

Introduction to Test Plants

Technical Center of Okawara Mfg. provides variety of test plants and specialized engineers, to meet the customers' requirements.

Feel free to contact our sales staff.



RM-50VD

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* As a result of continuous improvement, technical parameters, design, dimensions, etc., can be changed without prior notice.



 OKAWARA MFG. CO., LTD.

Multi-Purpose Conical Ribbon Mixer Dryer

RIBOCONE

Mixing, Atmospheric Drying, Vacuum Drying, Cooling, Evaporation
plus Drying, Filtration plus Drying, Heat Treatment, Crystallization
and Dosage of Active Ingredients

Short Processing Time and Uniform Products for a Large Variety
of Applications and Industries

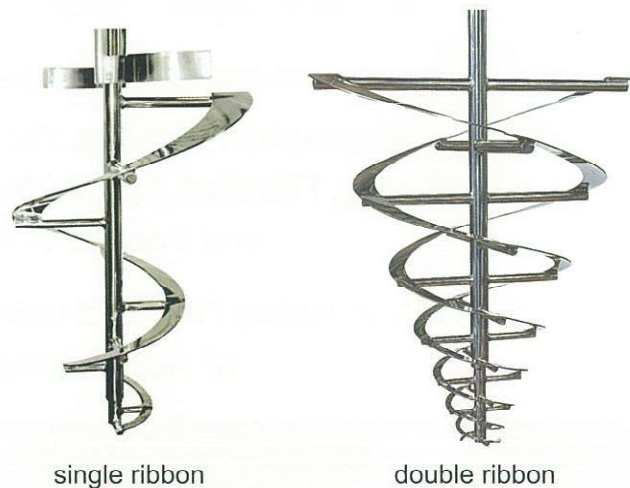


Optimal Mixing, Short Processing Time and Uniform Final Product

OUTLINE

RIBOCONE consists of a vertical cone-shaped vessel with a special combination of top placed vortex breakers and helical ribbon agitator with minimal clearance to the side walls. The internal dead free design avoid cross contamination and eases cleaning process. Above-average heat transfer through continuous mixing and intensive product contact with the heated side wall, resulting in shorter drying time.

Helical Ribbon Agitator Options



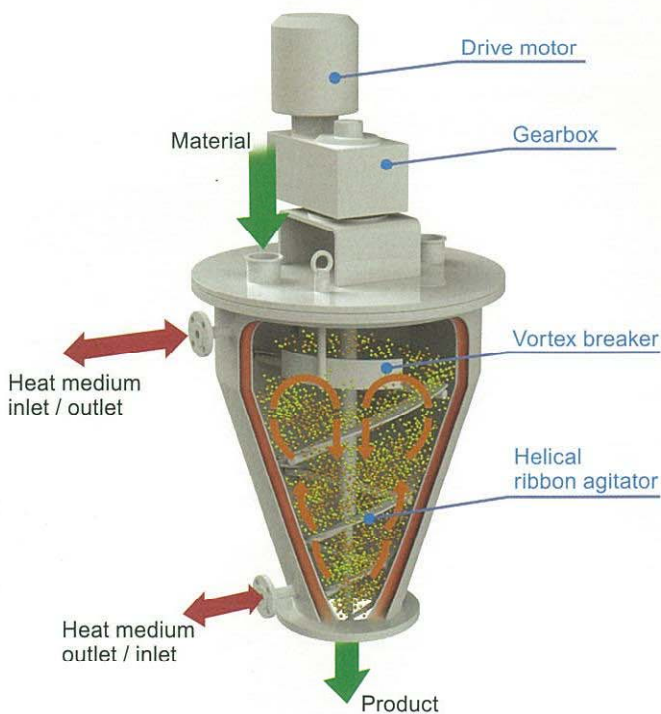
PRINCIPLE OF OPERATION

The products are lifted upwards along the heated side wall, and with the help of the vortex breakers, the products will get sunk downwards again inside the process chamber resulting in a uniform temperature and product humidity across the entire product chamber. Its vertical design, and lack of bearing on the bottom of the vessel ensures a quick full product discharge.

