Evolutionary Engineering

ROSS



Where the warm waters of the Sea of Cortez swirl into the Pacific, 50 miles south of the Tropic of Cancer, a giant glides in the cool depths. With unblinking eyes she scans the shimmering surface for prey...

ROSS PLANETARY MIXERS

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ROSS

DOUBLE PLANETARY MIXERS

Thousands of Ross Double Planetary mixers are at work today on process lines around the world. They are producing a vast variety of products in countless applications – from simple mixtures to sophisticated reactions involving vacuum, internal pressure, close blade to bowl clearance and controlled mix temperature.

The Ross Double Planetary Mixer today is the product of many Ross innovations. Stirrer design and rotation are highly evolved for optimal mixing efficiency. With no packing glands or bearings in the product zone, contamination is virtually eliminated. And with the Ross Change Can, the mix vessel can easily be rolled away for remote discharge when the mix cycle is complete. A new change can is then rolled into place, and productivity increases dramatically. Decisive innovations such as these have secured a dominant position for Ross in Double Planetary Mixers for more than 50 years.



Beneath the shadow of a drifting weed line, she turns into the current, all but invisible to anything swimming above her. The upper surface of her body, a deep blue-black, is as dark as the sea beneath her. With an underside of silver and grey she is invisible from below as well. She is a solitary hunter. Of all the great billfish–the sailfish or the four marlin: blue, white, striped or black – she is the most fierce. The blue.

She wields two terrifying weapons: her eight-foot pike and a powerhouse of strength behind it. With a flash of her tail she tears into a school of mackerel at 45 mph, her bill lashing from side to side, leaving fish stunned and shredded behind her. Then she turns and one by one swallows them whole.

At 1,300 pounds she dwarfs the males of her species, and her power is explosive. She strikes a tuna senseless with a single blow of her pike. Striking again from below she hurls him through the air like a toy. She leaps from the sea and dances on white caps. She crashes back into the sea more than forty meters away, throwing an explosion of spray into the wind.

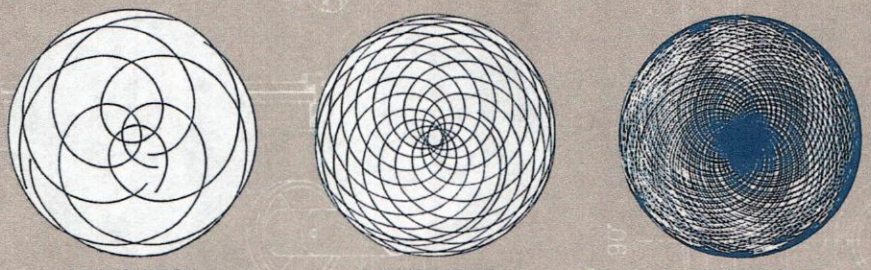
The generation of great power is a design goal as old as design itself, but it is one that can never be truly satisfied. At each step in the evolutionary process, familiar engineering concepts combine to yield new designs – which make new applications possible, and these inevitably impose new goals for even greater power and control ...Ross planetary mixers have evolved to meet this challenge. They are the finest in the world. And now the family includes the PowerMix, the most highly evolved of them all.

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MIXING PATTERNS

The orbital mixing pattern of the Ross Double Planetary mixer ensures homogeneity of the mix within a few minutes. While the two planetary stirrer blades revolve around the mix vessel on a common axis, each blade revolves on its own axis and advances along the tank wall.

Together the stirrers cover every point in the vessel, which ensures complete mixing regardless of the flow characteristics of the mix. Close blade to bowl clearance available.

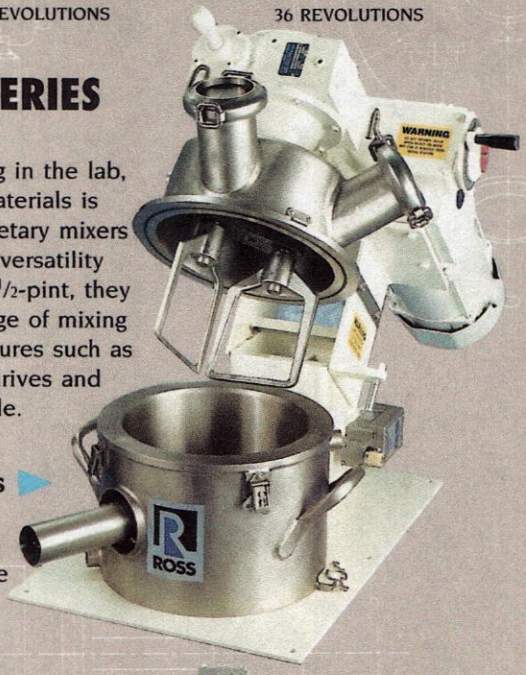


1 REVOLUTION | 3 REVOLUTIONS | 36 REVOLUTIONS



LDM LABORATORY SERIES

In process development and testing in the lab, where conservation of costly raw materials is often critical, the Ross Double Planetary mixers are renowned for their outstanding versatility and efficiency. In sizes as small as 1/2-pint, they are fully configured for a broad range of mixing applications. High performance features such as vacuum, pressure, variable speed drives and sanitary construction are all available.



LDM 1, 2 or 4 gallon mixers

These mixers are ideal for labs producing viscous materials that do not flow. A constant torque, variable speed drive provides the power, while an optional 15 psig jacket ensures efficient heat transfer.

