

Raymond® Roller Mills

The industry standard for over a century

- Designed to dry, pulverize and classify
- Provides efficient control of product size with minimal power
- Maximum flexibility and control over mill variables
- Custom designed for your processing application



More than 2,000 Raymond® Roller Mills have been supplied since the first mills were designed in the 1800's. These early machines were the forerunners of the rugged, heavy-duty, ring-roll mills manufactured today. The roller mill provides the needed flexibility to economically and efficiently process a wide variety of materials.

Roller mill system

The typical Raymond® Roller mill system is designed to dry, pulverize and classify to deliver a number of different products.

Cost efficiency

The Raymond® Roller mill provides efficient control of product size, with minimal power resulting in cost-effective production. The system offers maximum flexibility and control over mill variables, delivering controlled product quality at minimum operating costs.

Custom engineered systems

Each roller mill system is custom designed to achieve the best solution for your processing application. The mill, feeder, classifier, fan, cyclone, dust collector, and other system components are selected to meet the requirements and characteristics of the material processed.

Experience

Raymond® pulverizing and classification equipment has been setting the standard in size reduction since 1887, serving many types of mineral processing industries. Our portfolio includes not only the Raymond® Roller Mill, but the, Raymond® Imp™ Mill, Raymond® Bowl Mill, Raymond® Vertical Mill, Raymond® Ultra Fine Mill and others.

Raymond® is known for its reliable size reduction and classification equipment by customers worldwide. Our products are supported by our engineering and field service departments to ensure the highest level of customer satisfaction, while delivering the reliability and high level of performance that today's industrial applications require.

Standard roller mill system

The Raymond® Roller mill system is designed to pulverize, classify and deliver a number of different types of products. From a feed ranging in size from approximately ½- 2in / 10-50mm the roller mill can product particles ranging from coarse, granular products 90% minus 10 mesh (10%R2000 microns) to a fine as 99.9% minus 325 mesh (0.1%R44 microns). They can also be used to prepare feed for systems producing ultra-fine material, such as a Raymond® Vertical Mill, Ultra Fine Mill or Jet-Stream™ classifier system, as well as other mills.

Applications

A roller mill is most effective processing materials that are 5 or less on the Mohs scale of hardness. There are a few limitations, but the most practical for material processing soft to medium hardness.

Principal of operation

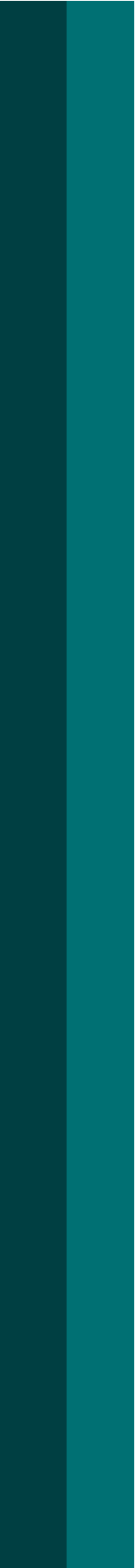
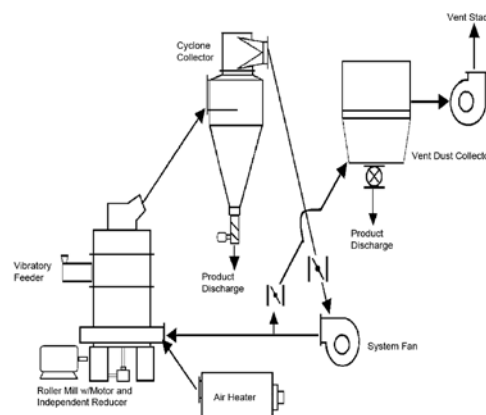
The roller mill is an air-swept vertical ring-roll with an integral classifications system. A vertical shaft rotates a "spider" assembly from which are suspended free swinging journal assemblies with rolls attached. As the unit turns, centrifugal force drives the rolls against the inner surface of the grinding ring. Plows rotating with the assembly lift feed materials from the mill bottom and direct it between the rolls and the grinding ring where it is pulverized.

Air enters from below the grinding ring and flows upward carrying fines to the classifying section. The classifier allows the sized material to pass to the product collector and returns oversized particles to the grinding chamber for further processing. The mill operates under negative pressure conditions, minimizing mill maintenance and plant housekeeping while maximizing the service life of major mechanical components.

Roller mill system with flash drying

Most naturally occurring non-metallic minerals and many manufactured products contain a certain amount of free moisture. Raymond's technique combines drying and pulverizing in the roller mill which may eliminate independent drying equipment this reducing capital investment, processing time and handling.

Heated air or hot waste gas is delivered to the mill return air housing and introduced through air ports to the grinding zone in the mill. The air turbulence and particle size produced during the grinding process are ideal for almost instantaneous evaporation of free moisture. Feed material is normally limited to what can be reliably fed into the mill. Typical product moisture is 0.1 to 0.5% by weight



Design features

Journal assembly – forged steel shaft supports a steel journal housing on carrying rings or roller bearings.

Roll – cast and machined wear resistant steel roll is fastened to the tapered lower housing of the journal.

