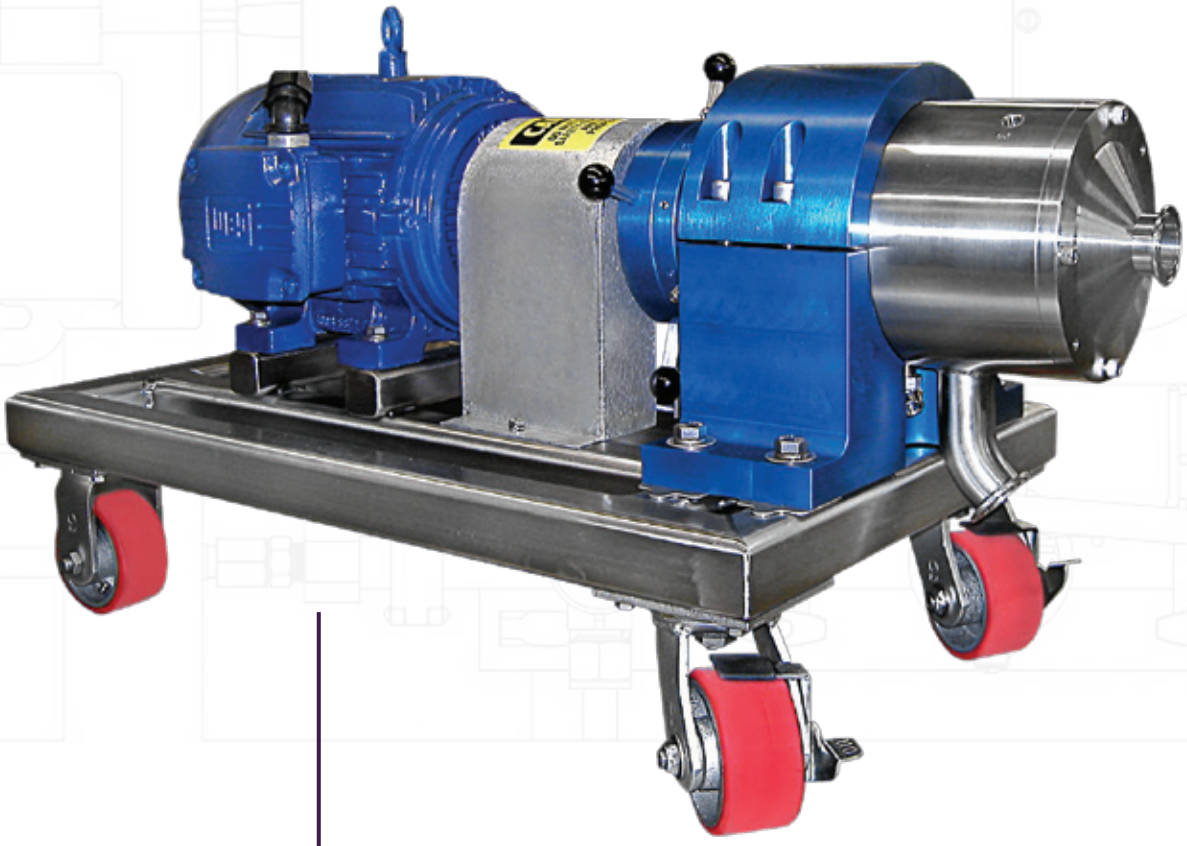
Custom Mixing and Process Equipment

Roto-Mill™

Grinding and Shearing Colloid Mills

Colloid Mill Booklet



Sonic CORPORATION

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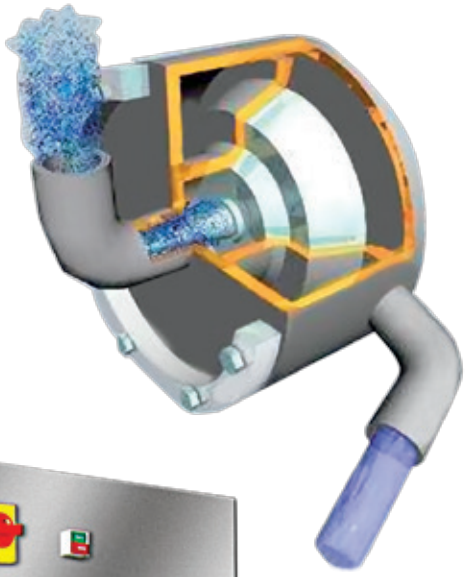
Roto-Mill Colloid Mills

Sonic's Roto-Mill Colloid Mills are designed to provide optimum particle shearing and grinding. Undispersed material is forced into a cavity formed between a spinning rotor and fixed stator. Centrifugal force propels the material to the outside of the rotor, causing intense hydraulic shearing and grinding of the undispersed phase. Sonic's rotors are designed with three high-shear areas to maximize particle disruption.