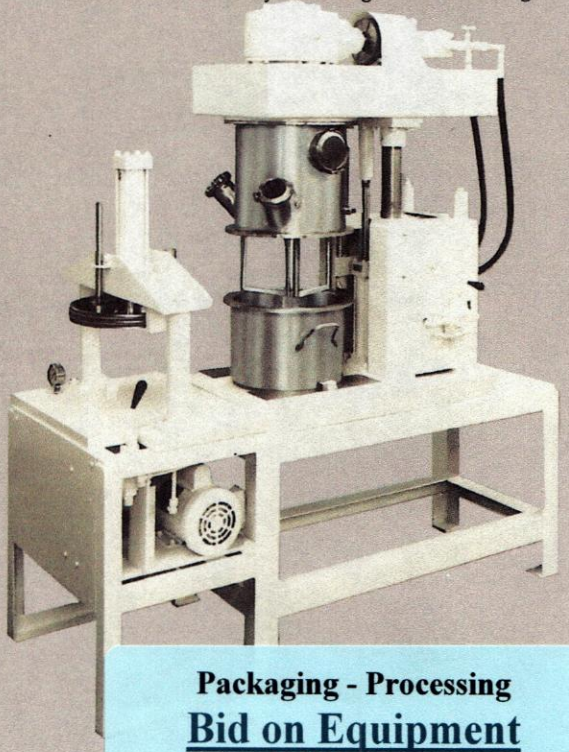
Once the mix cycle is complete, a Ross Discharge System (right) can make the transfer and cleaning process fast and easy. A platen lowered hydraulically into the change can forces the mix through a discharge valve in the bottom or side of the can, or through a valve in the platen itself. The mix is then transferred directly to a secondary vessel or to a cartridge-filling attachment.



LDM 1-Quart Mixer

Ross builds the Double Planetary mixer shown above in 1/2-pint, 1-pint and 1-quart capacities. In any size, the mixer is superbly constructed and designed for unmatched versatility on the benchtop. Vacuum construction and a jacketed mix vessel are standard. All wetted parts are of type 304 stainless steel. The powerful 1/2-hp motor that drives the unit is coupled with an AC inverter to add variable speed control as well.

Dual ports allow inspection and charging during the mix cycle. The mix vessel, which lowers vertically from the vaccum hood, is removable for easy discharge and cleaning.



LDM 4-gallon with vertical lift.

To provide increased shear rates, this hydraulically-driven 4-gallon model (right) is equipped with a vertical lift assembly that permits extremely close tolerances between the stirrer blades and the vessel wall. The discharge system shown alongside the mixer allows fast transfer of mixed materials with a minimum of handling and delay.

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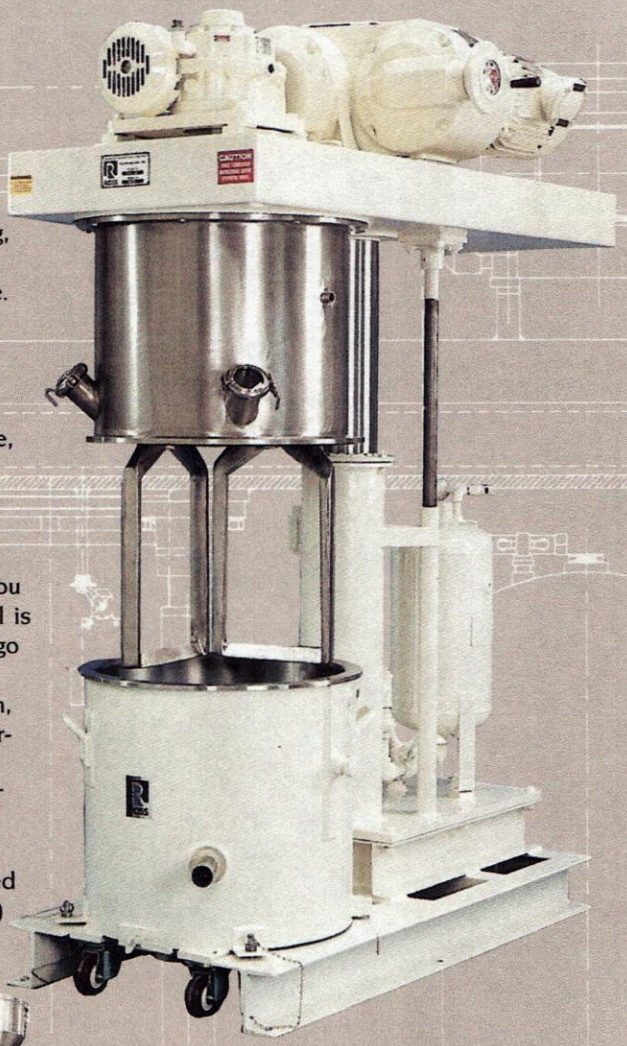
HDM PRODUCTION SERIES

Ross Double Planetary mixers are at work today on process lines around the world, producing superior end-products, shortening mixing cycles and cutting costs. Most are equipped for vacuum mixing and drying, and all include a hydraulic lift, which raises the stirrers out of the mix for easy cleaning and allows the change can to be removed for efficient discharge.

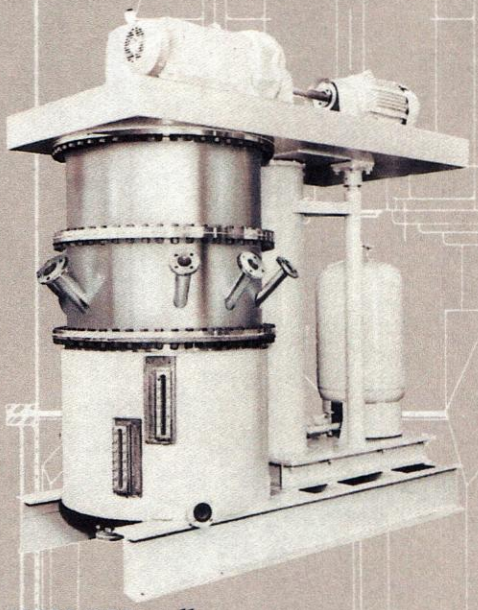
Vacuum mixing and drying, both specialties at Ross, are powerful tools for improving both the quality of your end-product and the efficiency of your process line.

Vacuum can eliminate voids which may otherwise occur in many end-products – thus improving quality and reducing waste. On the process line, mixing cycles are nearly always shorter under vacuum, and the work environment is cleaner. Vacuum mixing and drying help to contain free solids and solvents which might escape from a non-vacuum mix vessel into the atmosphere.

