



# RAYMOND

## Guide to Quality Equipment



Air Preheater Company  
Raymond Operations

# Raymond Experience Means Performance for You

## Experience Counts

Raymond's long-established capability to supply processing equipment and systems is the key to the success of our product lines. It is a result of many years of specialized experience in the design, development and application of reliable equipment for the process industries.

Raymond pulverizing and classifying equipment and systems have set standards in size reduction for over 100 years.

Raymond equipment and systems are known for their quality and ability to perform and are supported by our technical staff, aftermarket products and service departments. Starting with fully objective, practical and cost-conscious recommendations, we custom design and fabricate the equipment to meet your specific needs.



Raymond Roller Mill

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# Raymond Facilities and Personnel Offer Total Capabilities

## Facilities

Every Raymond manufacturing facility is equipped with the latest in fabricating machinery and staffed with personnel who employ the most modern technology available.

Raymond's primary manufacturing facilities are located in Wellsville, New York and Concordia, Kansas. They are equipped with modern manufacturing resource planning systems, production equipment and quality assurance techniques in support of fabrication, welding and machining operations, as well as assembly and testing.

Constant production improvement and aggressive cost reduction efforts typify Raymond's manufacturing facilities and personnel, whose broad experience, capabilities and commitment, assure Raymond customers that they will receive reliably built equipment on an economical basis.

The fully-equipped Raymond applications laboratory and test center in Naperville, Illinois is staffed with well-trained and experienced personnel, and offers pilot plant capabilities to simulate actual plant operation.

Production-sized units are used to make test runs with your product. Raymond engineers can use the results to guide you in the correct selection of equipment to properly fit your processing needs.

## People

Raymond's personnel are dedicated to providing solutions for your processing needs. Their experience and years of service offer innovative ideas and technological advancements that can improve your current system. In many cases Raymond's engineers have already encountered processing situations similar to yours and have a proven solution.

## Total Capability

Raymond's total capability includes everything from lab testing to final commissioning. A telephone call to the sales office nearest you will put you in touch with a member of our staff who can offer you economical solutions and time-saving advantages for the design and implementation of your processing system.



Raymond components are respected for quality and performance.



Raymond Test Center

# Raymond Pulverizing and Classifying Equipment and Systems



Roller Mill

## Raymond® Roller Mills

Rugged, dependable, pendulum type mills for fine and medium-fine grinding of a variety of non-metallic minerals and chemicals.

- Available in 7 sizes, ring diameters 30" to 86" (760 to 2,180mm)
- Range of capacities to 80 tph, fineness from 20 mesh to 99.99% passing 325 mesh.
- Proven design, integral grinding and classifying system provides accurate fineness control.
- Available with integral flash drying to remove moisture.
- Static or dynamic classifier options available.



Imp™ Mill

## Raymond® Imp™ Mills

High-speed, air-swept swing-hammer impact mill well suited to fine and medium-fine grinding of softer non-metallic minerals, coal, grains, various chemicals and fibrous materials.

- Range of capacities 1/4 to 45 tph of pulverized product, fineness from 20 mesh to 99.9% passing 325 mesh.
- Heavy-duty design for continuous 24-hour operation, minimum maintenance.
- Low operating temperature design ideal to address simultaneous thermal processing applications. Available with integral flash drying or calcining.



Bowl Mill

## Raymond® Bowl Mills

Primarily used for pulverizing coal and petroleum coke, the bowl mill features a revolving bowl and tapered rolls.

- Coal grinds quietly on coal, no metal-to-metal contact.
- Low maintenance, minimum wear.
- Capacities to 100 tph, fineness up to 95% minus 200 mesh.
- Integral drying system permits handling high moisture fuels.
- Recognized reliability with thousands of units in the field.
- Hybrid dynamic classifier option available.
- Modern "HP" design with independent gear box and other advanced features.



Vertical Mill

## Raymond® Vertical Mills

A vertically arranged high-speed, air-swept hammermill designed for uniform ultra-fine grinding.

- Two sizes provide capacities from 100 to 10,000 pounds per hour, fineness to 95-99% finer than 5-10 microns.
- Unit swings open easily for inspection, cleaning and maintenance.
- Compact design requires little floor space.
- Available with integral flash drying.

