

Raymond® Vertical Mill

Pulverizing Materials in the Extreme Fineness Range

The Raymond® Vertical Mill is a specialized unit intended for pulverizing materials in the extreme fineness range. The principle of integral air classification, originally developed by Raymond, has been applied with outstanding success to this mill and as a result a great many materials can be produced in the lower micron sizes with a very minimum of oversize.

Particle Size Range

In many cases, this mill operates in the fluid-energy mill fineness range. In most instances, ultimate crystalline particle size of the particular material handled has a definite effect on the fineness and determines the highest particle size range available. Thus, many products can be reduced with this mill to 95% to 99% passing 15 to 20 microns while some products with smaller crystalline structure can be ground as fine as 95% to 99% passing 5 to 10 microns.

Range of Uses

The Raymond® Vertical Mill is well adapted to the grinding of a considerable number of non-metallic minerals and manufactured materials where these products are desired in the extreme fineness range. Typical materials processed include graphite, limestone, cocoa powder, marble, kaolin, sugar, talc, certain synthetic resins, organic and inorganic colors, phosphate chemicals, glass, enamel, pharmaceuticals, food products, and a variety of chemicals.



35" Raymond®
Vertical Mill

Mill Sizes

Raymond® Vertical Mills are available in two grinding chamber sizes - 18 and 35 inch. These mills are similar in operation and construction. Both are exceptionally compact requiring an usually small amount of floor space for their power transmission and product surface area capabilities.

The following table summarizes the Raymond® Vertical Mill's performance features.

Mill Size	18	35
Capacity Factor	1	7
Power - hp	20-25	150-200
Airflow - cfm m ³ /h	1000 1700	3500 5900

Raymond® Vertical Mill Advantages

- Uniform particle size
- Unit swings open easily for inspection, cleaning and maintenance
- Easy replacement of wearing parts
- Simple straightforward operations
- Compact design requires little floor space
- Available with integral flash drying or water-cooled grinding chamber



**Air Preheater Company
Raymond Operations**

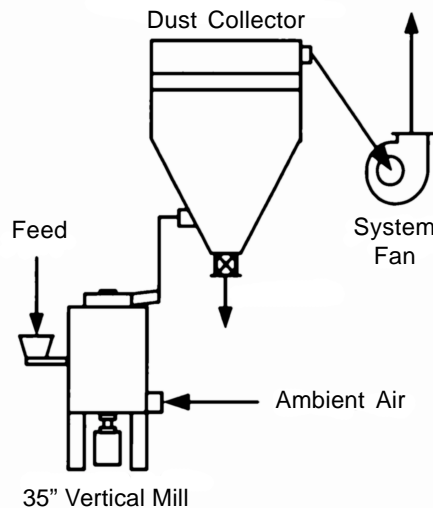
Raymond 35" Vertical Mill Typical Performance

Material	Fineness		Rate	
	% Passing	Size	lb/h	kg/h
Alumina Trihydrate	90	10 micron	1400	630
Cocoa 18% butterfat	99	200 mesh	2400	1100
Talc	95	200 mesh	3500	1600
Sugar	99.9	20 micron	2500	1100

Principle of Operation

The distinguishing feature of the vertical mill is the straightforward manner of operation with no need for close clearances or complicated adjustments. One vertical shaft carries all the rotating parts within the mill. On top is the fan which produces the required air flow. Below this are the two banks of whizzers which do the classifying, and below these are the hammers or accelerating elements.

The feed enters the mill through the side mounted variable speed screw feeder between the hammers and the whizzer classifier. The airflow enters below the grinding chamber and carries pulverized material vertically, combining it with newly introduced feed, to the classifier where any acceptable material is removed from the mixture prior to being ground. This optimizes grinding efficiency and reduces power consumption. The classifier's high speed cyclonic action concentrates the coarser fraction along the walls where it falls back to the grinding chamber for further size reduction. The pulverizing action combines impact of the hammers and attrition with the grinding chamber walls. The airflow then carries the reduced material to the classifier, where the finer material is separated from the combination of ground material and new feed, and it is then transported to the product collection system. The system airflow may recycle through the mill with only a por-



tion vented in many applications, or it operates as a once-through system and all the air is vented when the feed material is heat sensitive.

Range of Capacities

The capacities of the Raymond® Vertical Mill vary over a wide range, depending on the material being handled and the desired product fineness.

Fineness Control

The Raymond® Vertical Mill incorporates whizzer classification with simple and positive fineness control coupled with high product uniformity.

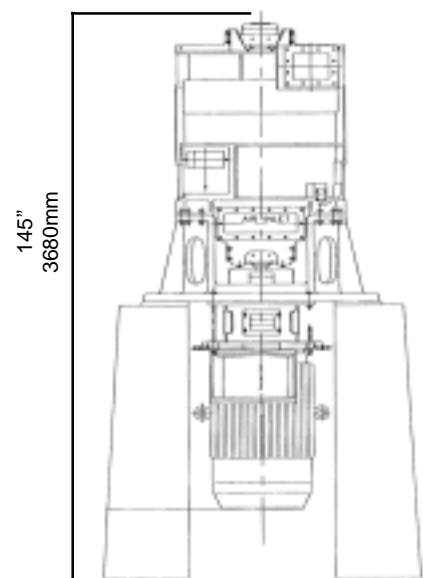
Preparation for Pulverizing

It is important that the materials be fed to the mill are properly sized. Materials to be ground should be pre-crushed to a maximum of 1/4 inch (6mm) in size and with some materials the best results can be obtained starting with a maximum of 10 to 20 mesh material. Feed rate and fineness can be easily and accurately controlled with the variable speed feeder which is furnished as standard equipment with both the 18" and 35" mills.

Built to Insure Dependability

Raymond® Vertical Mills are built to insure dependable operation year-after-year. They are designed with heavy iron castings to get the rugged construction necessary to carry the high-speed vertical shaft and bearings. We dynamically balance the complete rotor with hammers and discs, whizzers and exhaust fan after assembly to provide a smooth, vibrationless operation.

The main body is built with a hinged section that allows for easy access for inspection, maintenance and cleaning. Depending on the model, the mill is either v-belt driven or direct-connected to the motor through a flexible coupling.



Arrangement 35" Raymond Vertical Mill

ALSTOM

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