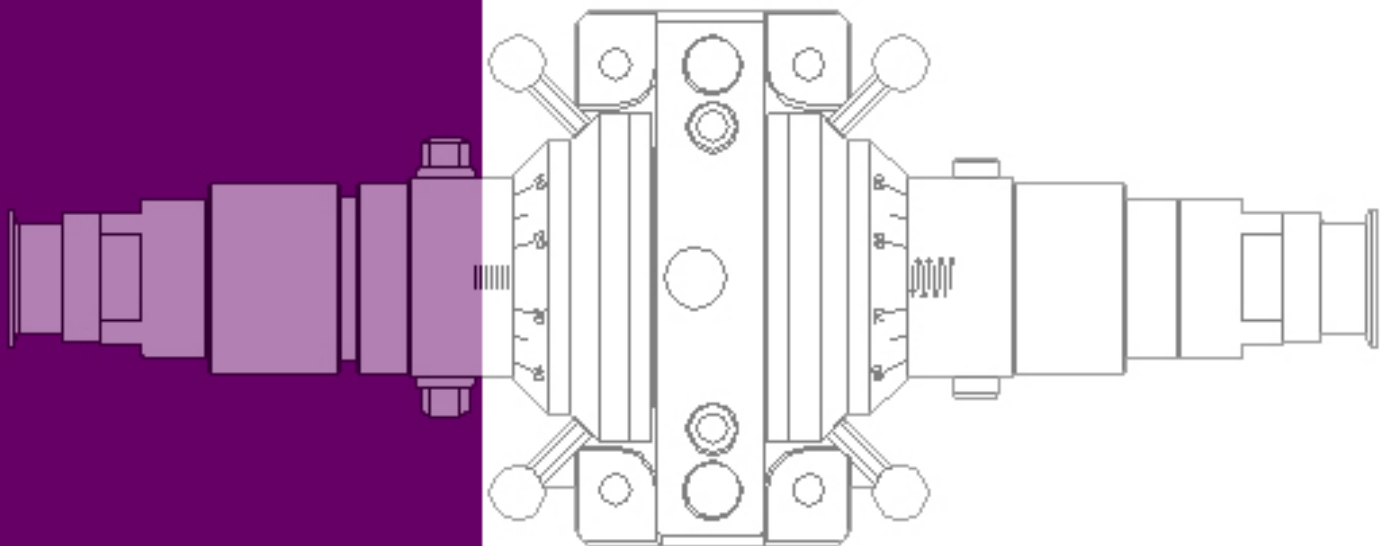


Table of Contents

- The Sonolator Principle
- The Basic Sonolator System
- Sonolator Systems
- System Benefits
- Multi-Feed Sonolator
- Multi-Feed Sonolator Benefits
- Sonolator Case Histories
- Lab Testing and Rentals