- **Insertable stator with large cooling chamber**
- **Rotor: 1500 to 7200 rpm; engineered with three angled faces for maximum shear, subjecting material to intense centrifugal force, then cavitation, then extreme grinding**
- **Auger draws in and pre-treats process material**
- **Finished product ranging from 0.50 micron and upward**

- Sizes: 2.5 to 12 inches
- 1.5 to 30 horsepower
- 2 to 1600 gal/hr flow rates
- Stone rotors and stators from 36 to 120 grit for tough applications
- 316 stainless smooth and serrated rotors and stators
- Feed pumping systems supplied with Waukesha and other style pumps

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Lab and Benchtop Colloid Mills

As shown in the chart below, Roto-Mill Colloid Mills are available in various sizes, ranging from 2.5-inch rotor size to 12-inch. The smaller 2.5-inch units are suitable for lab uses, such as new product trials, reformulation trials and process development. These units fit on a bench top or on a utility cart provided by Sonic.

Nominal Rotor Diameter	2.5"	4"	8"	12"
Motor Horsepower	1.5	5	15	30
Approximate Weight	150 lb.	300 lb.	800 lb.	1800 lb.
Gravity Flow GPH - Light Viscosity	3-15	15-50	50-250	300-1000
Gravity Flow GPH - Heavy Viscosity	2-10	10-30	40-125	200-700
Pressurized Flow GPH - Medium Viscosity @ 50 PSI	N/A	150-600	400-1000	800-1600

Full PLC Automation

The Complete Package

- Premix Station with feed pump, vessel and lab agitator
- Optional Jacketed Vessel with hot water unit for heating to 180°F
- Pressure transmitter to regulate feed pressure
- 2.5-inch benchtop Roto-Mill Colloid Mill, Full PLC Automation with control screens, alarms, parameter displays, etc.
- Lab utility cart

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Production Colloid Mills

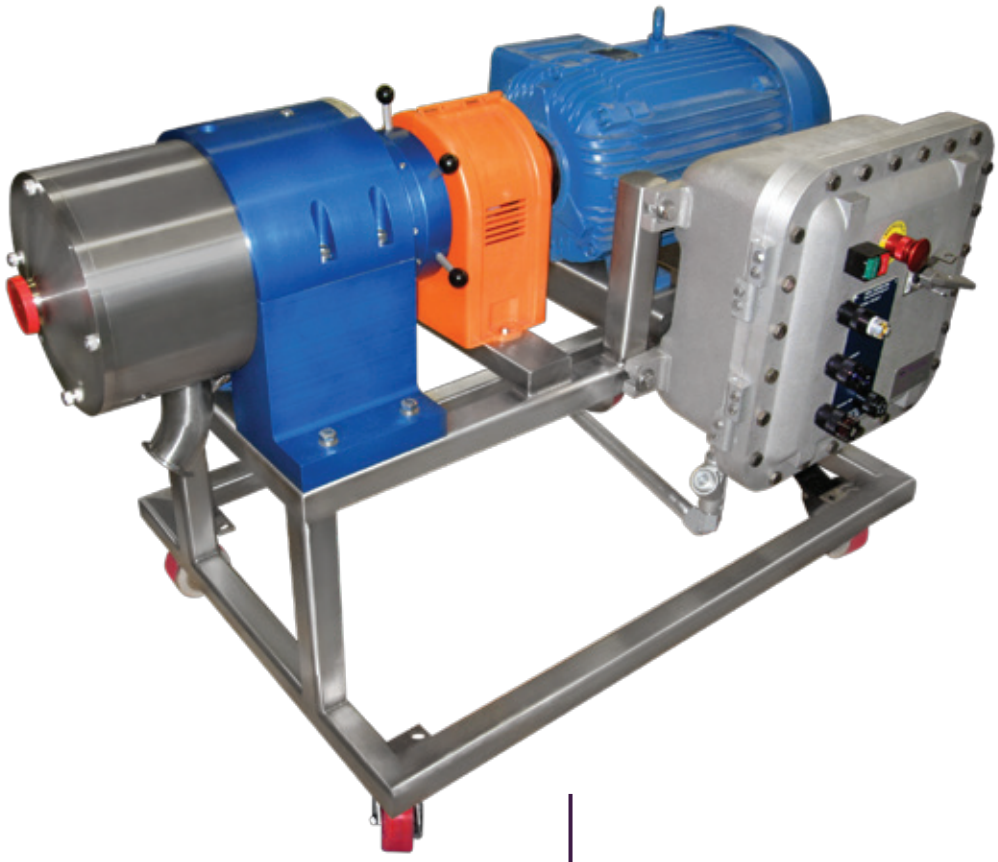
Roto-Mill Production Colloid Mills provide excellent process efficiencies by using three phases of shear and grinding per pass, allowing the mill to accomplish great results in a single pass. Sonic works with the customer to provide a mill and/or customized system with feed pump, tanks, valves and controls to meet needs.