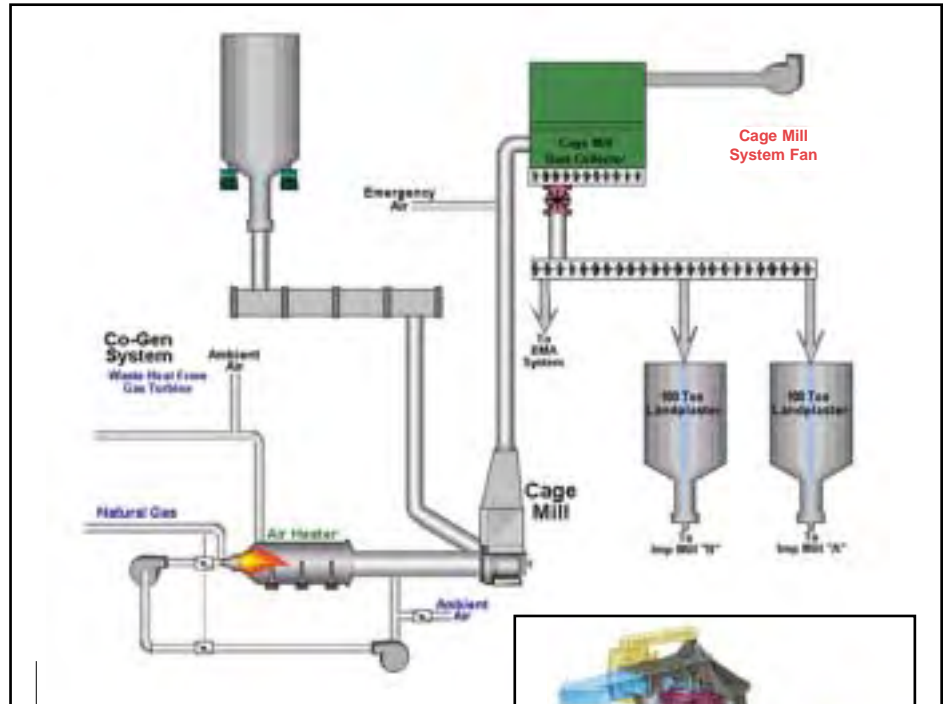
# Raymond Pulverizing and Classifying Equipment and Systems

## Raymond® Flash Drying Systems

Simple to operate and well known for high on-line availability and tough applications involving fine, non-metallic, low to medium abrasive, sticky and heat sensitive materials, Raymond flash drying systems have been used for flash calcining in various applications.

In addition, flash drying can be simultaneously combined with other functions such as pulverizing, classification and conveying, providing flexibility for use in additional process applications.

- Cage mill flash dryers: Designed to bring wet, lumpy and dispersable products into contact with a high velocity hot gas stream.
- Imp™ Mill flash dryers: Selected when size reduction of the process material is also required.
- Twin cyclone systems: Solves the problem of uneven drying and produces material having uniform moisture characteristics.



Cage Mill Flash Drying System

## Raymond® Classifiers

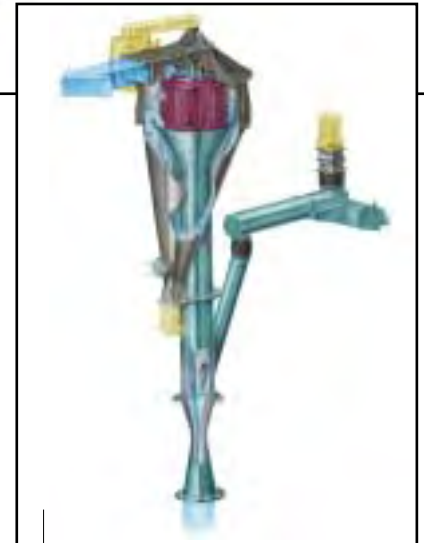
Designed for use as independent units or in circuit with pulverizing equipment, efficient designs maintain optimal control of fineness.

- Mechanical air separators: Single and double whizzer in sizes from 30" to 24'. Accurate fines separations to 325 mesh (44 microns).
- Jet-Stream™ classifiers: Available in 4 sizes and capable of producing materials having a top size of 5 microns or less.
- Integral or instream classifiers: Double cone, single or double whizzer and turbine classifiers for use in conjunction with Raymond® Roller, Imp™, Bowl, and VR mills. Top size classification from 20 mesh to 10 microns or less.

## Raymond® New Generation Hybrid Turbine Classifier for Bowl Mills

The patent pending design enhances system and process performance.

- Produces particle size distributions compatible with improved flame characteristics while reducing emissions and minimizing unburned carbon.
- Facilitates combustion of fuel possessing a coarser average particle size without sacrificing system performance or compromising process capability.
- Available for all types of Raymond® Bowl Mills or other manufacturers' pulverizers.