The Sonolator Principle

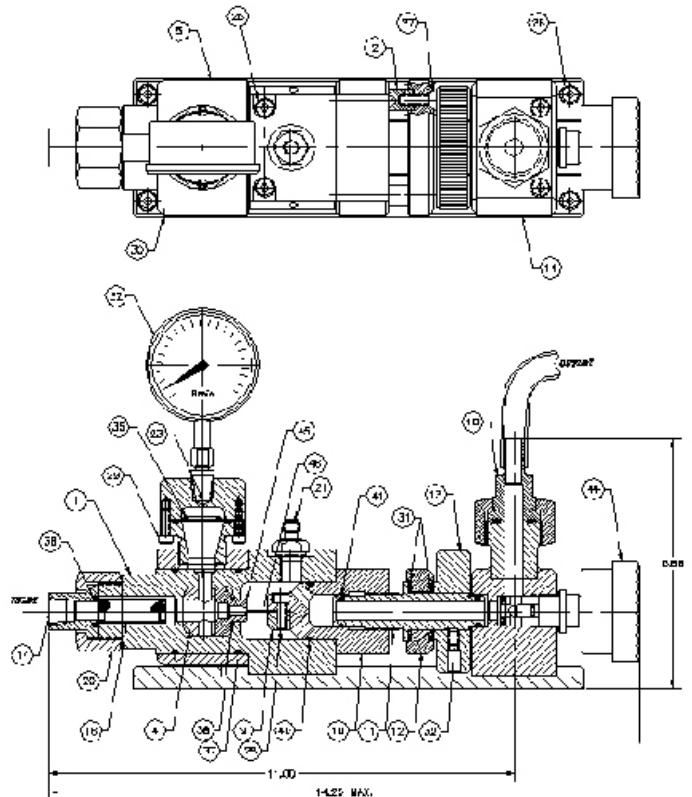
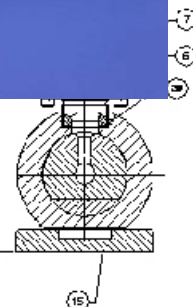
The Sonolator is an in-line, high-pressure, ultrasonic homogenizing device that employs pressure and ultrasonic cavitation forces to emulsify, disperse, de-agglomerate and blend a wide range of materials. Process material is forced via a positive displacement pump, selected according to your products characteristics, through a specially engineered orifice where it is subjected to extreme shear and pressure. Material is then projected at high velocity over a knife-like blade. The blade acts like a foil where a strong, pulsating cavitation field is formed. The pressure and cavitation created by the orifice and blade efficiently and effectively help form tightly uniform emulsions and dispersions with particle sizes from below 0.5 micron and up. The Sonolator employs an acoustic intensity meter which helps the operator tune the device to achieve optimum cavitation.



The Sonolator is incorporated into comprehensive homogenizing systems featuring positive displacement pumps, motors, inverters, pressure transmitter, flow meters, PLC automation and much more. We offer a wide range of standard units with optional instrumentation as well as custom designed systems to meet specific process requirements. We also offer complete turnkey plant designs and installations.



The Sonolator, lab model shown above, is connected to any variety of pumps to handle a range of process fluids. Orifice is removable and can be replaced with various sizes and metal constructions.



1. SUBJECT TO DESIGN OF DIFFERENT CONNECTION OR ACCESSORIES.
 2. USE ASSEMBLY WITH OTHER COMPONENTS EXCEPT FROM FLUOROPOLYMER, INC. VENDOR.
 3. PREP ORDERING EXTRA NUMBER THE COMPLETE PART NUMBER, AS IT APPEARS ON THE FACE OF THE CENTER BLANK OF THIS. 12-A-1028-003 IDENTIFIED A.S. 2. INVOICE WITH AN ORDERING OR APPROVED. JOB 50, H.

The Basic System

By itself, the Sonolator is actually fairly small in size, but coupled to any PD pump it's a powerhouse homogenizing system. All model Sonolators contain the orifice and blade that produce the pressure and cavitation required to make tightly uniform emulsions and dispersions. The key in designing and engineering Sonolator systems is choosing the right pump for the application. This is where our technology shines in that we can choose from a host of commercially available PD pumps including:

Triplex Piston and Plunger
Progressing Cavity
Rotary Gear and Lobe
Triplex Diaphragm

Economical PLC option by Allen Bradley, Koyo, Mitsubishi and Siemens

VFD Inverters by Allen Bradley, ABB, Mitsubishi, Hitachi, AC Tech, and more.

Motors by US Motors, WEG, Siemens, Marathon and more.

PD Pump w/ varying pressure capabilities ranging from 50-5000 PSI, and varying viscosity capabilities

Pilot Model A Sonolator w/ orifice and blade; blade and orifice construction available in tungsten carbide for abrasive applications.

Stainless steel tubular baseplate w/ clean weldments and welded uprights for enclosures.



Sonolator Systems

The basic Sonolator system is available in a compact Bench top System to full scale Production System. Sonolator technology is directly scalable from the bench to large 50-100 GPM systems.



