Head Office
Jai Ganesh Vision, 'B' Wing, 3rd floor,
Jai Ganesh Fame Building, Akurdi, Pune 411 035 (India).
Phone : + 91 - 20 - 40710010, Fax : + 91 - 20 - 40710009
E-mail : sales@rajprocessequipment.com, www.rajprocessequipment.com

Regional Offices

205, Padmaja's, Jhansi Enclave,
Bhagyanagar Colony, Kukatpally Housing Board,
Hyderabad - 500072
Phone : + 91 - 40 - 23160044

303, Ravish Complex, Near Mani Nagar, Char Rasta,
Mani Nagar, Ahmedabad - 380008
Phone : +91 - 79 - 40091648

Marketing Representative - India

No. 17, Anna Commercial Complex,
Gowriwakkan, Chennai 601 073 (India)
Cell : +91 - 9840411048

ED - 55, Tagore Garden, New Delhi 110 027
Cell : +91 - 9810268495

J - 161, Sardarnagar, Baroda - 390002, Gujrat,
Cell : +91 - 9979873346

Marketing Representative - International

No. 29 A, 1st floor, Jalan Timun 24/C, 40300 Shah Alam,
Selangor, Darul, Eshan, Malaysia, Phone : +603 - 5542 9668

Jl-Tarum Barat II Blok Kav, Pl. No. 30, Cikarang Baru,
Cikarang, Bekasi - Indonesia,
Phone +62 - 21 - 29083225, + 62 - 21 - 92755156

Manufacturing

Unit - I - Plot No. 166 & 167, Sector No. 7,
PCNTDA Bhosari, Pune 411 026 (India)
Phone : +91 - 20 - 27119973, 27124145

Unit - II - Sr. No. 373, Village Kharabwadi,
Chakan, Tal. Khed, Dist. Pune (India)
Phone : + 91 - 2135 - 252251, 255654

RAJ PROCESS EQUIPMENTS AND SYSTEMS PVT. LTD.

Our Product Range

TURNKEY PROJECTS
Distilleries – Molasses & Grain based
Detergent powder plants
Starch & Glucose Plants
Micro Crystalline Cellulose Powder Plants
Guar Gum Plant
Zero Liquid Discharge Plants

DRYERS
Spray Dryers
Flash Dryers
Rotary Dryers
Continuous Fluid Bed Dryers
Paddle Dryers
Steam Tube Bundle Dryer
Rotary Vacuum Dryer
Cone Screw Dryer

EVAPORATORS
Agitated Thin Film Evaporator
Falling Film Evaporators
Forced Circulation Evaporators
Multi Effect Evaporator

MIXERS
Cone Screw Mixer (Nauta Mixer)
Conical Blender
Plough Shear Mixer
Ribbon Blender
Double cone Blender
Paddle Mixer
Continuous High Speed Mixer
Conche Mixer
Combination Mixer

ALLIED PRODUCTS
Air Pollution Control Equipments
Material Handling Equipments
Heat Transfer Equipments
Pharma Equipments
Agitators
Auto Weighing & Batching Systems
Coded Vessels
Storage Silos

RAJ GROUP

Mixers

www.raj-mixers.com

Mixers

Mixing Systems

Mixing is a means whereby mixing of phases can be accomplished and by which mass and heat transfer can be enhanced between phases.

Mixers can be used for powder-powder, powder-liquid, liquid-liquid or liquid-air mixing. Mixer is rotary or stationary equipment depending on applications. Mixer selection is decided by various factors like viscosity, nature of feed, heat sensitivity of feed, nature of final product and etc. We offer mixers of various types and for various applications.

Usually mixers consist of drum, shaft, propeller, gear box & motor. We can offer mixers with horizontal, vertical or inclined shaft depending upon application. Some of the products require pilot trial before selection of mixer, for that we have pilot plant facility for checking suitability of mixer.

Our mixers find applications in food, pharmaceuticals, chemical, mineral, biochemical & fertilizer industry.

