

# Raymond<sup>®</sup> Mechanical Air Separators



Air Preheater Company  
Raymond Operation

# Raymond® Mechanical Air Separators

## Produce Materials with High Uniform Fineness

The Raymond® Mechanical Air Separator produces material with high uniform fineness; operates in open or closed circuit; is excellent for de-dusting; can provide drying and cooling; and features the unique single or double whizzer for faster separation of fines and more positive rejection of oversize.

### Operation Cycle

Material enters the hollow shaft or center feed pipe at the top of the separator and drops upon the rotating distributor plate below. This distributor plate disperses the material into the upward sweep of circulating air developed by the fan in the top chamber of the drum. The whizzer blades set up a centrifugal motion of the air and material. This concentrates the oversize material along the surface of the upper inner cone, where gravity causes it to flow into the lower inner cone and then out the coarse spout at the bottom. The airstream carrying the powdered material of required fineness moves through the fan and is delivered into the outer cone chamber where the fines are discharged as finished product. After the fines are released in the outer cone, the air returns through the deflector ports to the inner cone, setting up a continuous circuit.

In addition to accomplishing faster separation of the fines and more positive rejection of the oversize, the whizzer action is also useful in de-dusting operations-making granular products by removing objectionable fines, for example-as well as producing microsize materials with maximum surface area.

### Single Whizzer Air Separators

Single whizzer separators have only one bank of whizzer blades to set up centrifugal action. This unit is ordinarily used for coarser separations up to approximately 10-15% R74 microns (85 to 90% passing 200 mesh) which is excellent for de-dusting and raw mix cement operations.

### Double Whizzer Air Separators

Double whizzer units have two rows or banks of whizzer blades. In normal operations they can produce finished materials up to 0.5-1% R44 microns (99 to 99.5% passing 325 mesh) and in finished cement circuits 2800 to 6000 Blaine or masonry cements.

### Fineness Control

Both the single and double whizzer units in 4 and 6 foot diameter sizes are equipped with vertical slide dampers which allow external fineness adjustment while the unit is in operation. For precise fineness control, all units 8 foot diameter and larger are provided with special vertical swing dampers to increase their efficiency and versatility when separating in the minus 325 mesh and subsieve size range. On many materials, finished products with a high percentage passing 15 to 20 microns can be obtained without difficulty.

Raymond® mechanical air separators are built in eleven sizes ranging from 4 feet to 24 feet in diameter, as well as a 30 inch unit for small capacities and test runs. Each size is available in a single or double whizzer construction. A special 10 inch laboratory separator completes the Raymond line and provides a useful machine for handling small lots of materials in experimental work.

### Typical Applications

- Cement - classify and dry raw mix, and to classify and cool finish cement.
- Limestone - produce limestone sand to meet the close specifications required for use in bituminous concrete, mortar, aggregate and many similar uses.
- Flour Mixes - make fine, uniform cake mixes and for production of protein-enriched grades of flour.
- Hydrated Lime - produce a high-fineness, uniformly-classified hydrated lime for chemical and spray purposes.
- Food Products - classify various food products including sugar, cocoa, milk powder, food mixtures, corn starch, wheat starch and soybean meal.
- Chemicals - make various grades ranging from extremely fine to the granular, dust-free gradation, such as soda ash and sodium phosphate.
- Talc and Clays - upgrade the quality of such materials as talc, kaolin, clays and phosphate rock by removing such impurities as silica, flint and other foreign materials.
- Metal and Metallurgical Powders - classify metal powders consisting of copper, bronze, iron and various alloys. De-dusting of sea-coal for foundry-facing in another typical application.

The Air Preheater Company, Raymond Operations continues in its commitment of providing our customers with the best products and service in the industry.

For additional information, contact your local Raymond Operations' sales office.

# Construction and Specifications

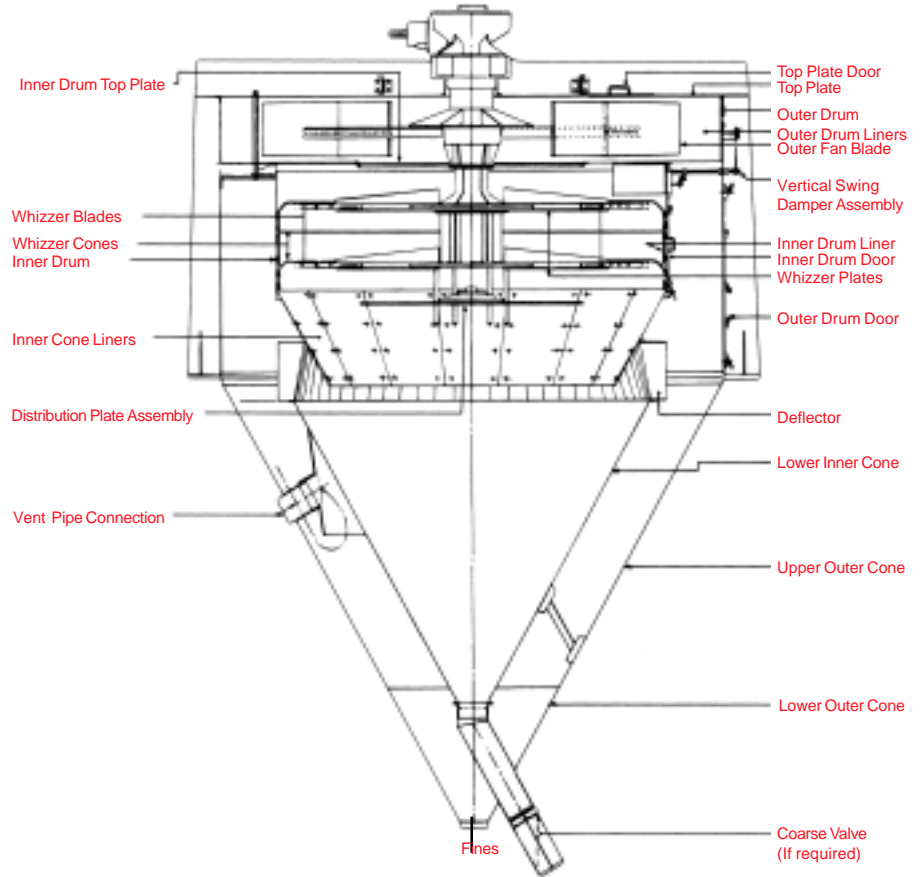
Standard construction of the Raymond® mechanical air separator includes cast, abrasion resistant whizzer cones and replaceable steel-plate liners on the inner cone.