Bench top Sonolator system capable of pressures to 5000 PSI.

Unit complete w/ PD pump, Sonolator, motor, VFD and PLC controls.

System can include a Premix Station consisting of Feed Pump, Lab Agitator, Jacketed Vessel, VFD and water heating unit; optional cart.

Jacketed vessel can be provided with temp control unit to control vessel temperature.

Full PLC automation to control feed system and Sonolator system; such controls provide smooth transition to how systems are operated at pilot and plant level.

Bench results scalable to production.

Process on the Bench top Sonolator provides realistic and seamless transition to production plant floor. Rather than working w/ beakers or lab agitators, the Bench top Sonolator uses pumps, motors, VFDs, PLC controls and a lab scale Sonolator; all of which are used on pilot and production levels.

Production Sonolator Systems are comprised of similar components scaled up from the bench and pilot plant. In many cases an alternate pump, such as gear, lobe or progressing cavity, can be used to suit material viscosity. Sonic designs the system around your needs and uses instrumentation and controls specified by your plant.



30 GPM, 200 PSI, high-visc gear pump

30 GPM, 3000 PSI, plunger pump



Sonolator systems provide many benefits above conventional homogenizers and mixers.

Benefits of using Sonolator Technology

Greater Efficiency

Emulsions and Dispersion are formed with tightly uniform particle size distributions at significantly lower pressures than conventional homogenizers; at times 30-50% lower pressures.

Scalability and Repeatability

Results are scalable and repeatable from the bench top to the production size Sonolator systems. The Sonolator relies on pressure and cavitation from a stationary orifice to create emulsions and dispersions, whereas other devices use rotating components or spring-loaded devices to create shear; scalability is better when there are no moving parts creating the required shear. Working at the same pressure level at any flow rate will yield the same results.

Reduced Processing Cycles

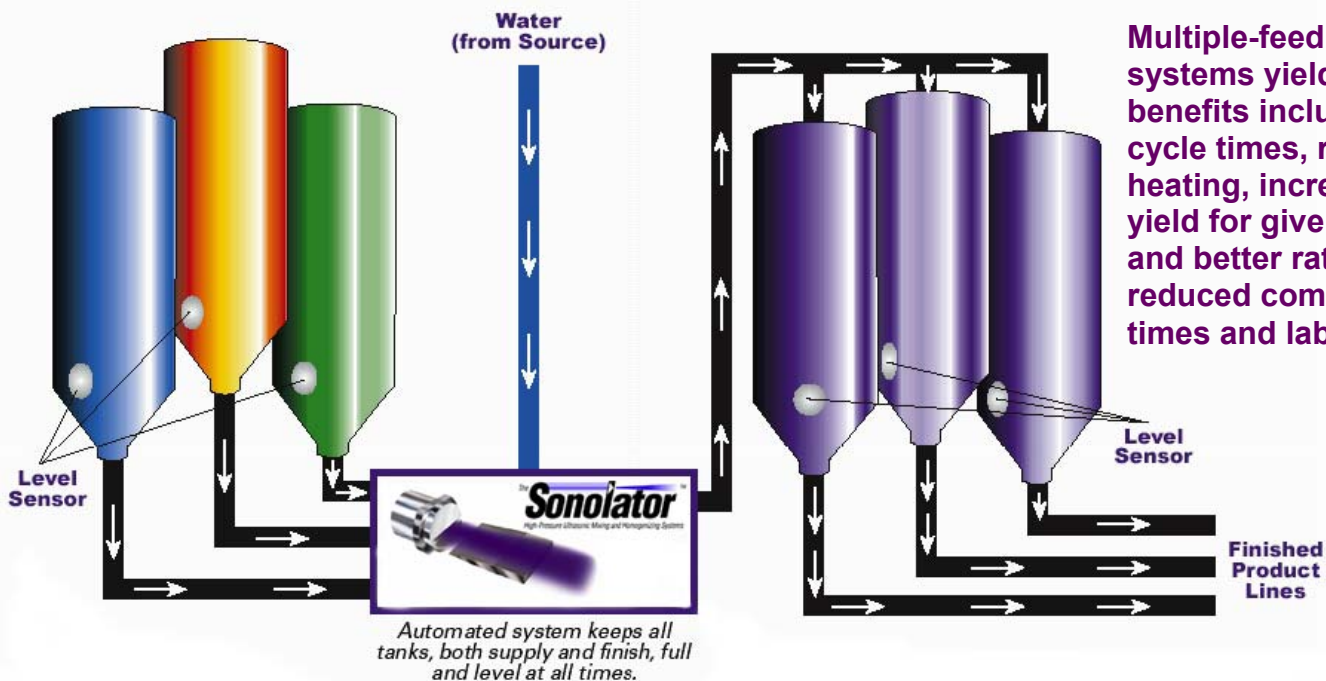
Converting from batch to continuous allows for shorter process cycle times. Because the Sonolator makes finished product in a single pass, the only limiting factor is the pump flow rate on the system. The Sonolator system acts as the material transfer pump because we process material in-line as it is being pumped to its final location.