Cone Screw Mixers

Cone screw mixer consists of a conical container which houses a continuous flight screw.The screw rotates about it's own axis and revolves along the walls of the cone. The material of widely differing densities and particle shapes and sizes are mixed homogenously without any degradation. Fragile filaments and flakes are safe from degradation and mixing is accomplished with minimal heat build-up and aeration in the product. The floor space required for this type of mixer is very less. The mixer can be started on full load. Due to the conical shape the unloading of the material is helped by gravity and is complete without any hold-up. Addition of liquids is easily possible by providing atomizing nozzles at the top of the mixer. There are no bearings or seals in direct contact with the product.

Various design options available are :

a) Capacities from 20 to 25000 liters.
b) Supported mixing screw at vessel bottom.
c) Satellite screw.
d) Sanitary designs for pharma applications.
e) Laboratory mixers.
f) Jacket/ Limpet for heating or cooling.
g) Solvent recovery system

Typical applications include dyes, herbal, pharmaceutical, plastic, food, ceramic, agricultural products, shampoos, tooth paste, chocolates, gelatins etc.

Features of RAJ Cone Screw Mixers

Exceptional Mixing Accuracy

Materials are mixed successfully to an accuracy of 1 part in 1,00,000(0.001 %) or better. With no degradation or separation, it thoroughly blends materials of widely differing densities and particle shapes and sizes.

Short Mixing Time

It achieves a thoroughly homogeneous mix in 30 to 40 % the time of most conventional mixers in the same category such depending on mixing element speeds.

Low Power Consumption

Cone screw mixer (Nauta Mixer) require approximately 50% power over conventional blender.

Gentle Mixing Action

Fragile filaments and flakes are safe from degradation and mixing is accomplished with minimal heat built-up and aeration in the product.

Low Floor Space Required

Since mixer occupies less floor space, user can free up space for other plant operations.

Full Load Starting

Its screw agitator begins axially rotating and loosens batch material before its orbiting motion starts. This design feature prevents stalling and permits starting under full load in the event of a power failure. Soft starters are available to reduce excessive torque at start-up.

Fast, Complete Discharge

Its unique cone design provides for gravity unloading, gives cleaner and faster batch discharge.

Easy Liquid Addition

Liquids are injected and atomized into the top of the mixer through the hollow shaft of the drive system.

Mixing of Partial Batches

Partial or full load batches are mixing equally well with no reduction in mixing efficiency.

Easy to clean

The top entering drive system provides full product protection with no bearing nor seals in direct contact with the product. Its unique obstruction free cone shaped design allows for quick and easy cleaning.

Typical Applications

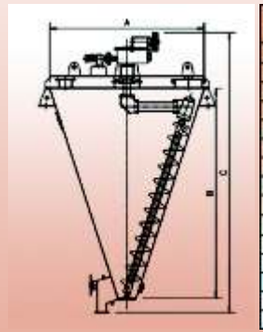
Dry Blending

Dyes I Herbal I Pharmaceuticals Plastic I Spices I Granulation Foods I Face Powder I Ceramics I Adhesives I Dry Food Blends I Soap Powders I Chemicals I Cleaning Compounds Insecticides

Powdered Cocktail Mixes I Ferrite Powders Food Premixes I Confectionery Products Agricultural Chemicals I Sugar Substitutes

Paste Mixing

Shampoos I Tooth Paste I Chocolates I Cheese I Plastisols I Polyurethane I PVC Coatings I Polyester Dispersions I Polysulfides I Epoxies I Gelatins I Electronic Additives I Asphalts



RAJ CONE SCREW MIXER STANDARD MODELS

Capacity (LIT.)	Main Motor HP	Planetary Motor HP	Overall Dimensions (mm) A	B	C
100	3	NA	900	1030	1470
200	3	NA	1075	1320	1760
500	5	NA	1375	1765	2205
750	5	NA	1540	2035	2475
1000	7.5	1.5	1750	2310	2890
1500	7.5	1.5	1975	2656	3240
2000	10	2	2125	2810	3390
2500	10	2	2440	3295	4725
3000	12.5	2	2565	3485	4905
4000	15	3	2740	3755	5185
5000	15	3	2940	4065	5410
7500	20	3	3315	4640	5990
10000	25	3	3585	5010	6300
15000	40	6	3315	4640	5990
20000	50	6	3564	5010	6300

Conical Blender

Conical blender consists of a conical vessel with a double start helix ribbon mounted on central shaft. This type of blender is used for mixing, granulation and homogenizing applications. It handles a range of applications from all types of powders including free flowing to cohesive and moist powders, bulk dry materials to wet cakes and slurries.

