



Innovation in

Planetary Mixers

Ross Planetary Mixers

THE WORLDWIDE STANDARD FOR QUALITY, RELIABILITY AND INNOVATION

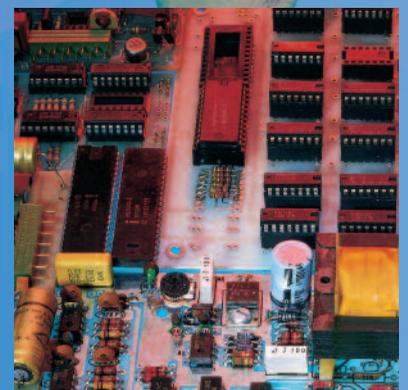
Ross has been the leading manufacturer of planetary mixers around the world since we introduced the original Double Planetary Mixer more than 75 years ago.

Today, Ross operates five plants in the USA, along with Ross owned plants in China and India. The Ross family of planetary mixers includes sizes from 1/2-pint to 750 gallons – and a multitude of options to meet the needs of any industrial application.

THE WORLD'S LARGEST INVENTORY OF MIXERS IN STOCK FOR FAST DELIVERY

Our multi-million dollar inventory of mixers and blenders is your ultimate assurance that you can have the equipment you need, when you need it.

Test on your own process line – After you have tested a Ross planetary mixer in our laboratory, a Ross trial unit allows you to evaluate our mixer in your own plant before you buy it.





*The original
Pony Mixer –
early 1900s.*

The Ross record of innovation

Since Ross introduced the change-can Pony Mixer just over 100 years ago, Ross innovations have delivered enormous increases in production capacity and flexibility. No other manufacturer can match Ross's experience in building systems for vacuum mixing and drying, solvent recovery, hands-free discharge, and integrated process control.

Ross has led the evolution of planetary mixer design for more than 75 years. Today, our leadership continues with breakthrough designs in planetary stirrers and next-generation systems for digital control and data management.



*The new DPM Double
Planetary Mixer –
designed for ultra-high
viscosity materials.*



Pioneering design in planetary mixing

The world's first change-can mixing system

The original Double Planetary Mixer

Vacuum mixing technology and techniques

Integrated discharge systems

Orbital temperature probes

PowerMix planetary/disperser mixers*

*HV Planetary Blades**

The Ross Double Planetary Mixer

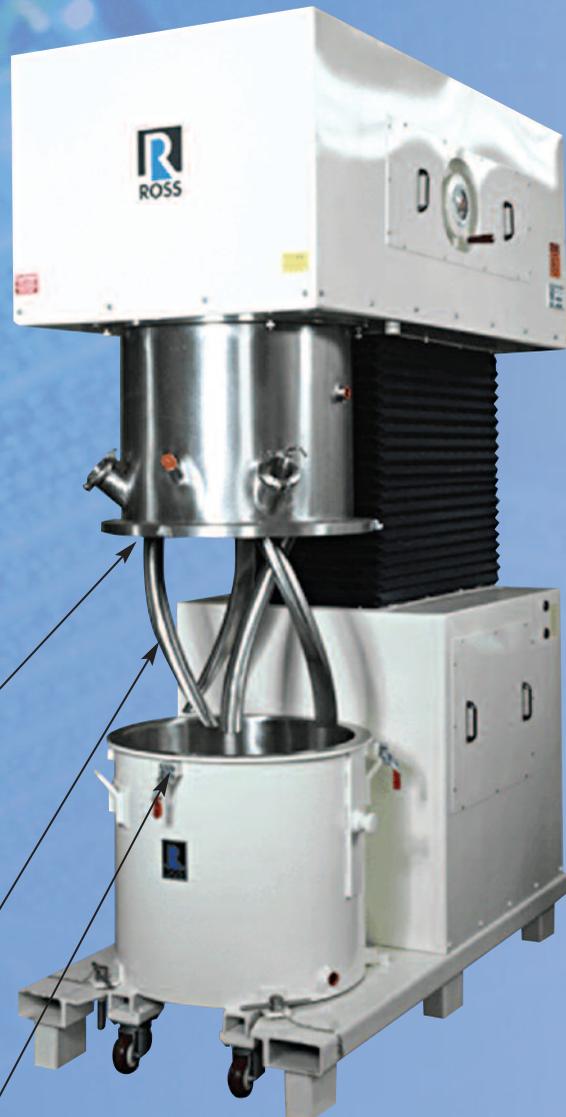
POWER AND PROCESS FLEXIBILITY

Ideal for mixing and kneading viscous pastes or putty-like materials, the Ross Double Planetary can be engineered for operation in many industries, from hot melt adhesives to microelectronics manufacturing. Configurations are available to apply the precise combination of power and shear rates you require, and Ross technical experts are available in our laboratory to help optimize your mixing process.