Reduced Operating Costs

Because the Sonolator systems can create product at lower pressures, less horsepower is required per system; this translates into less amperage draw and lower energy consumption.

Multiple-Feed Processing

Perhaps the biggest advantage to the Sonolator homogenizing approach is the ability to meter various streams of material on an in-line basis and generate finished product instantaneously.



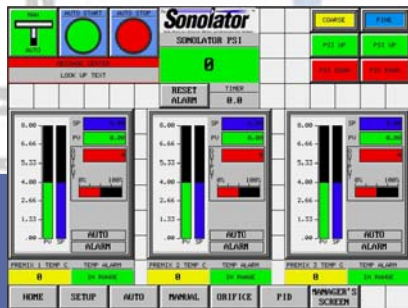
Multi-Feed Sonolator Systems

The Sonolator can be used to process a number of liquid streams to instantaneously create finished emulsion or mixture in a single pass. Several PD pumps are installed which accurately meter the various phases.

Bench top Dual-Feed Sonolator System

This system is designed to meter 2 liquid streams to create a fine finished emulsion. In most processing applications, a discontinuous phase needs to be mixed with a water or other phase. Here we connect 2 PD pumps capable of 2500 PSI to a lab scale Sonolator and use a PLC Op Panel that allows the operator to meter 2 independent phases to create an instant emulsion at various ratios. Metering is accomplished by either pump speeds or by flow meters. This system includes:

- Lab Sonolator 2500-5000 PSI
- Triplex PD Pumps
- VFD inverters
- Feed vessels
- Pressure transmitter
- Full PLC automation w/ Op Panel



Full PLC Automation on the bench. The bench top Sonolator provides realistic plant processing w/ pumps and instrumentation as well as controls. PLC controls include Allen Bradley, Siemens, Mitsubishi and more. Operator screens, recipe management, data logging and alarming all included.

Pilot Tri-Feed Sonolator System

Scaling up to the pilot plant, Sonic offers a system that employs 3 PD pumps, this time progressing cavity pumps for sanitary applications. With this system water can be metered as an independent phase so in the plant it will not be placed in a tank, but can be metered directly from its source. Other phases would be an oil, or discontinuous, phase and a water concentrate phase.

All phases here are metered with Mass Flow Meters to improve accuracy of ratio control to within 0.1%.

System here is completely sanitary and CIP-able.

System pumps can handle viscosities ranging from water to 100,000 cps.



Multi-Feed Sonolator Benefits

The Sonolator can be used to process a number of liquid streams to instantaneously create finished emulsion or mixture in a single pass. Several PD pumps are installed which accurately meter the various phases.