Mixing time depends on the ribbon speed. The rotating central agitator shaft does not have bottom bearing support thereby eliminating any dead spots or difficult areas to clean and there is no possibility of product contamination.

Discharge of the product is fast and simple as the bottom is fully open.

Various design options available are:

a) Models with single or double helix.
b) Capacities from 20 to 25000 litres.
c) Cutting rotors for breaking of agglomerates.
d) Liquid addition provisions.
e) Heating / Cooling jacket or limpet with insulation.

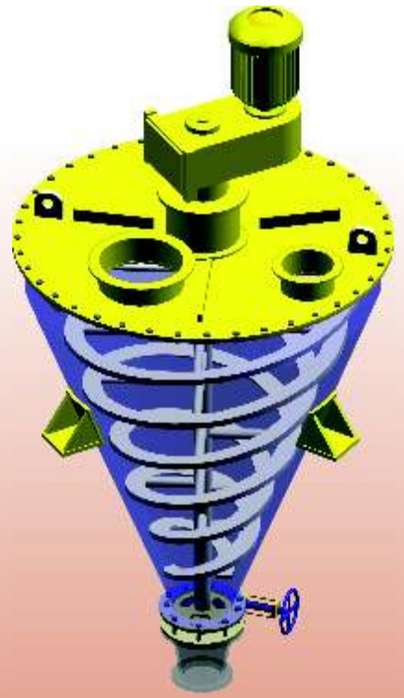
Description of RAJ Conical Blenders :

Raj Conical Blenders are best suited for mixing, granulation & homogenising batch process. It handles a range of applications from all types of powders including free flowing to cohesive & moist powders, bulk dry materials to wet cakes & slurries.

Raj Conical Blenders are very sturdy and robust. They consists of a conical vessel with dished /flat head. The central agitator shaft is driven from top end with gear reducer.

A double helical ribbon agitator in the vessel moves the product upward along the outer wall and releases it downward into cavities developed in the middle, simultaneously material is horizontally distributed by the mixing arm and is optimally homogenised.

Mixing time depends on the agitator speed. In general mixing time is three to four times shorter than the mixers working with a rotating screw. The drive and bearings are kept outside of the vessel, no gears or seals in the product compartment. The rotating central agitator shaft does not have bottom bearing support there by eliminating any dead spots or difficult areas to clean and there is no danger of product contamination. Discharge of the product is fast and simple as full bore open.



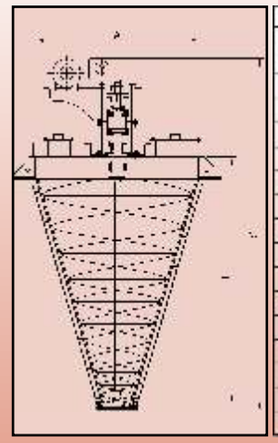
Conical Blender

Features

- Material are mixed to highest levels of accuracy even if some of the components are present in minor quantity
- It has flexible working capacity to 10 100% of filling rate
- Disintegration of agglomerates most often without additional tools
- Easy to clean
- Dust-and ex-proof models
- Space saving construction
- Various shaft sealing system
- Product discharge through gate, isem, ball segment or ball valve
- No danger of product contamination by lubricants.

Application

- Food
- Pharmaceuticals
- Chemical
- Building material
- Metallurgy



RAJ CONICAL BLENDER STANDARD MODELS

Capacity(Lit.)	Motor HP	Overall Dimensions(mm) A	B	C
100	3-5	900	1030	1470
200	3-5	1075	1320	1760
500	5-7.5	1375	1765	2205
750	5-7.5	1540	2035	2475
1000	7.5-12.5	1750	2310	2890
1500	7.5-12.5	1975	2655	3240
2000	10-15	2125	2810	3390
2500	10-15	2440	3295	4726
3000	12.5-20	2565	3485	4805
4000	15-25	2740	3755	5185
5000	15-25	2940	4065	5410
7500	20-30	3315	4640	5990
10000	25-40	3555	5010	6300
15000	40-60	3930	5400	6700
20000	50-75	4030	6500	8000

Plough Shear Mixer

The plough shear mixer is a horizontal mixer with cylindrical drum and horizontally installed mixing shaft. The mixer is designed for heavy duty blending of both dry and wet material. Plough shape shovels mounted on a central shaft with its sharp ends easily penetrate through the dense powder and thick pasty mass. Extra shear can be attained by adding side mounted choppers.