Drive and bearings are located outside of the mixing chamber in order to prevent risk of product contamination due to lubricants, amongst others.

CONSTRUCTION

The rotating helical ribbon screw agitator is designed to fit into the upright inverted conical vessel with minimal clearance from the sides. With the drive motor for the rotor mounted on the top plate, the only moving parts inside the vessel are the vortex breakers and the ribbon screw. The simple construction means there is only one shaft bearing, at the top of the vessel, with discharge via a valve at the bottom. The ribbon screw is wider at the top to ensure that material conveyance rate is constant at any vertical cross section of the vessel. The top vortex breakers at the top of the vessel promote downward circulation flow, thereby minimizing segregation caused by vortex in the surface layer during natural downward motion. This ensures a higher standard of mixing in the finished product.



FEATURES

- Drive, gearbox and bearings are located outside of the vessel in order to prevent risk of product contamination due to lubricants, amongst others.
- Its unique combination of a specially designed helical ribbon agitator and precisely placed vortex breakers creates a great circulation flow that ensures a higher quality of mixing resulting in a uniform, speedy and gentle drying, increasing productivity, minimizing production costs and maintaining consistent final product quality.
- Customized for purpose: mixing, hopper for cross-linking materials, atmospheric drying, vacuum drying, heat treatment, filtration and drying, others.
- Complete discharge (manual or automatic) from bottom due to no bearing.
- Compact design, simple and easy installation and extremely user-friendly operation.

	ADVANTAGE	REASON	RESULT
1	Good mixing	Mixing of product with tailor made helical ribbon agitator	Speedy mixing
		Forced mixing with top vortex breakers	Speedy drying
		No dead space	Speedy reaction
2	No risk of product contamination due to lubricants, etc.	No gearbox inside of the vessel	No contamination
		Bearing installed only on the top side of the agitator (outside of the vessel)	
3	High filling rate	No necessary extra space for gearbox or drive arm inside of the vessel	Smaller installation space required
4	Bottom discharge	No bottom bearing results in easy product discharge	No product hold-up Speedy discharge Different types of valves can be employed (automatic or manual)
5	Easy maintenance	No complicated mechanism	Simple construction Few consumables

SOME APPLICATION EXAMPLES

Mixing and drying

- Electronic and battery materials
- Ceramics
- Magnetic materials
- Herbal medicines
- Seasonings
- Animal feed
- Powder mixes
- Resin powders
- Pharmaceuticals

Liquid concentration, evaporation plus drying

- Inorganic aqueous salt solution

Heat treatment

- Inorganic chlorides
- Starches
- PET
- Confectionery ingredients
- Polyester
- Spices

Dosage of active ingredients

- Animal feed
- Fish feed
- Pharma ingredients

Extraction

- Herbal medicines
- Tea

Removal

- Residual monomers in synthetic resin
- Volatile organic solvents

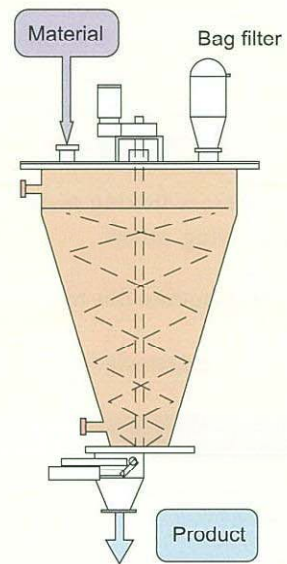
Available in a variety of configurations to suit

different applications

Conical ribbon mixer

Its unique combination of a specially designed helical ribbon agitator and precisely placed vortex breakers creates a great circulation flow ensuring a speedy and high quality mixing.