Drive gears – cut steel bevel and pinion operate in an integral or independent housing.

Base – heavy cast iron mill base is machined to provide an airtight fit for the return air housing, mill bottom and gear housing

Mill bottom – cast iron mill bottom with replaceable liners fits into a machined recess in the base.

Spider – ductile iron or steel plate is keyed to the main vertical shaft and bolted to the plow support

Plow support - ductile iron plow support carries the plows and rotates with the spider

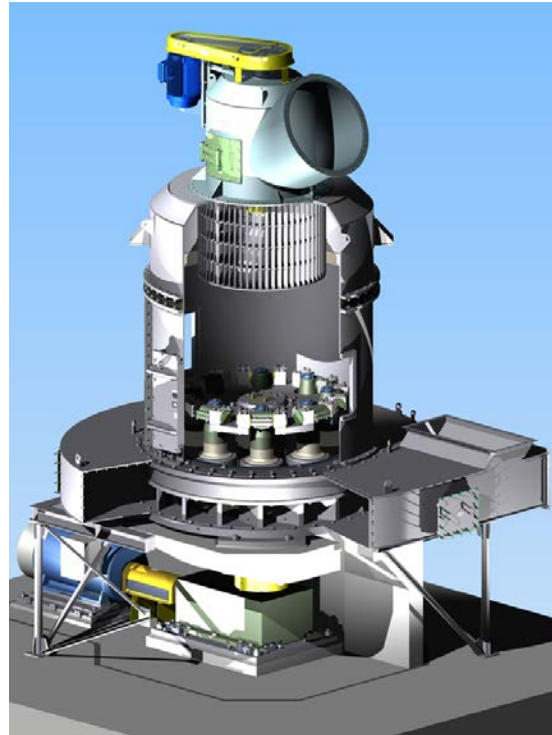
Integral gear housing – cast iron gear housing contains the lower thrust bearings for the vertical shaft and the bearings for the horizontal shaft.

Independent reducer – steel housing contains high efficiency gearing designed for maximum flexibility and extended service life.

Capacity

Major factors affecting the capacity of a roller mill include desired fineness, grindability and initial moisture.

- Mill capacity decreases when product fineness increases
- The harder a material is to grind, the lower the capacity
- High initial moisture may also decrease capacity because drying limitations of the mill



The roller mill, when equipped with a variable speed mill drive, can quickly be adjusted to accommodate changes in material hardness and feed size. This also allows the operator to match product rate with downstream process requirements, thereby reducing the operating and maintenance problems associated with frequent starts.

Standard size

Raymond® Roller mills are available with grinding ring diameters ranging from 30-120in / 760-3050mm. These sizes are capable of producing a wide range of product fineness from a wide variety of material.

Typical materials processed

Ideal applications include various clays, such as fire clay, bentonite and kaolin, as well as minerals like barytes, gypsum, limestone, phosphate rock, talc, coal, and manufactured materials such as hydrated lime, petroleum coke, pigments, phenolic resins or similar materials.

Nominal capacity of Raymond® Roller Mill-STPH

Material	Fineness		Mill Size							
	%Passing	Mesh	30	50	54	60	66	73	87	120
Baryte	90	325	2.0	7.1	8.8	12	19	29	45	100
Bentonite	80	200	2.5	9.0	11	15	23	37	56	125
Coke, Pet (HG-55)	95	200	1.5	5.3	6.6	9.0	14	22	34	75
Fire Clay	95	100	2.5	9.0	11	15	23	37	56	125
Gypsum	90	100	3.2	11	14	19	30	47	72	160
Kaolin	99.8	325	1.6	5.5	7.0	9.4	15	23	36	81
Lime, Burnt	70	325	3.0	11	13	18	28	44	67	150
Lime, Hydrated	99	200	2.8	10	12	16	26	41	63	140
Limestone	95	18	2.5	8.8	11	15	23	37	56	125
Limestone	85	200	2.0	7.1	8.8	12	19	29	45	100
Limestone	99	325	1.3	4.6	5.7	7.6	12	19	29	64
Phosphate Rock	70	200	2.4	8.5	11	14	23	35	54	120
Sulphur	90	325	1.7	6.0	7.5	10	16	25	38	87
Talc	80	325	1.7	6.0	7.5	10	16	25	38	87

Airflow, power requirements and water evaporation

Mill Size	Nominal Airflow*		Fan Power		Mill Power-Max		Turbine Power		Water Evap 1000 lb/hr
	acfm	m ³ /hr	hp	kW	hp	kW	hp	kW	
30in/760mm	3900	6600	30	22	30	22	25	18	0.7
50in/1270mm	10000	16900	60	45	100	75	30	22	1.8
54in/1370mm	12600	21400	75	55	150	110	40	30	2.3
60in/1520mm	15600	26500	100	75	200	160	50	45	2.8
66in/1670mm	22500	38200	150	110	300	225	75	55	4.0
73in/1850mm	31000	52600	200	160	600	500	100	75	5.6
87in/2180mm	46500	79000	300	225	900	700	150	110	8.4
120in/3050mm	100000	170000	900	675	1500	1200	200	150	18

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