Multi-Feed Sonolator Benefits

Reduced Heating/Cooling

In many cases, a hot phase can be metered with an ambient phase to create a finish product that requires much less cooling. When an emulsion can be formed where only one phase is heated, the cost of heating compared to batch methods, where all ingredients are heated, is much less, or, your product yield for the money spent on heating is greatly improved. Process cycle times are reduced as well because the hot and ambient phase combined make for a finish product that requires less cooling.

Increase Product Yield

Your product yield per given tank space can be increased significantly when water can be metered from its own source without being held in a tank. With batch mixing, and single stream mixers, water must be premixed with all other ingredients, consuming precious tank space.

Reduced Compounding

Compounding, or prepping, a batch for batch or single-feed mixing might require many steps and orders of addition. The multi-feed Sonolator approach simplifies this by breaking into phases of common elements that are added at the same temp, or by drawing from bulk storage, etc.

Reduced Process Times

Batch and single-feed mixing can take several hours process time, whereas the more efficient Sonolator can do so in much less time. Material transfer times are eliminated as well through the multi-feed approach as ingredients like water can be drawn from their source, other phases might be drawn off bulk storage.

Here is a Multi-Feed Sonolator system used to meter up to 3 streams at various ratios. The unit is completely sanitary and CIP-able. Here, water is metered from the source without being tanked, thereby dramatically increasing finish product yield per tank space and relieving plant bottleneck issues.



The Sonolator has been used to process a wide range of Personal Care products. Many companies have realized savings in time, labor and money by using a Multi-Feed Sonolator system.



Sanitary Tri-Feed Sonolator
Sonic developed a completely 3A Approved, Sanitary Multiple-Feed Sonolator System employing hygienic pumps and components for a customer seeking quality improvements and processing efficiencies. Use of flow meters in this system has provided a high level of accuracy and control for metering.

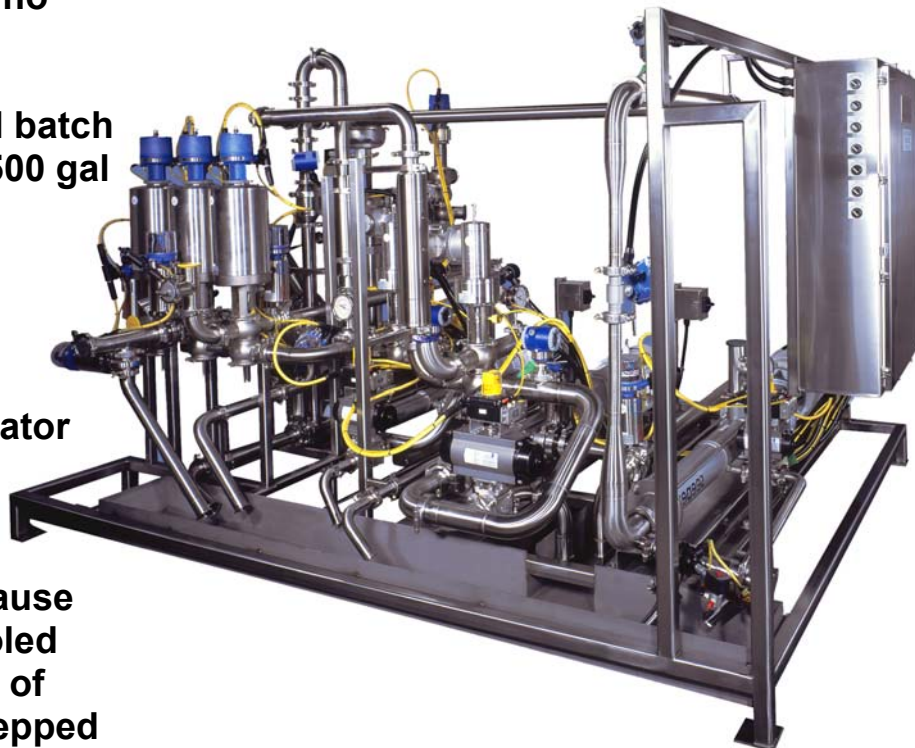
Shampoos
Conditioners
Body Wash
Creams
Lotions
Ointments
Liquid Soaps

Multiple-Feed method removed water from tank; thereby increasing total output from 2,500 gals to 12,500 gals, a 500% increase in throughput with no additional tanks

Cycle times reduced as traditional batch method took 2-3 hours to make 2500 gal batch where Sonolator processed material in 52 minutes.