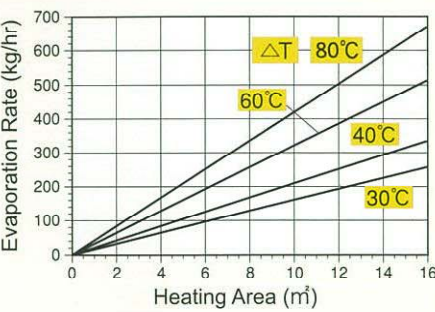
Conical mixer – flow diagram



Conical ribbon vacuum dryer

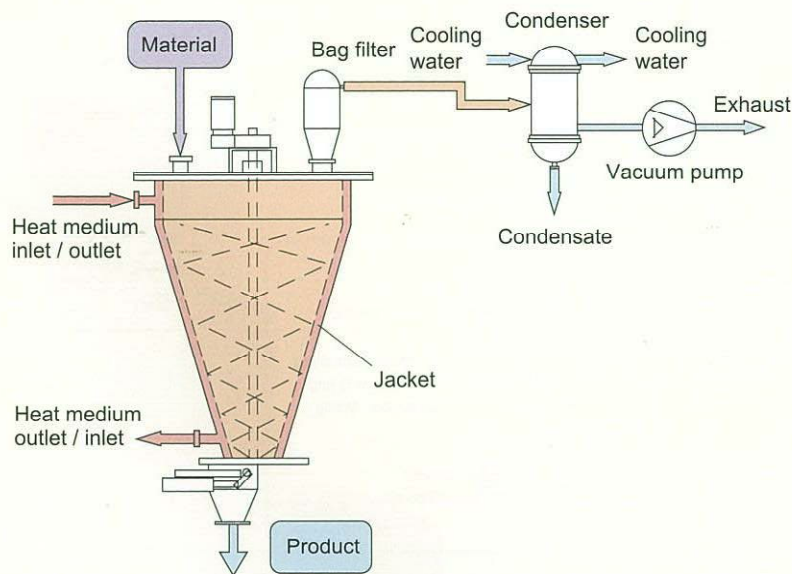
The drive bearing features a mechanical seal designed for high vacuum conditions. Total mixing means that all of the material is constantly moving, which ensures a uniform temperature distribution with no local heating. The dryer is designed to ensure uniform heating and prevent undrying or overheating of the product. Vacuum drying enables both mixing and drying of heat-sensitive materials in the same vessel for improved efficiency. The Ribocone can be used in batch operation for crystallization, mixing and drying in a single feed, thereby boosting productivity and reducing the installation spaces.

Performance (evaporation rate when drying)



- * Calculated constant-rate drying time for wet powder starch.
- * Indicates temperature difference between heating temperature and product temperature.
- * During vacuum drying, the product temperature is roughly at boiling point, corresponding to the degree of vacuum.