The distributor plate is protected with special liners along the outer edge with a cone at the center to provide further protection and insure even flow of the incoming material off the distributor plate at the start of classification.

Separators for handling abrasive materials can be equipped with special abrasion resistant liners in all parts of the machine.

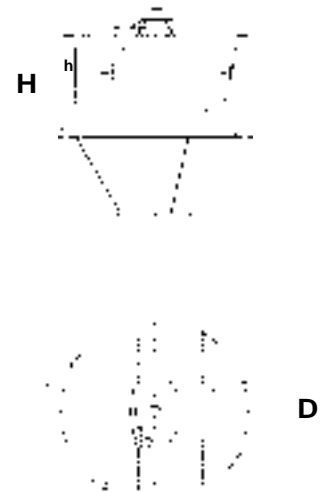
All mechanical air separators are provided with a vent connection in the cone section as standard construction for removing infiltrating air and keeping the unit under negative pressure for dust free operation.

The 4 and 6 foot diameter Raymond® mechanical air separators are built on the same principle as the larger units but are arranged with a vertical motor drive. This eliminates the need for a gear and pinion.



## Double Whizzer Separator

Size	Approximate Weight		Height - H		Height - h		Diameter - D	
	lb	kg	ft	mm	ft	mm	ft	mm
30"	950	400	5.2	1,500	1.5	400	3.2	900
4'	2,000	900	8.0	2,400	4.3	1,200	5.0	1,500
6'	4,000	1,800	11.0	3,300	5.8	1,700	7.1	2,100
8'	8,000	3,600	14.3	4,300	7.7	2,300	9.7	2,900
10'	11,500	5,200	16.8	5,100	8.5	2,500	11.7	3,500
12'	22,500	10,200	19.7	5,900	9.7	2,900	14.2	4,300
14'	28,500	12,900	22.1	6,700	10.3	3,100	16.0	4,800
16'	39,300	17,800	25.5	7,700	12.1	3,600	17.8	5,400
18'	44,800	20,300	27.1	8,200	11.9	3,600	20.8	6,300
21'	69,400	31,400	29.3	8,900	14.9	4,500	24.0	7,300
24'	90,000	40,800	37.3	11,300	17.2	5,200	27.0	8,200



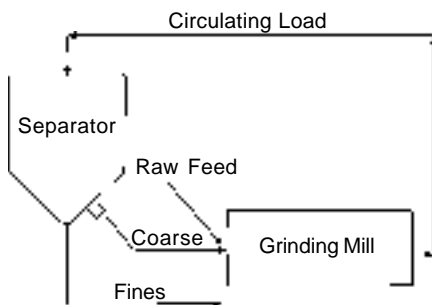
## Applications

### Closed Circuit Grinding

When operated in closed circuit combination with a pulverizer, the separator skims off the fines as fast as they are made so the mill works only on fresh material without wasting power. The tailings are discharged back to the mill for further reduction. The reground material is returned to the separator with the feed, so that a constant circulating load is set up between the mill and the separator.

The separator may be used in combination with ball mills, tube mills and compartment mills. Its function is to maintain a constant fineness in delivering the finished product.

It saves power in the overall operation and increases the capacity of the complete unit.



Raymond® Mechanical Separator in Closed Circuit System

The advantages of using a Raymond® mechanical air separator in closed circuit with the grinding mill for producing closely sized finished products include:

1. Positive control of fineness or surface area and the elimination of oversize particles.
2. Convenient variation of product fineness-vertical dampers permit wide range changes in fineness, externally while the separator is in operation.
3. Increase in the output capacity of the grinding mill. Experience has shown increases from 25 to 75% or more.
4. Lowering the temperature of the mill and product.
5. Improvement in grind efficiency, as in the case of ball mills where ball coating with fine material can reduce grinding ball effectiveness.

### Internal Air Flow System for Drying and Cooling

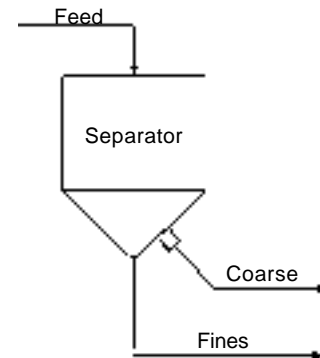
Effective drying within the separator is normally limited to those installations where the separator is used in closed circuit with a grinding unit. The oversize particles with entrained moisture, rejected in the first pass as coarse, are further reduced in the grinding mill to permit efficient drying in the second pass through the system.

Cooling in separators is also a widespread practice in classifying finished cement.

Both the single and double whizzer units can be provided with cooling and drying auxiliaries which consist of up to four inlet openings in the drum section and two air outlets in the cone section. Water jackets can also be provided on the cone sections for use in cooling finished cement on sizes 18' through 24' diameter.

### Open Circuit

In some cases, it is convenient to install the separator independently from the mill to make both a fine and coarse product simultaneously.



Raymond® Mechanical Separator in Open Circuit System

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