Design features of plough shear mixer :

a) Hygienic design.
b) Custom built to suit product specific requirements.
c) Teflon coated internals for food and sticky material applications.
d) Wear resistant plates for abrasive products.
e) Jacketed construction for heating or cooling applications.
f) Can be operated under vacuum.

Typical applications include homogenous mixing of pastes, rubber, heavy plastic mass, food, pharmaceutical, chemicals etc.

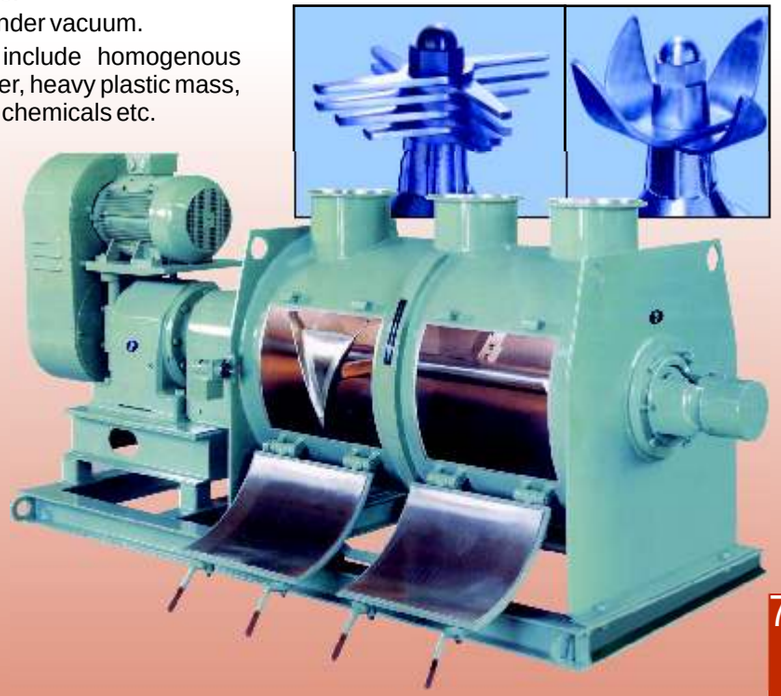
RAJ Plough Shear mixer is a horizontal mixing system with horizontal, cylindrical drum and horizontally installed mixing shaft .

RAJ Plough Shear Mixer is designed for heavy duty blending of both dry and wet materials. Plough shape shovels mounted on a central shaft with its pointed ends are easily penetrable through the dense powder, pasty mass.

The overlapping of shovels coupled with its shape and the high speed of the ploughs produces good mixing action and high turbulence.

The arrangement of mixing tools is the result of many years of development by RAJ process equipments combined with experience based on mixing trials and practical scientific work.

RAJ Plough Mixers are high energy, high shear, and high-speed mixers with cylindrical short aspect ratio mixing chambers. Extra shear can be achieved by adding side cutters or intensifiers. The use of high speed choppers further reduce the product particle size thus resulting in a better mix.



RAJ Plough Mixers are available with 'Easy Clean' cantilevered shaft, subject to application.

Applications

- Quick and homogenous mixing of pastes, rubber, and heavy plastic masses.
- Bulk Powder in dry / dry solids, dry / wet paste, and wet-wet mass.
- Applications in Food, Pharmaceutical and Chemical industries.
- Solid Solid Mixing. ■ Solid Liquid Mixing.
- Homogenizing. ■ Blending. ■ Granulation.
- Multiple Phase ■ Reactions. ■ Drying.

Choppers

Choppers are working in conjunction with the shovels, intensify the mixing process. They are used for dispersing lumps which are either in the original product or which forms during process, they chop pasty additives or prevent the formation of agglomeration when liquid is introduced to the mix.

The number and type of choppers which are installed is governed by the size of the mixer and the purpose for which it is used.