The Ross change can design also multiplies productivity, by allowing you to simply roll a second vessel into position for mixing while the first vessel is being discharged. Equipment utilization and production throughput both go up dramatically.

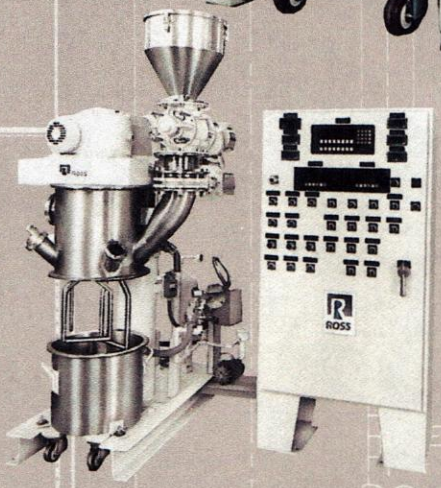


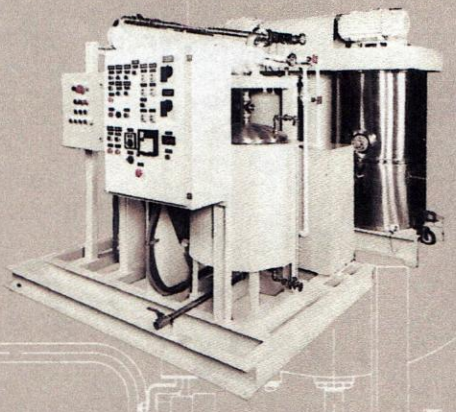
To match any application, Ross production units generally range from 10 to 300 gallon capacity – with larger sizes available in special applications. Single speed, two speed and variable speed drives (electric or hydraulic) are available.



HDM 200-gallon internal pressure design.

The Ross engineering and design department is fully equipped to customize any of our designs to match any application. This HDM 200-gallon Double Planetary mixer (above) was configured for vacuum and internal pressure. It is also fitted with an ASME Code 50 psig jacket for heating or cooling. Note the additional external sight glass assembly.

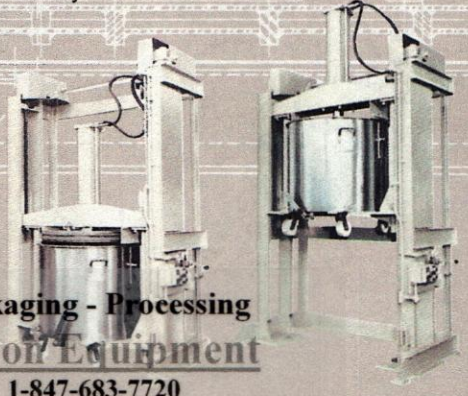




INTEGRATED PRODUCTION SYSTEMS

All Ross mixers are engineered both to meet your production requirements and to fit properly into your production environment. Often this requires system additions at both the front-end and back-end of the mixing process.

Complete, computerized control systems automate the mixing process and ensure both consistency and flexability. All mixing parameters – from individual agitator control to vacuum drying and programmed thermal control at key mixing stages – can be pre-set for a variety of mix recipes. These can easily be updated at any time, as production evolves.



Direct discharge adds another important dimension to Ross mixing. The Ross Discharge System allows virtually hands-free transfer of the mixed material to a secondary mix vessel or directly to metering, dispensing and packaging equipment. Operator contact with the material is reduced – which enhances operator safety and reduces the risk of contamination. By eliminating redundant equipment, the Ross Discharge System can also save time and significantly reduce production cost.

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TYPICAL APPLICATIONS

ADHESIVES
Hot Melts
Silicones
Rubber cements
Epoxies
Polyurethanes

PHARMACEUTICALS
Dental composites
Gelatin compounds
Toothpaste
Granulations

CHEMICALS
High performance ceramics
Special insulators
Pyrotechnics
Rubber additives
Battery pastes
Abrasives
Tungsten carbide powders
Precious metals