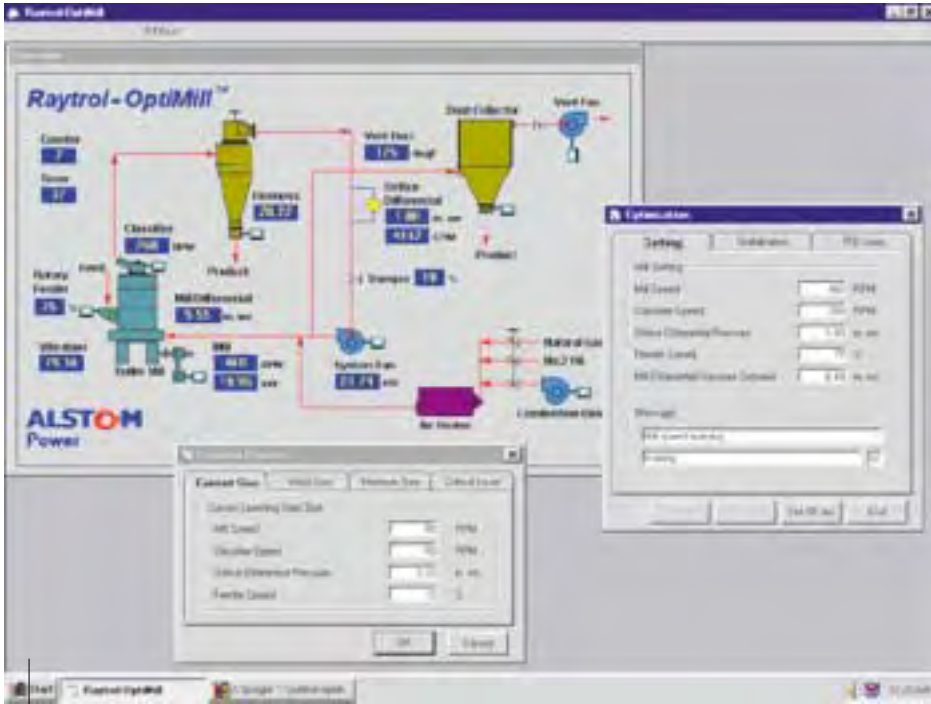


Jet-Stream Classifier



Hybrid Turbine Classifier

# Raymond Pulverizing and Classifying Equipment and Systems



Control Screen

## Raymond® Control Systems

Raymond now offers a new generation in mill control that provides the following advantages:

- Increased mill capacity.
- Automatic adjustment for changes in feed such as grindability, moisture content or bulk density, to maintain a constant rate of consistent quality product.
- Reduced maintenance and extended mill life with smoother operation.

Raymond offers two basic levels of control systems depending on your needs.

## Raytrol-II

The new Raytrol-II is designed to affordably replace existing Raytrol systems with the latest technology. It uses a multi-loop controller with expandable I/O and communications capability that allows PLC interfacing. The controller is PC configurable and includes integral trending. Its versatility and ease of use makes it an ideal system for today's economic environment.

## Raymond® PLC Systems

Raymond's standard PLC control system uses an Allen Bradley SLC 5/04 CPU with operator screen interface unit, historical trending and alarming capability. This system can operate in automatic, manual or maintenance mode. It is furnished with seven operator interface screens (views) and analog/digital I/O with start/stop control logic for typical mill system components. This system offers full control capability with expert support via the integral modem from the mill system designer - Raymond.

Raymond has also provided many customized PLC systems with user-specific hardware and software to complement existing control systems or to interface with other systems.

## Raytrol-OptiMill™ Control Software

This software option to the Raytrol II or Allen Bradley PLC systems establishes and maintains optimum mill operation to ensure peak performance of your roller mill. Its advanced optimization algorithm and built-in intelligence reduces dependency on experienced operators by monitoring system parameters and controlling the mill system automatically. This can result in up to a 20% capacity increase and a significant reduction in operating cost.

# Raymond Field & Technical Services

## Field Service

Raymond Operations' staff of experienced service technicians are available for startup, maintenance and troubleshooting of our entire product line. These highly trained individuals can help you find trouble spots and eliminate them for better performance.



HP Bowl Mill Installation

## Technical Services

Raymond offers a full range of technical services to help support and maintain your system.

### Equipment Inspections

Regular equipment inspections are an important factor in both reducing maintenance requirements and improving general equipment performance. A member of our technical service staff will visit your plant to conduct in-depth inspections of your Raymond equipment.

### Operating Seminars

Conducted at your facility by an experienced member of our technical service staff, these one or two day seminars have proven to be extremely beneficial in aiding plant personnel to operate equipment more effectively; reducing costs and downtime.