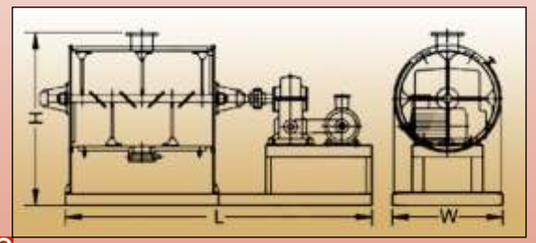
Type of choppers are available for highly specialised mixing process.

Types of choppers offered :

- Multiple choppers. ■ Tulip choppers.
- Shearing segment choppers.
- Turbo choppers.

RAJ Plough Shear Mixer Models

Model	Capacity Ltr	Motor HP	L mm	W mm	H mm
RP-1	100	2--5	1830	960	1435
RP-2	200	3--7.5	2030	1010	1535
RP-5	500	3--10	2500	1100	1685
RP-10	1000	5--15	3200	1300	2185
RP-15	1500	5--20	3300	1350	2250
RP-20	2000	10--30	3375	1450	2350
RP-25	2500	10--40	3400	1475	2550
RP-30	3000	12.5--50	3450	1500	2600
RP-40	4000	12.5--60	3550	1600	2675
RP-50	5000	15--75	3600	1650	2825
RP-60	6000	20--100	3675	1750	2875
RP-75	7500	20--125	3725	1800	3125



RAJ GROUP

Ribbon Blender

Raj Ribbon Blenders are available from Lab model to Heavy duty model. Ribbon Blender is a light duty blender, useful for easy mixing powder components it is a LOW SHEAR Mixer, most commonly used for SOLID/SOLID, SOLID/LIQUID Mixing and when high shearing force is not required. Its counter flow helicoid flight mounted on shaft ensuring gentle mixing.

Blades are designed for triple action mixing to suit product end characteristics. It also occupies less head room space for large volume mixing.

Features of RAJ Ribbon Blender

- Sanitary Design-heavy gauge, stainless steel constructions.
- Bearing mounted on lanterns outside of mixing container to avoid contamination.
- Dry blending of capsule formulation.
- Capacity available from lab model of few to few thousand liters.
- Feeding through a charging port mounted on top of blender.

Options Available

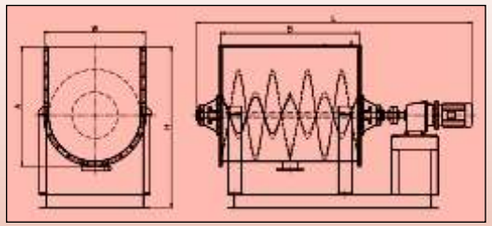
- Single shaft design for Low to Medium\ volume capacity.
- Double shaft design for Large to Mega volume capacity.
- Discharge butter fly valve.
- Discharge side gate valve.
- Jacketed ribbon blender design for a process that required heating and cooling.
- Vacuum capability to effect the removal of moisture accomplishing DRYING and MIXING in single operation.
- 4-B finish available.

Application

- Mixing of cosmetic powders.
- Dry mixing of free flowing powders requiring low shearing force.
- Dry blending of capsule formulation.
- Lubrication of dry granules in large quantity.

Capacities of RAJ Ribbon Blender

Capacity	HP	A	B	W	H	L
100	2-5	600	650	425	950	1500
200	3-7.5	700	825	550	1200	1700
500	5-10	900	1125	750	1400	2200
750	7.5-15	1000	1300	850	1750	2600
1000	10-15	1200	1500	1000	1800	3000
1500	10-20	1300	1650	1100	2000	3300
2000	15-25	1500	1800	1200	2200	3700
2500	20-30	1600	1950	1300	2300	4000
3000	25-40	1700	2100	1400	2450	4400
4000	30-50	1800	2250	1500	2550	5000
5000	30-60	1900	2400	1600	2700	5300
6000	40-75	2050	2600	1725	2900	5600
7500	40-75	2175	2775	1850	3000	6000
10000	50-100	2400	3000	2000	3300	6500



Double Cone Blender

Raj Double Cone Blender is efficient and versatile equipment for homogeneous mixing of dry powder and granules. This blender achieves absolute homogeneity in the blending of a wide variety of free flowing, dry materials. This is accomplished even with dry materials. Which are dissimilar in particle size and shape, because the double cone design interfolds the material regardless of its flow properties.