PLASTICS
Plastisols
Polyesters
Organosols
DOP Dispersions

COATINGS
Conductive inks
Thick film pastes
Paints
Printing inks
Textile colors

FOODS
Confectionery products
Soup bases
Food colors
Sugar substitutes

SPECIFICATIONS

LDM MIXERS

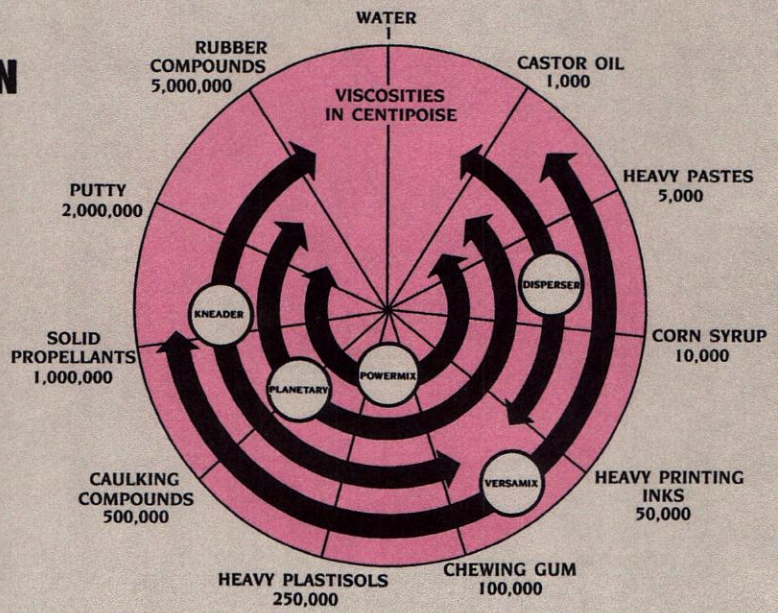
MODEL	MIXING CAPACITY (LITERS)	FULL HOLDING CAPACITY IN GALS. (LITERS)	HORSE POWER	ORBITAL SPEED RPM	STIRRER ON OWN AXIS RPM	WEIGHT LBS. (KG) *	CUBIC FEET	A	B	C	D	E	F	G	H	J *
1/2 Pt.	1/4 Pt.–1/2 Pt. (.12-.25)	0.1 (.04)	1/3	10-30	30-90	165 (75)	16	3 1/2"	2 1/2"	3"	2"	16"	12"	23"	20"	23"
1Pt.	1/2 Pt.–1Pt. (.25-.50)	.25 (1.0)	1/3	20-72	24-78	190 (85)	16	4 3/4"	3 1/4"	4 1/4"	1 1/2"	20"	12"	23"	20"	23"
1Qt.	1/2 Pt.–1Qt. (.24-.95)	.45 (1.89)	1/2	20-86	22-98	200 (100)	16	5 7/8"	4"	5"	1 1/2"	21 3/8"	13 1/2"	15 3/4"	25 1/4"	25 1/4"
1Gal.	1Pt.–3 1/2 Qts. (.50-3.3)	1 (3.8)	1	20-100	38-190	225 (102)	21	8 1/4"	5"	6 1/2"	1/4"	24"	16"	18 3/4"	40"	29"
2Gal.	1Qt.–1 1/2 Gal. (.95-5.7)	2 (7.5)	1	20-100	26-130	250 (113)	21	9 5/8"	6 1/2"	8"	1/4"	24"	16"	18 1/4"	40"	29"
4Gal.	1Qt.–4Gal. (.95-15)	5 1/4 (20)	1 1 1/2	20-100	24-120	300	26 (136)	14"	8"	9 5/8"	3/8"	26"	18"	19"	42"	34"

HDM MIXERS

MODEL	MIXING CAPACITY IN GALS. (LITERS)	FULL HOLDING CAPACITY IN GALS. (LITERS)	HORSE POWER	SINGLE SPEED STIRRER ORBITAL RPM	SINGLE SPEED STIRRER ON OWN AXIS RPM	VARIABLE SPEED STIRRER ORBITAL RPM	VARIABLE SPEED STIRRER ON OWN AXIS RPM	TWO SPEED STIRRER ORBITAL RPM	TWO SPEED STIRRER ON OWN AXIS RPM	WEIGHT LBS. (KG) *	CUBIC FEET	A	B	C	D	E	F	G*	H
10 Gal.	2-12 (7.6-45)	15 (56)	2 3 5	37	39	12-37	13-39	18/37	19/39	2200 (1000)	90	18"	13 1/2"	16"	6"	48"	25 1/2"	77"	62"
25 Gal.	5-25 (19-94)	34 (128)	5 10 15	36	39	12-36	13-39	18/36	19/39	3700 (1680)	204	25"	16"	19"	6"	65 1/2"	33"	93"	70"
40 Gal.	8-40 (30.3-151)	47 (179)	5 10 15	36	39	12-36	13-39	18/36	19/39	3900 (1770)	216	25"	22"	25"	6"	65 1/2"	33"	99"	76"
75 Gal.	10-75 (37.9-284)	91 (344)	10 20 30	30	34	10-30	11-34	15/30	17/34	7700 (3500)	396	34 1/2"	22 1/2"	25 1/2"	6"	88"	41"	124"	99"
100 Gal.	10-100 (37.9-378)	115 (435)	10 20 30	30	34	10-30	11-34	15/30	17/34	8000 (3630)	432	34 1/2"	28 1/2"	31 1/2"	6"	88"	41"	135"	105"
150 Gal.	20-150 (75.5-567)	184 (696)	20 30 40	24	26	8-24	9-26	12/24	13/26	12,000 (5440)	650	44"	28"	30 1/2"	8"	108"	47"	159"	123"
200 Gal.	30-200 (113.5-757)	225 (851)	20 30 40	24	26	8-24	9-26	12/24	13/26	12,500 (5670)	700	44"	34"	36 1/2"	8"	108"	47"	165"	129"
300 Gal.	75-300 (284-1135)	398 (1506)	50 75 100	22	28	7-22	9-28	12/22	14/28	22,000 (9980)	975	55 1/2"	38"	42"	8"	140"	54"	190"	150"

* Maximum raised heights shown in the tabulation are based on the largest horsepower drives used on the mixer. The raised heights will be less than that shown when smaller horsepower drives are used. Weights are estimated and are based upon mixers having the largest horsepower drives.