The new DPM Double Planetary Mixer can handle many ultra-high viscosity materials that have generally required a double-arm kneader. The Double Planetary Mixer provides an alternative that is much less expensive, and requires less maintenance. Unlike the double-arm kneader, the standard Double Planetary Mixer has no packing glands or bearings submerged in the product zone. Sizes range from 1/2-pint to more than 750 gallons.



Now you can see an online demonstration of the Ross Double Planetary Mixer in action! Point your web browser to our homepage, and click on "Animations."
www.planetarymixers.com



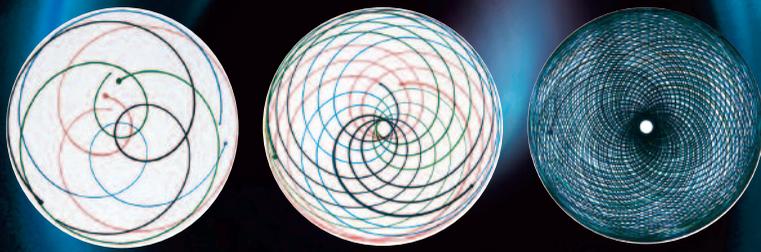
Precise machining for superior vacuum capabilities – Vacuum hoods and interchangeable vessels are precisely machined for a perfect fit. The result – you can sustain an extremely high level of vacuum (29" Hg).

HV Blades for ultra-high viscosities – The helical curve and graduated down-thrust cross-section of the new HV Blades prevent heavy materials from "climbing" up into the vacuum hood and charging ports. A smooth mixing action eliminates torque spikes during the mixing process and significantly increases the viscosity range of the Double Planetary Mixer.

Seal selection to match your performance requirements – Numerous options are available for sealing the drive shaft, stirrer shafts and the vacuum hood. Seal designs include such choices as Teflon chevron v-rings, dry-running mechanical seals, elastomeric o-rings, and lip seals in materials such as Nitrile, Viton, silicon and Kalrez.

Our sleek new DPM Double Planetary design encloses the drive components and auxiliary equipment.

Our integrated control systems are designed and built by Ross Systems and Controls. They can be pre-programmed and pre-wired, so start-up is fast and inexpensive. No need for third-party installers.



Blade motion during
1 revolution

3 revolutions

After only 36 revolutions, the blades of the Double Planetary Mixer have contacted virtually the entire batch.

DOUBLE PLANETARY MIXER OPERATION

In a Ross Double Planetary Mixer, two planetary blades rotate on their own axes, while they orbit the mix vessel on a common axis. The blades continuously advance along the periphery of the vessel, removing material from the vessel wall and transporting it to the interior.

This positive mixing action serves several purposes.

Complete mixing – In only a few minutes, the blades pass through every point in the vessel and promote fast and thorough mixing.

Efficient heat transfer – By preventing a layer of material from accumulating on the vessel wall, the mixer ensures efficient heat transfer and even distribution of heat throughout the batch – critically important concerns for heat-sensitive materials.

Now, ultra-high viscosity capacity with HV Blades – The mixer can handle materials of extremely high viscosities. With conventional blades, the Double Planetary Mixer can operate up to approximately 1.5 million centipoise.* With Ross HV Blades, specially designed for heavy materials, the operating limit is much higher – approximately 6 million centipoise.

* At very high levels, the measure of viscosity is an extremely subjective process. In addition, many variables besides viscosity must be considered when determining the operating limits of any mixer. Contact Ross to discuss the key parameters that must be considered in your application.

Select the right blade design, and the right flow pattern, to optimize the mixing process in your application.