- Complete 316 stainless steel design including motor shaft
- Rotor designs with 316 stainless smooth and serrated faces
- 36-120 grit stone rotor designs for tough applications
- Flush mechanical seals available for clean applications where product makes no contact
- Sanitary process connections available

Customized Colloid Mill System Solutions

Standard Roto-Mill Colloid Mills can be optimized via customization to allow for:

- Feed vessels
- Feed pumps
- Instrumentation
- Automation and PLC Controls
- Automated flush pumping units
- Complete cart systems



Sonic has the engineering and fabrication capabilities to add value to your Roto-Mill Colloid Mill. Customization is engineered first through 3D modeling that meets with the customer's ultimate approval.

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RotoMill Design Enhancements

In 2004 we made design enhancements to our RotoMill Colloid Mill, which was the most exciting thing happening in colloid mill technology. Its streamlined design boasts several features that make it stand out, as well as enhanced stability and performance coupled with improved maintenance characteristics.

A Better Colloid Mill for the Industry

- Robust bearing chamber houses three heavy-duty bearings at both ends of the rotating shaft to provide more stability and longer life
- Bearing chamber is removable, allowing easier access and maintenance
- Available with double mechanical seals and flush mechanical seals for clean operations
- Three-stage milling rotor/stator design subjects material to three levels of centrifugal force and cavitation in a single pass
- Insertable stator piece creates larger cooling chamber and reduced spare costs

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Seal Flushing System

Many seal flushing systems are old-fashioned, pressurized vessels that resemble something you might see on a war-era tank. Sonic has developed a new system that utilizes a PD pump, sanitary piping and a non-pressurized feed vessel. We generate the required pressure across the seal faces using a manually adjustable modulating valve. As a result, the feed vessel does not need to be pressurized. Instrumentation to indicate feed vessel level and temperature is provided, as well as a pressure sensor between the pump and the seal chamber to set the seal chamber pressure. Our seal pump can handle up to 250 psi and is a magnetically coupled pump with no seal of its own.

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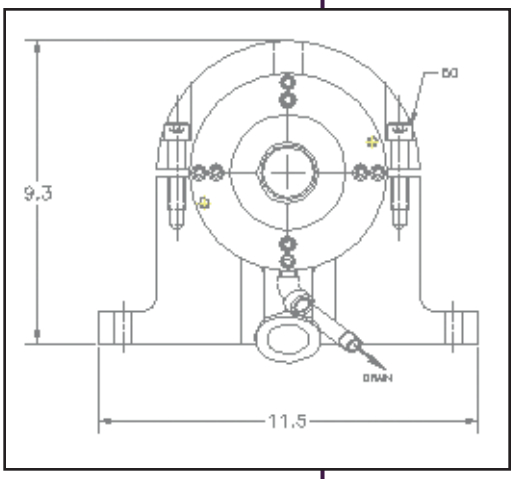
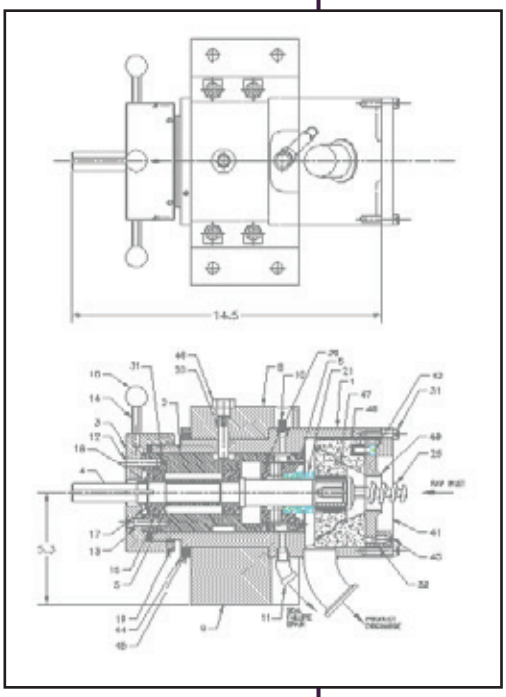
Mill Applications

