

# RAYMOND® ROLLER MILLS

With a 130 years of experience, Raymond is a leader in the design and manufacture of industrial milling equipment and has set the standard in size reduction.

## THE INDUSTRY STANDARD FOR OVER A CENTURY

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

### Reliable Solutions

#### ROLLER MILL SYSTEM

The typical Raymond roller mill system is designed to dry, pulverize, classify and 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 standards 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.



## Providing Full Scope of Services to Our Customers

Raymond is known for its reliable size reduction and classification equipment by customers worldwide. Our product line is 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.

### ROLLER MILL SYSTEM

The typical roller mill system is designed to dry, pulverize, classify and deliver a number of different types of products. From a feed ranging in size from approximately 10-50mm (1/2" to 2"), the roller mill can produce particles ranging from coarse, granular products of approximately 10%R2000 micron (90% minus 10 mesh) to as fine as 0.1%R44 micron (99.9% minus 325 mesh). They can also be used to prepare feed for systems producing ultra-fine materials, 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 are soft to medium hard materials.

### PRINCIPAL OF OPERATION

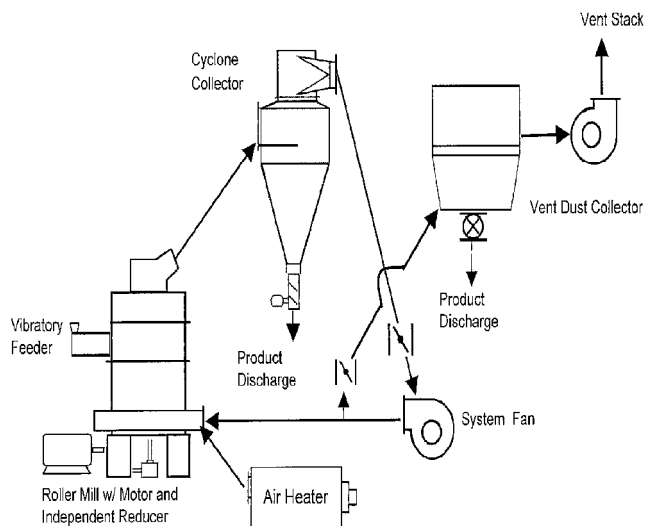
The roller mill is an air swept vertical ring-roll with an integral classification system. A vertical shaft rotates a "spider" assembly of arms from which are suspended free swinging journal assemblies with rolls attached. As the unit turns, centrifugal force drives the rolls against the inner surface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

Air enters from below the grind 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 thus 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 moisture. Feed moisture 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, gear housing and mill bottom.

**Vertical shaft** - cold rolled finished steel vertical shaft is engineered to support all moving parts.

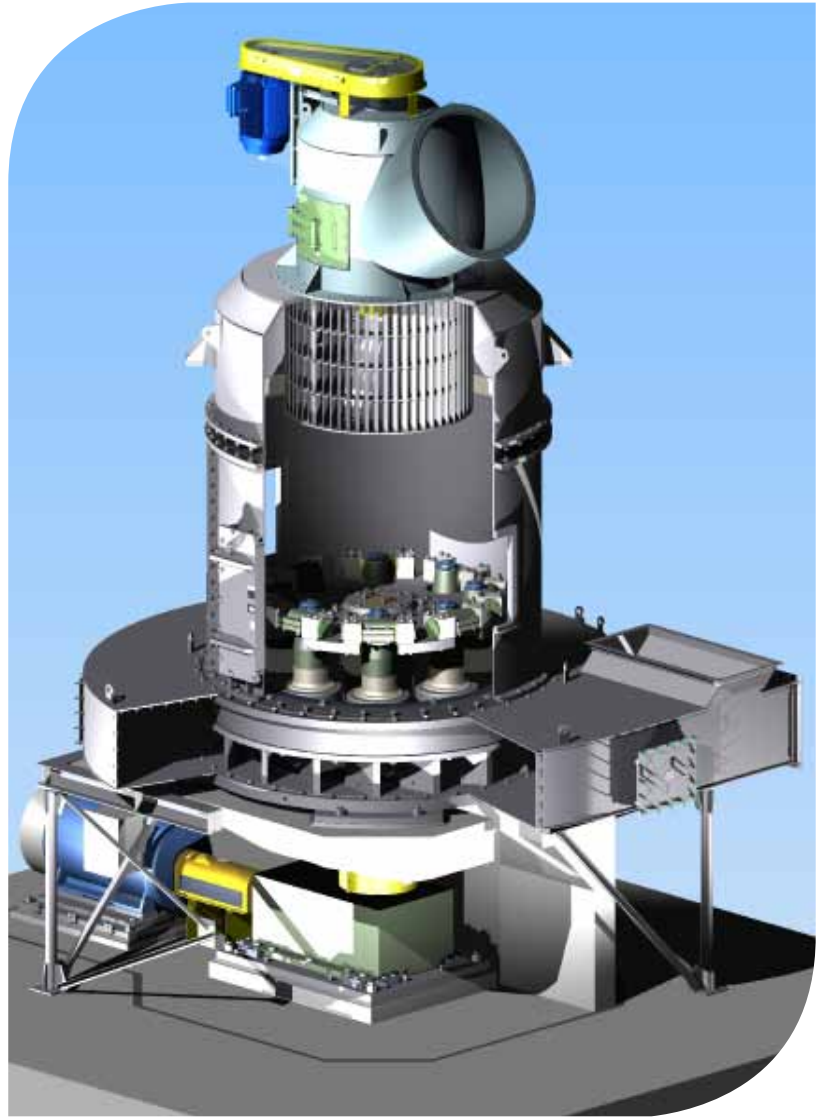
**Mill bottom** - cast iron mill bottom with replaceable liners fits into a machined recess in the base.

**Spider** - ductile iron or steel plate is keyed to the main vertical shaft.

**Plow Support** - ductile iron plow support is bolted to the spider assembly.

**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 of drying limitations of the mill.

The roller mill, when equipped with a variable speed mill drive, can be used in applications requiring adjustable capacity. This allows the user 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 inches to 120 inches (760 to 3050 mm). 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 and coal, and manufactured materials such as hydrated lime, petroleum coke, pigments, phenolic resins or similar materials.

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## NOMINAL CAPACITY OF 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 AND POWER REQUIREMENTS & WATER EVAPORATION

Mill Size		Nominal Airflow		Fan Power		Mill Power-max		Turbine Power		Water Evaporation
in	mm	acfm	m3/hr	hp	kW	hp	kW	hp	kW	1000 lb/hr
30	760	3900	6600	30	22	30	22	25	18	0.7
50	1270	10000	16900	60	45	100	75	30	22	1.8
54	1370	12600	21400	75	55	150	110	40	30	2.3
60	1520	15600	26500	100	75	200	160	50	45	2.8
66	1670	22500	38200	150	110	300	225	75	55	4.0
73	1850	31000	52600	200	160	600	500	100	75	5.6
87	2180	46500	79000	300	225	900	700	150	110	8.4
120	3050	100000	170000	900	675	1500	1200	200	150	18