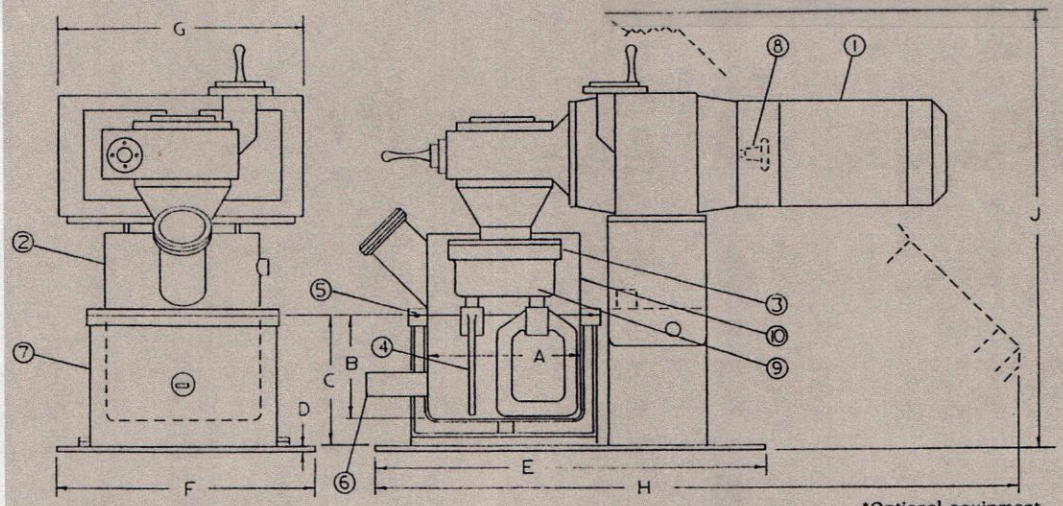
MIXER SELECTION GUIDE



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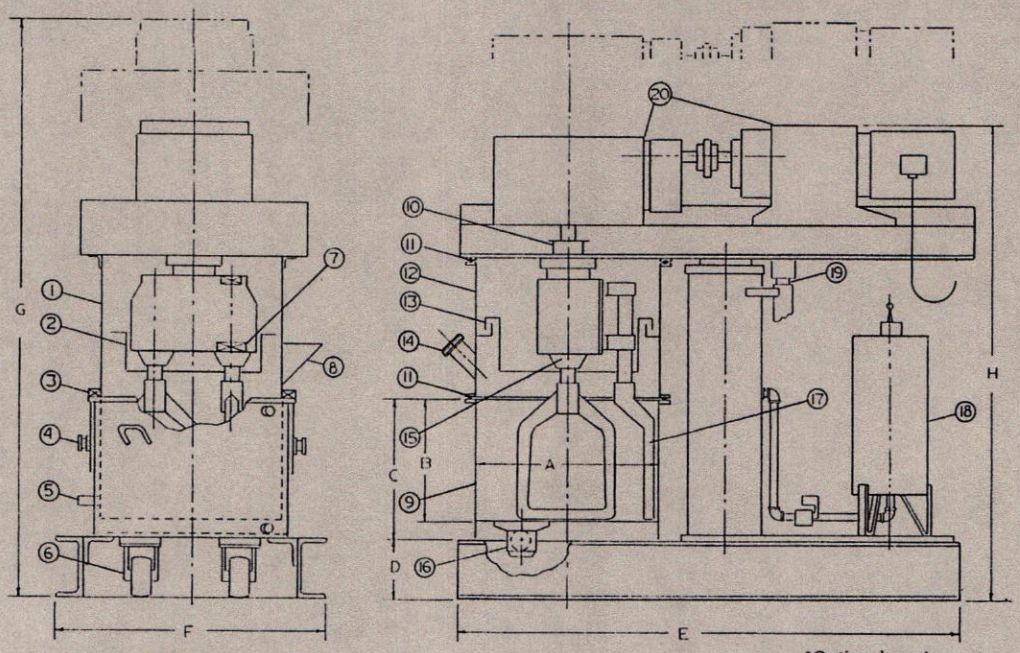
DESIGN FEATURES



*Optional equipment

LDM MIXERS

1. Motors, constant torque, mechanical variable speed drives suitable for 115\230 volt, single phase, 60Hz current on 1,2 and 4 gallon models
1A. The ½ pint, 1 pint and 1 quart models utilize single speed motors with inverters for variable speed (not shown)
*2. Vacuum hood with one 3" port.
3. Gearbox. Stainless steel gearbox available
4. Two planetary stirrers
*5. Neoprene O-ring seals on vacuum mixers. Optional viton for resistance to most hydrocarbon solvents
*6. Thermocouple
7. Mix bowl (jacket shown)
8. Handwheel for positioning stirrers
9. Neoprene seals. Teflon in stainless steel casings available
*10. Vacuum hood adaptable for internal pressure

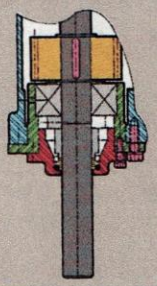


*Optional equipment

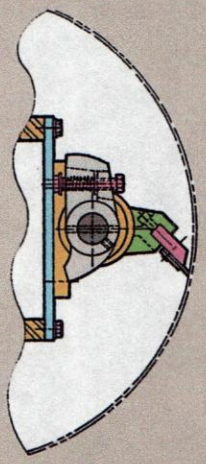
HDM MIXERS

*1. Dust hood
*2. Dust shield
3. Neoprene sponge rubber gasket seal furnished on dust hood
*4. Cast steel lift trunnions
*5. Thermocouple with iron or copper constantan element
*6. Mix bowl mounted on casters
7. Flange-type ball bearing cartridge units
8. Charging doors on dust hood
9. Non-jacketed carbon steel change can
*10. Packing gland (on vacuum mixers)
11. Neoprene O-ring seals on vacuum mixers. Optional viton for resistance to most hydrocarbon solvents
*12. Vacuum hood adaptable for internal pressure
*13. Liquid seal to isolate mix chamber from planetary gearbox
*14. 3" sight and charge ports
*15. Mechanical seals on stirrer shafts for critical applications
*16. Flush-bottom tank valve
*17. Self-adjusting scraper arm with replaceable Teflon blade
*18. Reservoir tank for air/oil operation at 80-100 PSI air pressure
19. Two non-rotating guide rods
*20. Single-speed, two-speed, or variable-speed drives

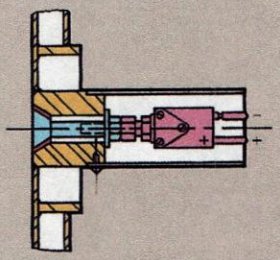
OPTIONAL FEATURES



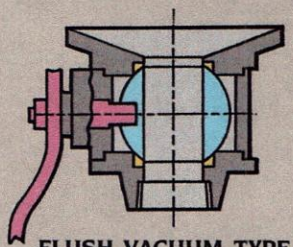
MECHANICAL SEAL ASSEMBLY



SCRAPER ARM ASSEMBLY



THERMOCOUPLE FOR TEMPERATURE READOUT



FLUSH VACUUM TYPE BALL VALVE

- VACUUM CONSTRUCTION
- INTERNALLY MACHINED CANS
- CODE STAMPED JACKETS
- VARIABLE SPEED DRIVES, ELECTRIC OR HYDRAULIC
- SANITARY DESIGNS
- CASTER WHEELS
- SEALED PLANETARY GEARBOXES

POWERMIX

The Ross PowerMix can make *two* of your present mixers obsolete.