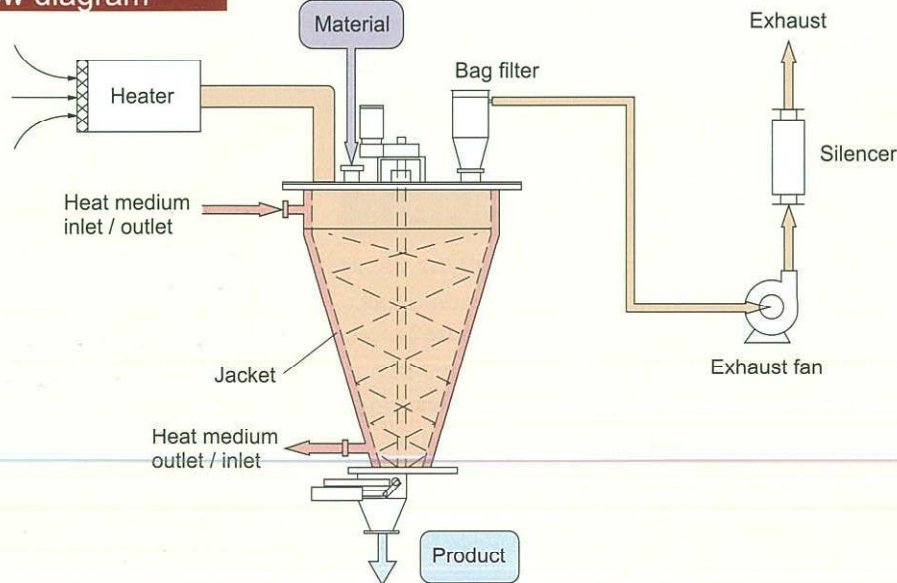
Conical vacuum dryer – flow diagram



Conical ribbon dryer

The vessel is enclosed in a jacket and can be used as a dryer. Thanks to the unique ribbon screw mixing action, the Ribocone functions as a highly efficient rotating heat conduction dryer, and can be configured for heating using steam or a heating medium. The jacket can be designed with extra pressure resistance where required.

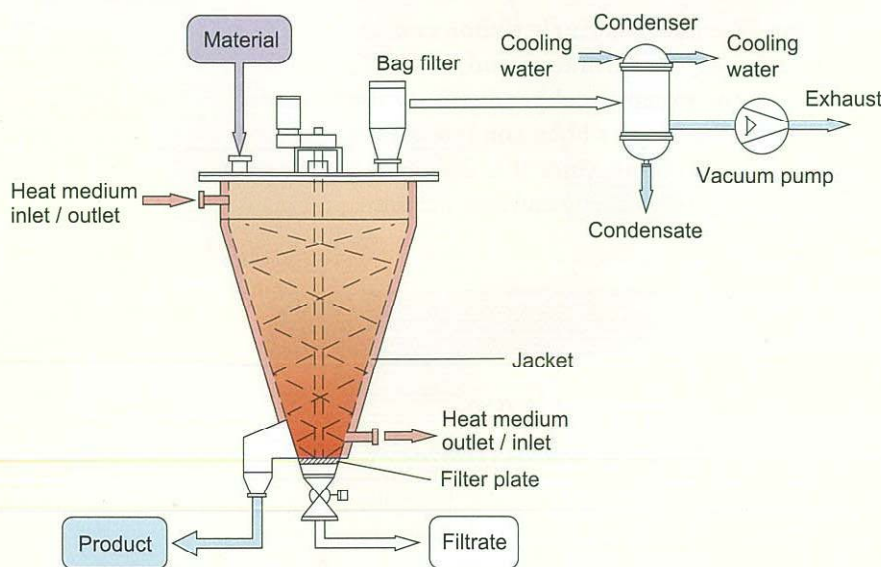
Conical dryer – flow diagram



Filter dryer/ribbon vacuum dryer

By attaching a filtration unit to the bottom of the Ribocone, it is possible to provide both filtration and drying in the same unit, for improved processing efficiency and reduced risk of cross-contamination.

Conical filter (vacuum) dryer – flow diagram



STANDARD SPECIFICATIONS

Item	Model	RM-50	RM-100	RM-200	RM-400	RM-600	RM-1000	RM-1500	RM-2000	RM-3000	RM-4000	RM-5000	RM-6000
Working volume (ℓ)		50	100	200	400	600	1,000	1,500	2,000	3,000	4,000	5,000	6,000
Vessel diameter A (mm)		500	620	800	1,000	1,150	1,350	1,550	1,700	1,950	2,150	2,300	2,450
Rotation speed (min ⁻¹)		68	61	54	48	45	42	38	37	34	33	32	31
Vessel height B (mm)		680	920	1,175	1,250	1,495	1,685	1,975	2,120	2,455	2,645	2,890	3,130
Power (kW)		1.5	2.2	3.7	5.5	7.5	11	22	30	37	45	55	75
Heat jacket area (m ²)		0.58	0.93	1.55	2.19	2.90	4.00	5.27	6.34	8.34	10.14	11.61	13.17
Weight (kg)		100	200	400	600	800	1,200	1,600	2,000	2,500	3,200	4,500	5,400

- Also available as RM-10 model (effective capacity 10 liters) specifically designed for research and development applications.
- Horizontally mounted motor configuration also available.
- Power values shown here are standard measurements. Actual powers are selected on the basis of test results.
- Standard weight is estimated weight for RM conical ribbon mixer.