### Modification and Upgrade Packages

Raymond has developed a number of equipment improvements that can be installed in existing machines as conversion packages. We provide modification and upgrade packages for control systems, vertical shafts and roller mill journals.

## Equipment

### Rebuilding/Refurbishing

Raymond equipment and systems are designed and manufactured to deliver optimum performance for years, but even with the best maintenance, wear and damage are inevitable. With an investment of a fraction of the cost of buying new equipment, the existing units can be rebuilt using dependable Raymond OEM replacement parts, bringing them to standards approximating those of new equipment.



Classifier Housing before Refurbishing



Refurbished Classifier Housing

# Raymond OEM Replacement Parts

## Why Raymond Parts?

Raymond original parts are of the best quality and match for your Raymond equipment.

## The Right Part

We maintain a database of the original specifications of all equipment sold, by serial number and model, resulting in an accurate record for every piece of equipment in our installed base, including custom designed variations for specific applications. Therefore, the parts you ordered always meet the proper specifications.

## On-Time Delivery

Since our customers prefer to order OEM replacement parts, we maintain a large inventory of parts, available for immediate shipment. Outstanding customer service and a commitment to ship parts on time — every time — are top priority.

## Parts Stocking Program

Raymond Operations maintains stock on most wearing parts for Raymond equipment in its warehouses. These parts include, but are not limited to, grinding rolls, bull rings, plow tips, liners, hammers, whizzer blades, mixer paddles and feed rolls, as well as bushing and bearings, at our facilities in Wellsville, NY and Concordia, KS. We stock many non-wearing parts including journal heads and housings, complete journal assemblies, shafts, spiders, plow supports, drive mechanisms, gears and pinions. Our warehoused parts inventory is monitored by a computerized program so that stock replenishment is triggered to assure optimum stock levels.



Replacement Parts Warehouse

## OEM Reliability

Raymond Operations maintains the original manufacturing drawings for all equipment and parts. These drawings show the exact metallurgical compositions, tolerances, lubrication requirements and many other important details of your Raymond equipment and are constantly updated to reflect design improvements while maintaining compatibility with original equipment.

## Full Warranty Support

Raymond warrants that all parts will be free from defects in material and workmanship. Warranty period expires twelve (12) months from the date of delivery.

## Customer Confidence

We have the solution for all your replacement part needs. Staying with the supplier of the original equipment results in fewer problems, less downtime and higher productivity.

## Customer Communications

Raymond Operations believes it is essential to stay in touch with its customers. "Tech Talk" is regularly published to answer questions about proper operating and maintenance techniques and to keep you informed about technical innovations for equipment upgrades.



Pulverizer rolls being machined



Manufacturing Mill Shafts



# Raymond Laboratory Facilities



Roller Mill

## Raymond Testing Resources

Raymond's twenty-five thousand square foot laboratory is used exclusively to test and demonstrate Raymond® and Bartlett-Snow™ equipment with customer-supplied material under simulated production conditions. This facility houses a wide range of full-scale processing equipment capable of grinding, classifying or thermally processing virtually any non-hazardous mineral, chemical, food or other material. It also includes equipment for pre- and post-processing chemical and physical analysis of many diverse test materials.



VR Mill

## Raymond Does it Differently

While some manufacturers test equipment with process materials on small scale or bench models of equipment, Raymond uses actual full sized equipment and large material lots. A pound of material is generally not a valid representation of a ton. Managing large production quantities of test materials often uncovers handling difficulties and other problems, which might otherwise be overlooked.



Computational Fluid Dynamics (CFD) Analysis

## Pulverizing Capabilities

- Raymond® Roller Mill
- Raymond® Imp™ Mill
- Raymond® VR Mill
- Raymond® Vertical Mill
- Raymond® Screen Mills

## Particle Size Separation

- Jet Stream™ Dynamic Classifier
- Dynamic Classifiers for Mills
- Mechanical Air Separators
- Screen Tests

## Thermal Equipment

- Bartlett-Snow™ Rotary Electric Calciner
- Bartlett-Snow™ High Temp Rotary Calciner
- Bartlett-Snow™ Rotary Dryer
- Bartlett-Snow™ Rotary Kiln
- Raymond® Flash Drying System

## Material Tests

- Moisture Analysis
- Particle Size Distribution Analysis
  - Microtrac
  - Ro-Tap Screen Analysis
  - Alpine Air Sieve
- Abrasion/Grindability Analysis
  - Raymond Grindability Test
  - Raymond Abrasion Test
  - Hardgrove Grindability Test
  - Bond Index Test
  - Material Specific Gravity and Bulk
  - Density Measurement
- Industry Specific Test

## Air Preheater Company Raymond Operations

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