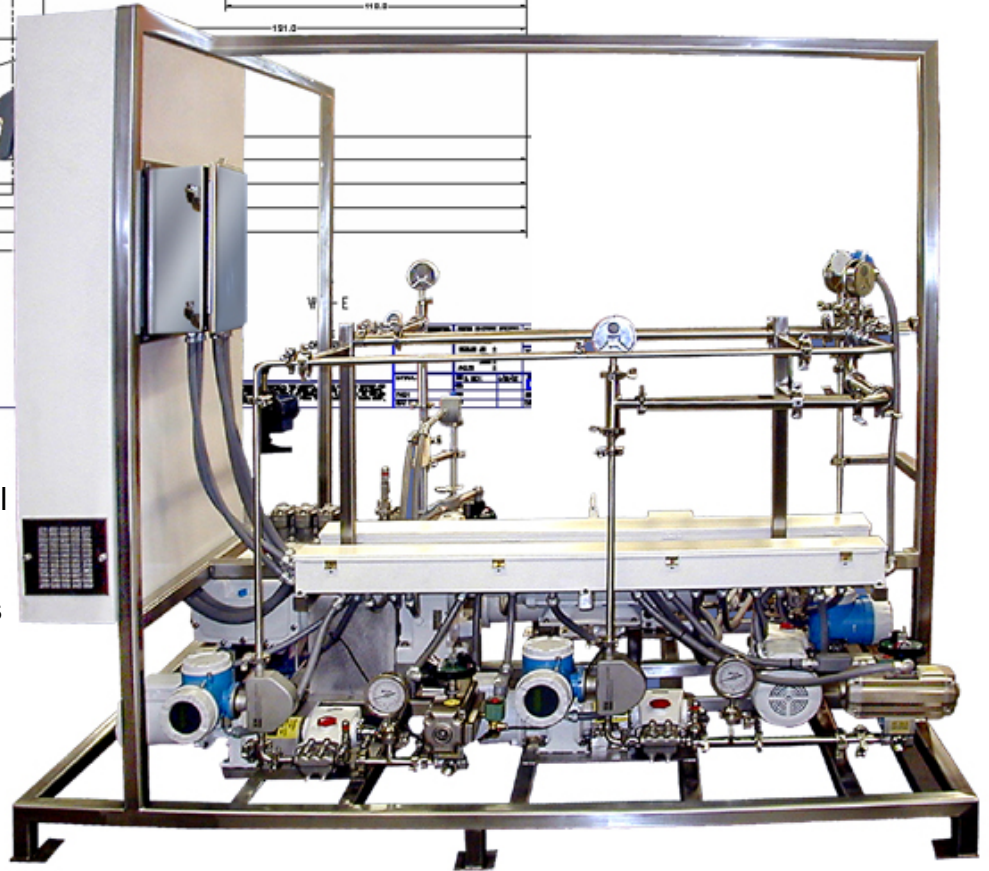
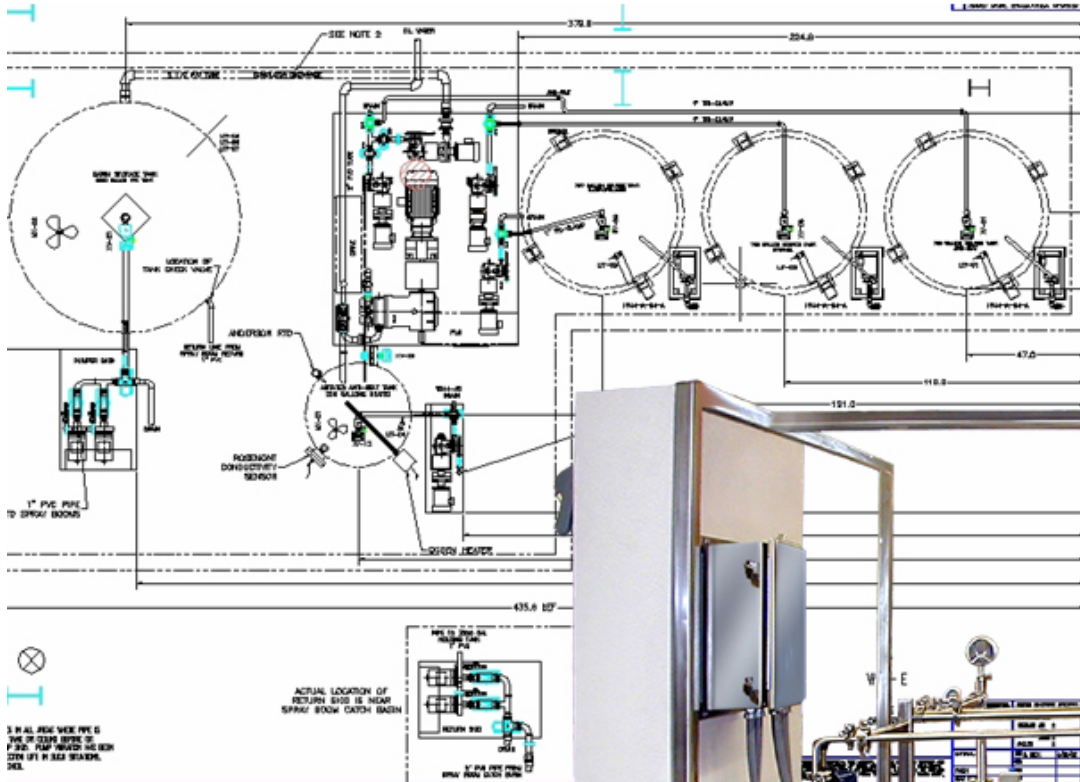
Material transfer times associated with traditional batch methods eliminated as PD pumps on Sonolator system pump material directly to final destination or filling lines