Design Highlights

- Three-side accessibility.
- Higher clearance under discharge.
- Small floor space requirements.
- Competitively priced.
- Dependable blending.

The slant double cone design eliminates dead spots which occasionally occur in conventional double cone mixer.

The particle size reduction is minimized due to the absence of any moving blades.

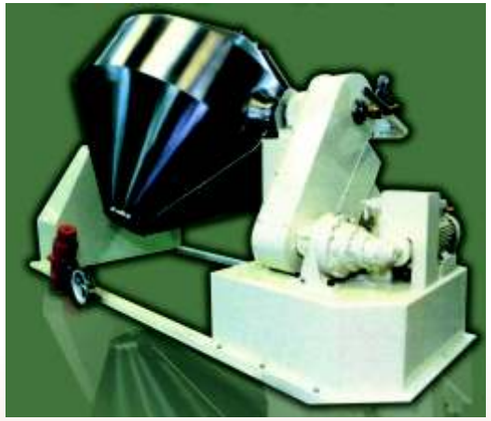
Shape of blender body results in a near complete discharge of product material, clearly an added advantage over horizontal blender.

Blender rotates, the material at the sides nearest the access starts to cascade first, striking the sloping sides of the cone where it is deflected towards the center. The progressive cascading action moves material from the smallest axial radius and towards the center. The speed of the unit determines the point of rotation at which the material starts to cascade.

A second action takes place simultaneously with the cascading action. Material falling in to the middle of the blender spreads apart as it falls, mixing with the material flowing inwardly from the sides. The double blending action is so rapid and effective that particles of different physical properties cannot separate, and are interspersed uniformly throughout the batch.

Application

Double Cone Blender is an efficient and versatile machine for mixing dry powder and granules homogeneously. It can be used for pharmaceutical, Food, Chemical and Cosmetic products etc.



MODEL	GROSS VOLUME (Litres)	WORKING VOLUME (Litres)	MOTOR (hp)
RCB-5	15	9	0.5
RCB-10	30	18	0.5
RCB-15	45	27	0.5
RCB-25	75	45	1
RCB-50	150	90	2
RCB-100	300	180	3
RCB-150	450	270	3
RCB-200	600	360	5
RCB-250	750	450	5
RCB-300	900	540	7.5
RCB-350	1050	630	7.5
RCB-400	1200	720	10
RCB-500	1500	900	10

Paddle Mixer

Paddle Style agitators are specially designed to scoop, lift and tumble materials in a gentle, but thorough mixing action. While being mixed, the material travels in a three dimensional "figure 8" pattern. the material is constantly being pulled from the ends of the mixer to the middle of the "figure 8" where the most aggressive mixing is taking place. This unique paddle design is ideal for mixing solids or liquids of various particle size, density and viscosity. The gentle scooping action is ideal for blending fragile ingredients such as nuts or fiberglass strands. Paddle mixers work effectively when filled to as little as 20% of rated capacity, thus allowing flexibility of batch sizes. Paddle style agitators allow easier access for cleaning between batches.

Applications

These are horizontal mixers utilized for blending dry material, powdery granular, short fibered, moist solids and liquids together with pasty substances up to and including highly viscous masses.

- Powder and semi dry solid mixing
- Cutting fat into flour
- Addition of oil & liquid into powder
- Mixing soap
- Extending colors
- Breaking down agglomerates

Features of RAJ Paddle Mixer

The paddles are positioned to move the material in opposing lateral directions as well as radially. The paddle design is generally employed where friable materials are being blended.

Paddle mixer consists of several elements: a centrally mounted horizontal shaft that rotates within a cylindrical container, paddles, ploughs or other shaped mixing elements that are attached to the centrally mounted shaft, special openings at the top for feeding materials, flush fitting access doors at the front of the mixer, a flush fitting discharge valve at the bottom of the mixer, which is pneumatically or manually operated, inside a cylindrical conduit and a complete drive unit.

Continuous High Speed Mixers

Single Shaft Shovel Type

A continuous mixer is an efficient machine used to blend different ingredients together. It can be used in a variety of different industries like Food, Chemical, Pharmaceuticals, Plastic & Composite & Construction Projects.