Model designation

RM

1

2

3

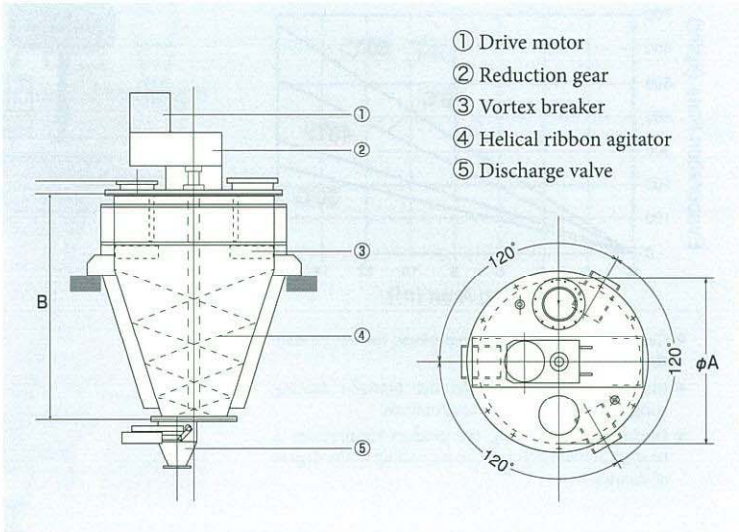
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③ Cone volume (L)

④ D : Atmospheric drying
VD : Vacuum drying
No symbol : Mixing

① RMW : Wide bottom design
RMW : Narrow bottom design

② F : Filter design (Option)
S : Sanitary design(Option)



Conical single ribbon mixer dryer

Ribocone SR

OUTLINE

The Ribocone SR employs a single ribbon configuration for improved cleaning performance and visibility without compromising the exceptional productivity levels of the Ribocone series. The single ribbon configuration is ideal for food sanitary applications, since it is designed to prevent adherence of material to the vessel and minimize residual material in the vessel.

FEATURES

- Reduces adherence and residue in vessel
- CIP in vessel (including underside of ribbon) via cleaning nozzles
- Improved visibility for monitoring and observation
- Same mixing performance as conventional models



Single ribbon

Usability and options

Ribocone offers excellent usability and a range of optional features

Spray ball cleaning

A way to clean the vessel is to stop the helical ribbon and insert a spray ball, which moves up and down within the vessel to clean both the sides and the helical ribbon. After cleaning, the spray ball is stored at the top of the vessel.



Cleaning methods

● Liquid cleaning
Liquid cleaning uses cleaning liquid that accumulates within the vessel. The helical ribbon rotates during cleaning for improved cleaning efficiency. Since the gearbox and other parts are mounted externally, the vessel can be filled completely with liquid.



Separated cleaning

The helical ribbon can be removed from the vessel and cleaned separately, to enable inspection of cleaning results as well as manual cleaning if needed.

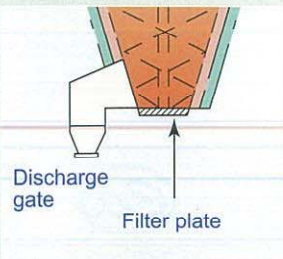


Liquid nozzle

Used to add liquid to materials inside the Ribocone for liquid-solid mixing.

Filtration mechanism

The filtration plate is installed in the base of the vessel to separate liquids from solids in a slurry mix. It supports both suction filtration and pressure filtration.



Discharge valve

Many different types of discharge valve can be used, including flap valve, ball valve, gate valve and choke valve. The horizontal discharge can also be designed.

Load cell

The load cell can be used to monitor weight changes inside the Ribocone.

Air blow nozzle

The air blow nozzle is used to introduce hot air or inert gases at the bottom of the shell to promote drying.