Compounding times reduced because entire batch is not heated and cooled intermittently to allow for addition of various ingredients; hot phase prepped without water.

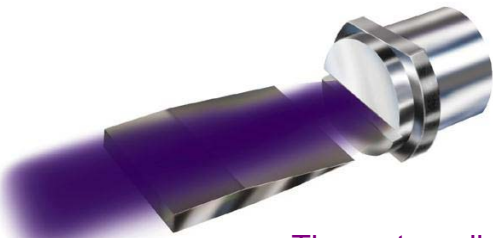


The Sonolator has been used to process a wide range of products in the Chemical industry including resins, waxes, lubricants, textile finishes and more.

Tri-Feed Sonolator
1000 PSI
30 GPM
Tanks
Level Sensors
Valves
Transfer Pumps
PLC Automation



Sonic was contracted to design a complete plant solution for a chemical company where a Tri-Feed High-Pressure Sonolator System would be used to process various oils, solvents and water. Tanks were supplied with level sensors and transfer pumps. A full PLC design was included to control the operation. A labor-intensive batch method was replaced with a continuous, on-demand Sonolator system.



The water, oil and solvent streams are metered simultaneously into the Sonolator orifice where they are subjected to pressure and shear, then projected at high speed over the blade. In this way, 4 or more streams are instantly homogenized into a finished product.