The Ross PowerMix* takes you far beyond the limits of ordinary planetary mixing. By combining a single planetary blade with high speed disperser, the patented PowerMix can handle materials over an enormous range of viscosity – and probably accomplish the work of two mixers on your present process line.

As in a Double Planetary mixer, the two agitators in the PowerMix revolve around a common axis. Again the planetary blade advances along the vessel wall and transports material from the sidewall toward the center of the vessel. But in the PowerMix the planetary blade acts like a turbocharger, forcing material into the teeth of the high shear disperser.

This combined mixing action generally cuts the mixing cycle by 50% or more, compared with conventional mixing strategies. In many applications, the PowerMix also eliminates the need for a costly two-stage mixing process–one that relies on both a high-shear disperser and a Double Planetary mixer. With the PowerMix you can begin the mixing process with a low viscosity, high speed dispersion and carry on through a high viscosity, non-flowable end-product. All without a switch to another piece of equipment.

PowerMix delivers greater productivity for a broad range of applications:

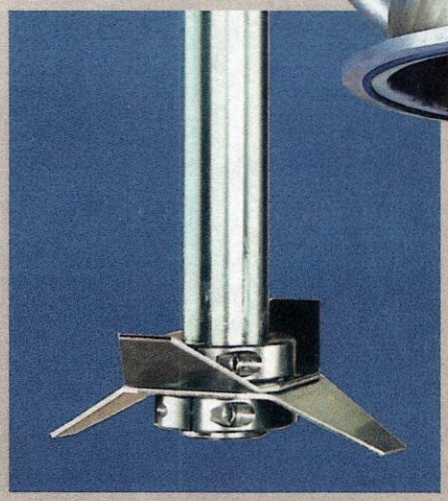
1. **Higher shear rates** – For applications that require greater shear than a Double Planetary mixer can provide.
2. **Dispersing low density solids** – In applications where low density solids must be dispersed into highly viscous materials, the PowerMix outperforms virtually all other mixer designs.
3. **Liquid-solids dispersions** – In many applications, such as those calling for the dispersion of liquids and solids, the PowerMix can complete the mixing process faster and more thoroughly.

*Patent applies: #4,697,929

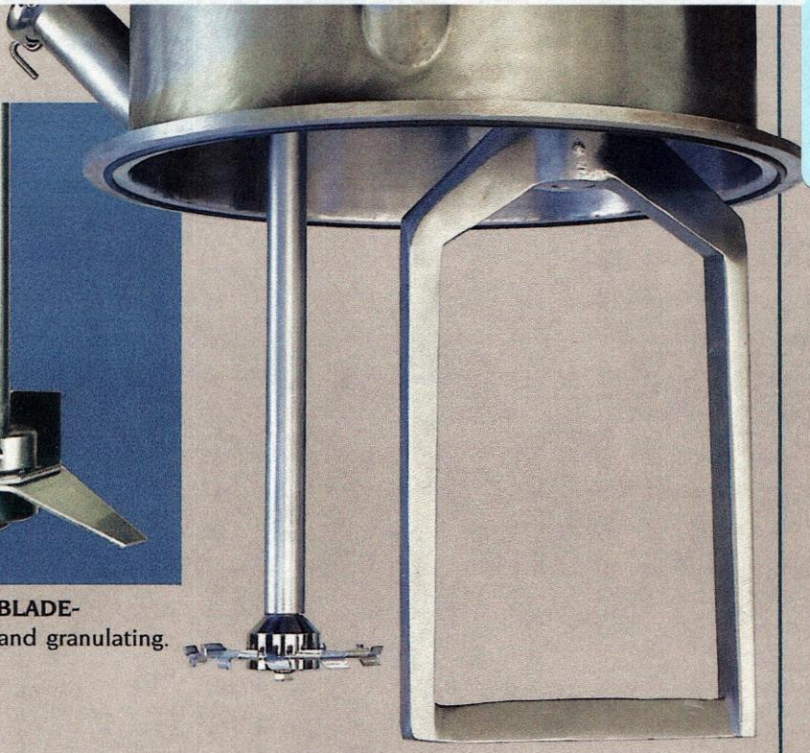


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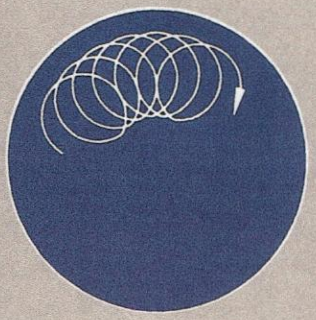


OPTIONAL CHOPPER BLADE-
for powder processing and granulating.



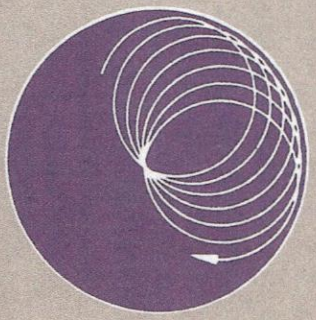
HIGH SHEAR POWERMIX DISPERSER

A Ross High Speed Disperser orbits the mix vessel (see diagram, right). The disperser delivers exceptionally efficient, high shear mixing action – and high speed results. Mix cycles are routinely cut 50-80%!



THE POWERMIX PLANETARY BLADE

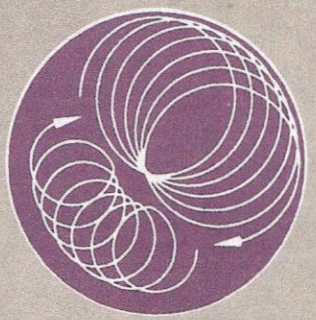
Orbiting the change can opposite the high shear disperser, the planetary blade continuously sweeps the sidewall and literally carries material to the disperser. Because this mixing action does not rely on the natural flow characteristics of the mix, the PowerMix can handle viscosities from 1 cps to 3 million cps.