HV Blades – Ross's patented HV Blades produce excellent axial and radial flow, and easily handle medium to ultra-high viscosity materials. The HV Blades prevent heavy batch materials from "climbing-up" the blades – extending the working range of the Double Planetary Mixer by several million centipoise.



Rectangular Blades – The proven choice for many low to high viscosity applications, these blades mix with a powerful kneading action. They are suitable for thorough wet or dry blending regardless of the product's flow characteristics.



Finger Blades – Ross Finger Blades are often preferred for special applications that require the mixing of delicate solids and fibers. These blades can also be custom designed to fine-tune axial flow – and meet the specific requirements of your application.



Ross provides many designs specialized to meet the needs of demanding applications. Sanitary Double Planetary Mixers, for example, are available in all sizes, with a variety of polishes. Special valve options, including flush bottom radial diaphragm valves and flush bottom ball valves, are available to simplify cleaning.

Ross offers many lift options to accommodate the special needs of your application. In this 300-gal. Double Planetary Mixer, a dual-post lift offers increased strength for handling high-viscosity materials. It also allows easy handling of mix vessels from either side of the mixer.



With heavy duty construction and exceptional adaptability, the 2 gallon Double Planetary Mixer is our most popular size for laboratory applications – especially for small-scale production leading to scale-up. The change-can design is ideal for use with an auxiliary discharge system, to meet special handling and filling requirements.



This 1/2-pint sanitary, stainless steel DPM Double Planetary Mixer addresses special requirements for cooling, heating, internal pressure and vacuum mixing. It is often selected for small-volume production involving costly materials such as precious metals and pharmaceuticals.

Double Planetary Mixer Applications

Abrasives – Grinding wheels

Adhesives – Silicones, epoxies, caulks

Batteries – Conventional and advanced fuel cells

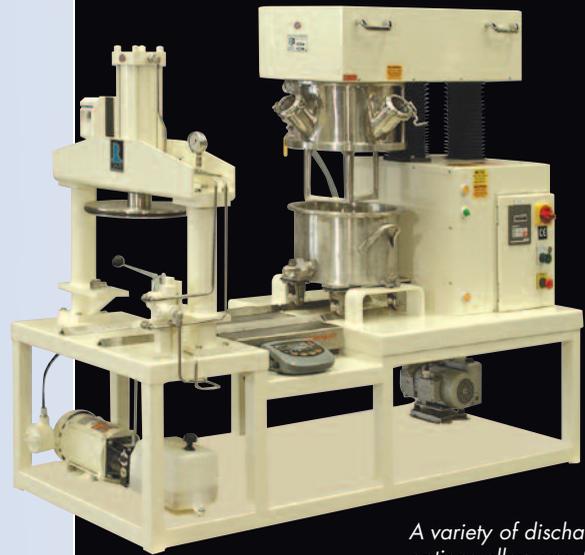
Dental Composites – Pastes, gels

Electronics – Dense metallic slurries and thick film pastes

Metal Powder – Drying and blending

Plastics – Syntactic foam, plastisols

Waste Treatment – Solidification for disposal



A variety of discharge options allow you to reduce material handling and increase throughput. This 4-gal Double Planetary Mixer is equipped to discharge finished product directly into cartridges.

Double Planetary

Model	Horsepower	Mix Capacity (Liters)
DPM-0.5 Pt.	.33	.25-Pt. – .50-Pt. (.12 – .25)
DPM-1 Pt.	.33	.50-Pt. – 1 Pt. (.25 – .50)
DPM-1 Qt.	.50	.50-Pt. – 1 Qt. (.24 – .95)
DPM-1 Gal.	1	1-Pt. – 3.5 Qt. (.50 – 3.3)
DPM-2 Gal.	1	1 Qt. – 1.5 Gal. (.95 – 5.7)
DPM-4 Gal.	1, 1.5	1 Qt. – 4 Gal. (.95 – 15.2)
DPM-10 Gal.	2, 3, 5	2 Gal. – 12 Gal. (7.6 – 45)
DPM-25 Gal.	5, 10, 15	5 Gal. – 25 Gal. (19 – 94)
DPM-40 Gal.	5, 10, 15	5 Gal. – 40 Gal. (19 – 151)
DPM-75 Gal.	10, 20, 30	10 Gal. – 75 Gal. (37.9 – 284)
DPM-100 Gal.	10, 20, 30	10 Gal. – 100 Gal. (37.9 – 378)
DPM-150 Gal.	20, 30, 40	20 Gal. – 150 Gal. (75.5 – 567)
DPM-200 Gal.	20, 30, 40	30 Gal. – 200 Gal. (113.5 – 757)
DPM-300 Gal.	50, 75, 100	75 Gal. – 300 Gal. (284 – 1,135)
DPM-500 Gal.	150	150 – 500 Gal. (570 – 1,900)
DPM-750 Gal.	150	200 – 750 Gal. (570 – 2,850)