With a continuous mixer, a steady flow of raw ingredients is fed into the mixing machine, and a steady flow of finished product is fed out the opposite end. The ingredients to be mixed are either fed to the mixer separately or in pre-mixed form. also liquids can be injected directly into the mixing chamber by spraying/dozing arrangement. The shear mixing is achieved by developing shear stress and stain between the mixer blade tips and shell.

Continuous High Speed Mixers

Double Shaft Paddle Type

In double shaft design blending is done by the kneading action between the mixing blades of different profile to suit different products and requirements.
The mixing quality is homogeneous and precise. The final product measured in Kg/hour and Kg per batch. A continuous mixer option is opted when a project demands high volume and where speed and efficiency is a priority.

Advantages over Batch Mixer

- Faster and efficient.
- Requires a smaller area due to small dimensions.
- Feeding ingredients can be automated.
- Automated feed eliminates the need for refilling.
- Are smaller and more economical than Batch Mixers.
- Lessfloor space.
- Lessvariation in mixing.
- Agglomerates dispersions in bulk materials.

Conche Mixer

Conching is the central process of chocolate manufacture; conching determines flow properties and flavor. In Conche Mixer the chocolate mass is changed from a bland, dry powder into a fine flowing melt that has an intensive, harmonious and long-lasting flavour. As a central process, conching is important as it decides the quality of chocolate, consistency in flavor and flow pattern.

RAJ Conche Mixer is designed in the view to satisfy the needs of the chocolate production. RAJ Conche Mixers can be built in sizes ranging from 10 to 10,000 liters. The unit is built to operate accurately with a minimum of supervision.

Features of RAJ Conche Mixer

- For heating/cooling purpose mixers are built with jacket.
- Blades are designed to produce perfect mixture of the product with rapid mixing.
- We provide Temperature Control System for better control on heating/cooling.
- Our Mixers comes with Twin shafts with special mixing elements designs.
- The direction of rotation of the mixing shaft can be controlled and the mixing arm can be rotated in reverse direction.
- Easily accessible design simplifies dismantling, maintenance and cleaning.
- Mixes a variety of dry, pasty and liquid components to a smooth, homogenized paste of uniform consistency.
- Minimum clearance to the wall.
  There is almost no unused space, even in the discharge area.
- Elimination of "dead zones" in the trough ensures uniform mixing of product

Combination Mixer

Conical Screw Ribbon Blender :

RAJ Conical Screw Ribbon Blender consists of conical vessel containing two different types of blades one is helical ribbon type and other is helical screw mounted on a central shaft. It is for mixing and lifting or discharging the material. The blades are designed to rotate independently, same direction or counter-rotate.

Features

- The Conical Screw Ribbon Blender can be operated under full vacuum.
- Heating / cooling arrangement can be provided.
- Liquid addition provision
- Models with single helix or double helix can be provided.
- Capacities up from 20 to 20,000 Liters can be provided.

RAJ Conical Screw Ribbon Blender can be used as a pre-mixer in a continuous process line. If you are having bridging problems with multi-density materials, the Conical Screw Ribbon Blender will usually resolve these issues.

- **Paddle Mixer With Ribbon Blade Arrangement:**

In paddle mixer the tumbling style action suits many products and flights are often included in the design to ensure a free flow of product both during processing and discharge.

- **Single shaft ribbon and paddle mixers**

These kinds of mixers are used for applications which require light blending, for flash dryers where easy back-mixing is required and for soothing fluctuating feeder outputs. Simple ribbon mixers allow a degree of back spillage that causes light mixing and axial diffusion of the material. The blades can be cut and folded, or pegs fitted, to give extra disturbance to the contents but only for relatively free flowing bulk materials. Paddles may be of quadrant shaped or ribbon shaped and sometimes sharpened to separate the bulk easier and reduce build-up on the ribs.

- **Twin shaft ribbon and paddle mixers**

Twin overlapping blades brings the material into a compression at the center of the casing. This small region allows relatively high shear loads to develop at high cross sectional loading of the machine as the submerged blades converge within the mass. Ribbon type blades allow product to be articulated and initiate a degree of back-mixing in the machine. Blades are specified to deal with sticky or cohesive products that would otherwise tend to stick on shafts and paddles. Flatter blades are fitted for more agitation and finer settings for dealing with difficult flow materials.