In place of manual compounding, solvents and oils were drawn off of 3 supply tanks; water was drawn from its own source. Material was homogenized in-line as it was pumped to a main holding tank. Level sensors on the hold tank would trigger the Sonolator to produce more product at exact pressure and ratios. Finish product would be drawn off the hold tank and pumped to alternate destinations all day without supervision.

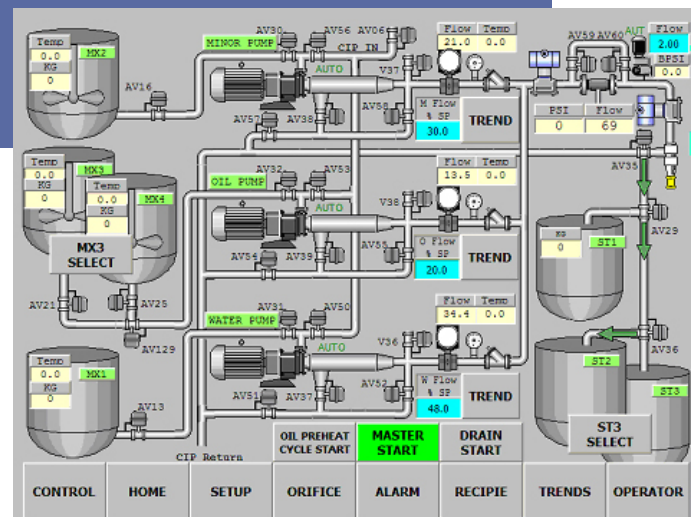
This streamline approach saved the customer considerable time and labor. Many hours of compounding and material transfers to a blend tank were eliminated. Labor-intensive supervision of a batch process was eliminated as material was drawn from storage tanks. Transferring and weighing of raw components was eliminated reducing errors and waste.

The Sonolator has been used to process a wide range of Food & Beverage products. Many companies have realized savings in time, labor and money by using Multi-Feed or Single-Feed Sonolator systems.



Creams
Sauces
Soup Bases
Vegetable Juice
Tomato Sauce
Flavor
Emulsions

Complete Sonolator systems are fabricated with progressing cavity pumps to handle a wider range of viscosities. In the food industry a customer required a system to meter water from its source with an oil phase and water concentrated phase to make various sauces for frozen foods and jars. The product yield for the money spent heating the oil phase was greatly increased as water was not placed in a tank and heated. The resulting finish product temp was significantly lower as well, eliminating much of the time-consuming cooling time required with other mixing methods. Compounding and premixing time of the phases was improved, as common ingredients comprised the phases allowing for only 1 heating cycle as opposed to several, and no cooling cycle at all. Material transfer time was eliminated as well because the material was processed in-line as it was pumped to holding tanks at the filling lines. The system was sanitary and CIP-able. A full PLC package was designed to control the unit, providing control screens, alarming, data logging, ratio control, etc.



Lab Testing and Rentals

Sonic offers complimentary lab testing to assess how well suited our equipment is to your application. Our lab is fully equipped and we offer limited analytical services such as viscosity measurement, solids, microscopy, etc.



Lab Testing at Sonic!

Lab Fully Equipped

- High-Pressure Sonolator Homogenizing System; various pumps for range of materials
- Low Pressure Blending Skids
- RotoShear In-line Mixers
- RotoMill Colloid Mills
- Steam Kettles and heating equipment
- Analytical lab to assess viscosity, solids, approx particle size and distribution

Lab Services

- Pre-mix and prepare materials; weighing and measuring, heating, agitating, etc.
- Process through specified equipment
- Collect, bottle and label all samples drawn
- Analyze samples
- Submit a detailed Lab Report including procedures, parameters and results
- Package and ship all samples to customer

Rental Systems Available!

Sonic offers a range of Rental Systems offering flow rates to 30 GPM and pressures to 5000 PSI. Most units, like the one pictured here, are 2000-5000 PSI at 1-2 GPM flow rates. Please contact us for rate quotes and delivery schedules.