The Ross PowerMix

THE MOST VERSATILE PLANETARY MIXER EVER CREATED

The patented Ross PowerMix* offers remarkable versatility, which makes it ideal for applications in which a series of mixing stages require several types of mixing action.

In one continuous mix cycle, for example, the PowerMix can apply high shear and quickly disperse a powder in a low-viscosity liquid. As the material thickens, the PowerMix can continue the mixing process even after the product has reached a high-viscosity, non-flowing state.

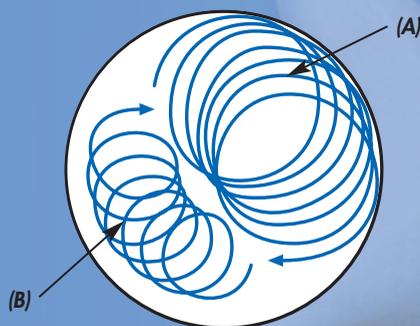
With this versatility, the PowerMix can often combine the mixing action of two mixers – allowing you to retire two pieces of equipment – and cut the cycle time by 50% or more.

POWERMIX OPERATION

The PowerMix is unique because it combines a planetary blade and a high speed disperser with the characteristic planetary motion of a Double Planetary Mixer. Both agitators are in constant motion. The planetary blade continuously sweeps the vessel wall and feeds material directly into the high shear zone of the orbiting high speed disperser – accelerating the mixing process.



To see an online demonstration of the Ross PowerMix in action, point your web browser to our homepage, and click on "Animations." www.mixers.com



In the Ross PowerMix, the planetary blade (A) and HSD (B) revolve on their own axes, while they both orbit the vessel on a common axis. By constantly advancing the agitators into the batch material, the PowerMix can apply intense mixing action while it prevents the localized build-up of heat.



The Ross PowerMix can be supplied with your choice of high speed, high shear agitators. Here, a high speed chopper blade substitutes for a high speed disperser. Multiple high speed disperser blades can also be supplied, with their positions adjustable on a single shaft.



Lab models, like this 2 gallon PowerMix, are extremely efficient for either benchtop process development or small-volume production. Scale-up is smooth and predictable. Lab models are often supplied with a discharge system mounted on the same bench – a highly efficient, self-contained system.



The use of multiple change cans can transform a traditional batch mixing system into a semi-continuous system. Efficiency increases measurably as one can wheels away from the mixer for discharge while another rolls into position immediately to begin mixing the next batch.



Many PowerMix units, like this one, are built with a jacket and a thermocouple for monitoring batch temperature during the mix cycle. For applications involving heat-sensitive materials – in which thermal control is critical throughout the mix cycle – Ross engineers have developed a sensor that orbits the vessel and travels through the batch material. Readings are extremely accurate.

PowerMix

PowerMix Model	Planetary Horsepower	Disperser Horsepower	Mix Capacity in Gal. (Liters)
PDM-0.5 Gal.	.50	1	.15 – .50 (.85 – 2)
PDM-2 Gal.	1	2	.75 – 1.5 (3 – 6)
PDM-4 Gal.	1.5	3	2 – 4 (5.5 – 15)
PDM-10 Gal.	3	3, 5, 7.5	4 – 12 (15 – 46)
PDM-40 Gal.	7.5, 10	10, 15, 20	10 – 40 (36 – 151)
PDM-100 Gal.	15, 20	20, 30, 40	30 – 100 (120 – 379)
PDM-200 Gal.	25	30, 40, 50	66 – 200 (250 – 757)
PDM-300 Gal.	40	50, 60, 75	100 – 300 (380 – 1,136)
PDM-400 Gal.	40, 60	60, 75	150 – 400 (570 – 1,514)
PDM-500 Gal.	60	100	200 – 500 (760 – 1900)
PDM-750 Gal.	60	150	200 – 750 (760 – 2850)