TURBOCHARGED POWERMIX COMBINATION

Combined, the planetary blade and disperser can give you access to a much higher level of mixing productivity.

1. The PowerMix can often do the work of two mixers on your present process line.
2. The PowerMix is the most versatile mixer ever created. It can take a single batch through more distinct mixing stages than any other mixer.
3. The PowerMix shortens mix cycles – usually by 50% or more.
4. The PowerMix minimizes localized heat build-up, despite high-volume throughput.



HIGH PERFORMANCE

Proven stirrer design for efficiency.

Both PowerMix agitators are proven Ross designs. The Ross Planetary blade design is the latest in 50 years of development. Close tolerances and a highly evolved orbit design give you unbeatable operating efficiency. The Ross EasyClean feature makes maintenance simple and efficient, too.

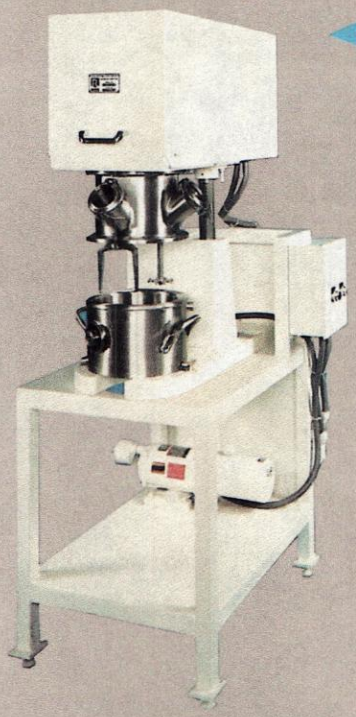
Superior Ross construction.

For most applications, wetted parts on the PowerMix are stainless steel. O-rings and expertly machined mating surfaces guarantee a flawless seal. With no submerged packing glands in the product zone, cleaning problems are virtually eliminated. The PowerMix produces contamination-free batches time after time.

Vacuum/pressure

In many applications end-product quality can be improved decisively by mixing in a vacuum or under pressure. Vacuum mixing also reduces the risk of contamination – of both the mix and the surrounding work environment.

Ross offers more expertise in vacuum/pressure mixing technology than any other mixing specialist. As a PowerMix option, vacuum/pressure is often chosen as a high-performance plus.



BENCHTOP POWERMIX

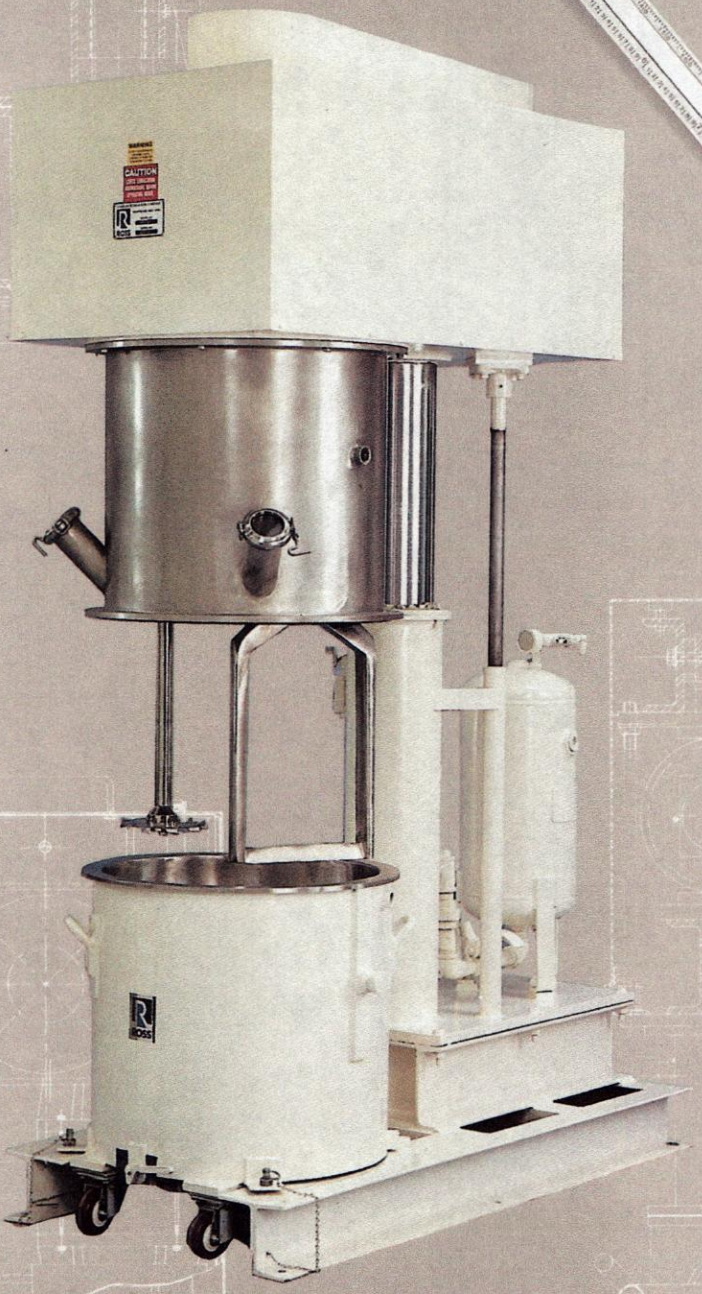
The outstanding power and versatility of the Ross PowerMix is available in a 2-gallon size for laboratory applications. A 1 hp planetary drive and a 2 hp disperser drive operate independently. The unit includes vacuum, thermal jacket and variable speed. Dual ports in the hood allow observation and charging of additional materials during the mixing cycle.