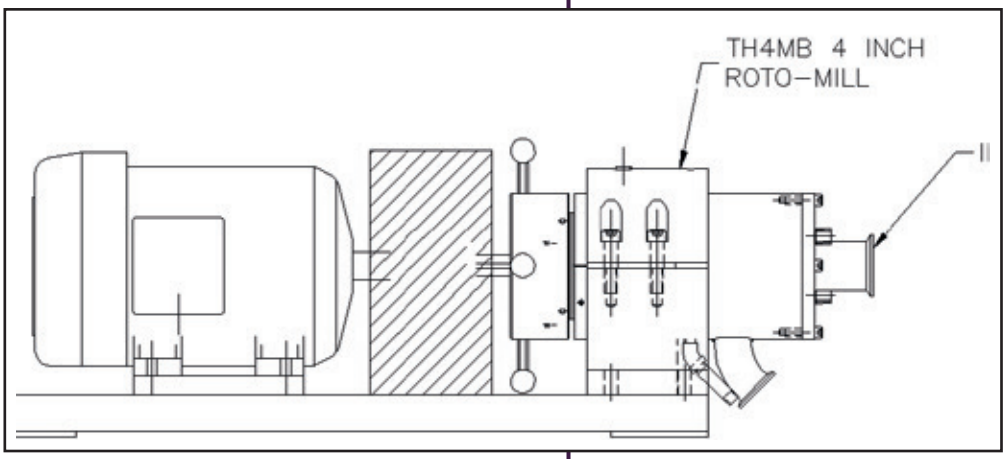
Chemical Industry
- *Asphalt emulsions*
- *Bitumen dispersions*
- *Clay and graphite dispersions*
- *Greases*
- *Latex emulsions*
- *Lubricants*
- *Pigment and dye dispersions*
- *Wax emulsions*



Food Industry
- *Chocolate toppings*
- *Mayonnaise*
- *Mustards*
- *Peanut butter*
- *Salad dressings*
- *Sauces and gravies*
- *Puddings*
- *Cocktail mixes*



Personal Care Industry
- *Creams and lotions*
- *Cosmetics*
- *Deodorants*
- *Gels*
- *Lipstick*
- *Makeup*
- *Ointments*
- *Toothpastes*



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Rotor/Stators Selection Guide

Stone
Abrasive stone rotors and stators are recommended for maximum grinding when shedding or product absorption is not critical or deleterious to the product. They produce the finest particle size and somewhat cooler product, and are the least expensive to replace. The standard material is aluminum oxide. Silicone carbide is available as an option for solids that are more abrasive or have a harder Mohs rating than aluminum oxide. Aluminum oxide has a Mohs rating of generally 8 or 8.5; silicone carbide is 9, as compared to diamond, which is 10. Different grits are available, ranging from rough (60-80 grit) to fine (120 grit). Widely used in paint and ink manufacturing, these rotors and stators are most effective when milling hard abrasive slurries. Because they are inexpensive to replace, it is also feasible to use stone in a variety of one-time applications where small particle size is required, such as in the production of pharmaceuticals.

Ni-Resist
These nickel-iron alloy rotors and stators are effective, long-wearing and easy to clean. This material is particularly suited to applications where frequent cleaning is required for change of color or product or for one-machine plants. Ni-Resist rotors and stators can run for indefinite periods at close settings without any operator attention. They are also less susceptible to damage than those made of stone. Ni-Resist is widely used in the production of all kinds of commercial dispersions not requiring the fine particle size achieved with stone and where corrosion is not a problem.

Stainless Steel
Manufacturers of most food, pharmaceutical and cosmetic products require stainless steel to meet sanitary requirements. In general, stainless steel does not mill as effectively as stone or Ni-Resist, nor is it as economical to use. When starting up, care must be taken to adjust for the expansion, which occurs when the mill warms up to normal operating temperature. Performance can be enhanced by the selection of the proper style of rotor and stator. Smooth and serrated styles are available. Stainless steel is also recommended when working with chemicals with high or low pH because it is corrosion-resistant.

Notes...

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For more detailed information or equipment recommendations, please contact us directly:

One Research Drive
Stratford, CT 06615
Phone: 203.375.0063
Fax: 203.378.4079
www.SonicMixing.com

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