Check out the most recent application information available for the Ross Double Planetary

Mixer and the Ross PowerMix. Point your web browser to our homepage, and click on "Technical Reports and Articles."

www.mixers.com

Applications

Electronics – Thick film inks

Sealants – Urethanes and silicones

Adhesives – Hot melts and formulated epoxies

Plastics – Sheet molding compounds, plastisols

Ceramics – Slurry dispersions

Propellants – Automotive air bags, munitions

Coatings – Conductive and security inks, and specialty coatings

OTHER HIGH PERFORMANCE OPTIONS

Ross design and application engineers are the best in the business. They can recommend a package of options that will ensure that your new planetary mixer will deliver superior performance for many years.

- Internal pressure
- Complete vacuum and solvent-recovery systems
- Explosion-proof designs
- Jackets for heating and cooling the batch
- Bottom and side-wall scrapers
- Discharge systems for bulk discharge and cartridge filling
- Sanitary design
- PLC control systems
- Solenoid operated valves for hydraulic lift and discharge valve – for remote/automated control
- Devices to measure and monitor torque
- Drum mixers
- Reverse lift designs

MATERIALS OF CONSTRUCTION

Ross is uniquely equipped to provide a PowerMix or Double Planetary Mixer built to handle your application reliably. With world class fabrication facilities, we can work with virtually any material – and guarantee that the job is done right.

- Hastelloy
- Aluminum
- Titanium
- Carbon or stainless steel, including:
 - ASTM A36
 - SA516 Grade 70 for pressure vessels
 - SA240 Type 304
 - SA240 Type 316
 - 8620 special alloy hardened steel for shafts
 - Other specialty grades

SPECIALTY COATINGS

To provide an extra measure of protection against wear, Ross offers a variety of coatings for all its planetary mixers. These may be applied to the vessel wall, the agitators, or to all interior surfaces contacting the product.

- Kynar
- Teflon
- Tungsten carbide
- Nylon
- Halar

DRIVE OPTIONS

A variety of drive systems are available for both the Ross Double Planetary and the Ross PowerMix. Electric drives are standard. Electronic variable speed control is a popular option, because it enables you to start the mixer under heavy load and fine-tune the mixing process. Ross can also provide hydraulic drives for planetary mixers in any size.

Automated Discharge of Viscous Products

A Ross Discharge System can eliminate wasted hours scraping heavy or sticky materials from a mix vessel. With push-button simplicity, the system can automatically discharge a batch in minutes – into bulk containers, filling or packaging equipment, an extruder, or a two or three-roll mill. The system easily handles non-flowing products up to several million centipoise. By combining the Discharge System with a set of interchangeable mix vessels, you can make your operation even more productive. Change Cans from multiple mixers can be rolled to the Discharge System for fast discharge, then rolled away for cleaning as the next Change Can is positioned for discharge. This flexibility can boost production on several process lines, all working with a single Discharge System.

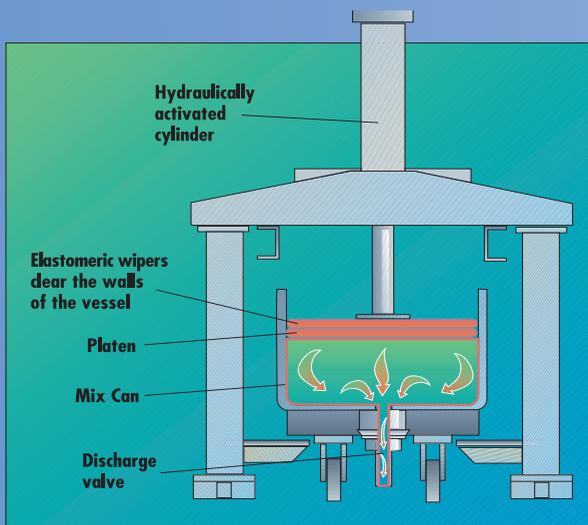
The Ross Discharge System improves plant safety, because it lowers the risk of injury while scraping heavy materials from the mix vessel. It also reduces the operator's exposure to the batch material, while it helps to minimize the release of vapors into the plant atmosphere. Ross Discharge Systems are available for use with Ross mixers and for mixers built by many other manufacturers. Many options are available to suit the special requirements of virtually any application.