10-GALLON POWERMIX

The outstanding versatility of the PowerMix makes it an ideal mixer for pilot plant applications and short-run process lines. With its wide operating range, it can easily be shifted from one line to another – taking on the work of several other mixers. This 10-gallon model (below) includes dual charging ports, all-stainless construction in the product zone and a valve in the change can for discharge.



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40-GALLON POWERMIX

In full-scale production, no other mixer in history has proven more productive than the PowerMix. This 40-gallon model (above) is equipped for vacuum mixing. Once the mix cycle is complete, the change can will be rolled to a Ross Discharge System, where the mix will be discharged automatically into dispensing and packaging equipment. Other change cans will be rotated through the mix-discharge-cleaning cycle to minimize mixer downtime between batches and maximize production.

TYPICAL APPLICATIONS

ADHESIVES
Epoxies
Polyurethanes
Polysulfides
Rubber cements
Silicones
Pipe joint compounds
Hot melts
Pressure sensitive compounds

PHARMACEUTICALS
Dental products
Granulations
Blood reagents
Toothpastes
Gelatin compounds

FOODS
Soup bases
Protein dispersions
Pet food
Confectionary products
Seafood mixtures
Sausage casings
Food colors
Cheeses
Sugar substitute

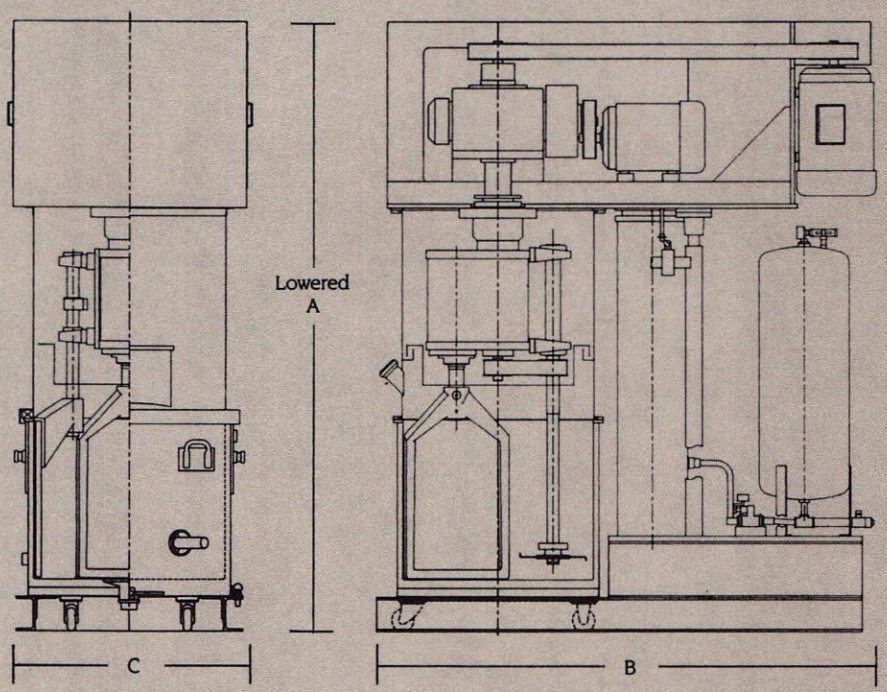
CHEMICALS
Abrasives
Rubber additives
Brake linings
Pyrotechnics
Gasketing materials
Special insulators
Flotation reagents
Ceramics
Battery pastes
Electrodes
Tungsten carbide powders
Propellants
Precious metals
Ferrite compounds

PLASTICS
Polyester molding compounds
Plastisols
Powder coatings
Organosols
DOP dispersions

COATINGS
Printing inks
Paints
Artist colors
Textile colors
Flush colors
Conductive inks
Thick film pastes

POWERMIX SPECIFICATIONS

MODEL	WORKING CAPACITY (GAL)	FULL CAPACITY (GAL)	PLANETARY H.P.	PLANETARY RPM	DISPERSER H.P.	DISPERSER RPM	MIX CAN DIA.(IN)	MIX CAN INSIDE HGT.(IN)	MIX CAN OVERALL HGT.(IN)	OVERALL HEIGHT RAISED (A)	OVERALL HEIGHT LOWERED (A)	BASE LENGTH (IN.) (B)	BASE WIDTH (IN.) (C)
PD-2	1.5	2	1	70	2	1140-3420	$9^5/_8$	$6^1/_2$	8	44	36	24	16
PD-10	10	15	3	35	5	835-2450	18	$13^1/_2$	16	81	61	48	$25^1/_2$
PD-40	40	47	$7^1/_2$	30	10	615-1850	25	22	25	111	88	$65^1/_2$	33
PD-100	100	115	15	25	20	415-1250	$34^1/_2$	$28^1/_2$	$31^1/_2$	142	112	88	41
PD-200	200	225	25	20	30	350-1050	44	34	$36^1/_2$	172	136	108	47
PD-300	300	398	40	16	50	310-925	$55^1/_2$	38	42	198	158	140	54
PD-400	400	500	40	16	50	310-925	$55^1/_2$	45	49	204	164	140	54



The Ross Customer Service Lab.

The Ross Customer Service Lab is fully-equipped to simulate virtually any mixing application. Using your raw materials, our staff of experienced engineers will work with you to find precisely the right Double Planetary or PowerMix configuration for your application.

With more than 150 years of engineering experience in the mixing business, Ross is your most valuable single resource for support in solving any mixing problem. That's why so many companies around the world attack their mixing problems by coming here first.

A Ross Rental confirms your mixer configuration.

The best place to confirm a mixing strategy is in **your** plant, on **your** process line. A Ross Rental gives you this opportunity – as well as an option to put a mixer on the line in a matter of days, when time is critical.

A rental is also an ideal tool for meeting a surge in demand which may not be permanent. During test programs, periods of high seasonal demand or when your normal process lines are operating at reduced throughput, a Ross Rental is a business tool that gives you flexibility without committing capital dollars.

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