Sanitary 4 gallon Lab Model – For applications involving pharmaceuticals, cosmetics, personal care or food products, we offer a Sanitary design for full GMP compliance with an all-stainless-steel support structure.

Elevated Production Model –

Ross provides Discharge Systems in a variety of configurations. Our Elevated Discharge System raises the change can for discharge and allows room for a receiver to be positioned beneath the vessel. Standard sizes are available from 10 through 1000 gallons.



With the Change Can positioned beneath the Discharge System, a stainless steel platen is lowered hydraulically into the vessel. The product is forced out through a valve in the side or bottom of the vessel, or through the top of the platen. For the discharging of thermoplastic materials, the platen may be jacketed for heating.



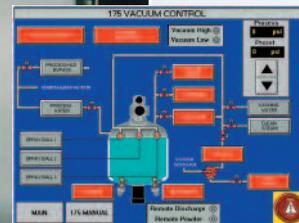
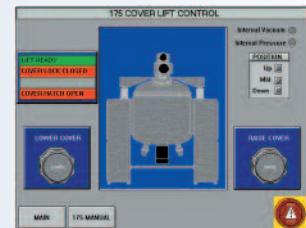
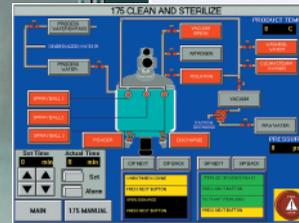
Standard 2 gallon Lab Model with Mixer on common bench –

The lab models are often mounted with a dedicated mixer system on a common bench.

Control Systems

Ross offers a complete line of control systems that are pre-programmed/pre-wired for turn-key start-up and long-term flexibility. With many options available, Ross can build multi-agitator and PLC/PC-based control systems with all the functionality you need for efficient data acquisition and process control.

Our new streamlined, built-in designs reduce cabling while they simplify maintenance. Routine operation is also simplified. Intelligent menus reduce the risk of error while they help improve process consistency.



Ross control options include turn-key automation, datalogging, trend analysis, and a simple interface with your PLC and production management system.

LONG TERM QUALITY ASSURANCE – IN OUR TEST AND DEVELOPMENT CENTER

Before you buy *any* mixer or blender, Ross strongly recommends a test in a well-equipped analytical laboratory. In the Ross Test and Development Center, you will have an opportunity to test *using your own ingredients* and a variety of equipment. A close simulation of actual conditions on your process line is essential to accurately predict machine performance.

Once you've identified the right mixer for your application, our mixing experts will help you fine-tune your process. Sophisticated analytical instruments enable us to document each test sequence and proceed methodically.

To learn more about our extensive test facilities, visit our website: www.mixers.com.



SUPPORT YOU WON'T FIND ANYWHERE ELSE

Ross planetary mixers are engineered to outlast all others. They can provide many *decades* of service.

Throughout the life of your mixer, Ross stands beside you with a complete package of support.

- **World class experts on call** – Experts with years of experience maintaining planetary mixers.
- **Chances are we have your parts in stock** – We maintain the world's largest inventory of spare parts – so you don't have to. Even if you suddenly need a gearbox for a 30 year old Ross Double Planetary Mixer, chances are we have one ready to ship immediately. We ship most orders for spare parts in less than 48 hours.

Contact Ross today for detailed information on any of the products and services we offer, or to schedule a test in the Ross Test & Development Center, call **1-800-243-ROSS** in the USA, or 631-234-0500.
Fax: 631-234-0691.
E-mail: sales@mixers.com.
Or visit Ross on the web:
www.mixers.com



Charles Ross & Son Company

710 Old Willets Path
Hauppauge, NY 11788-0615
USA Tel.: 800-243-ROSS
Overseas: 631-234-0500
Fax: 631-234-0691
E-mail: sales@mixers.com
Internet: www.mixers.com