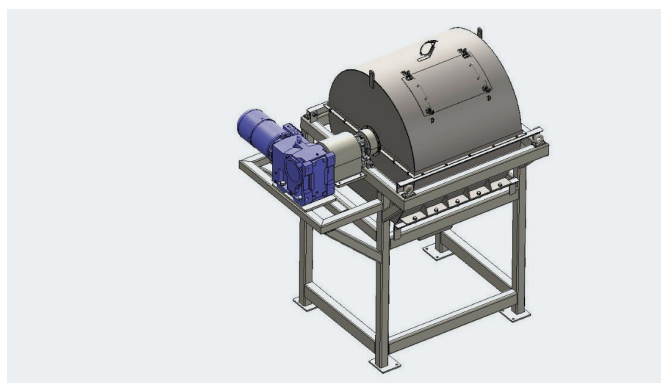
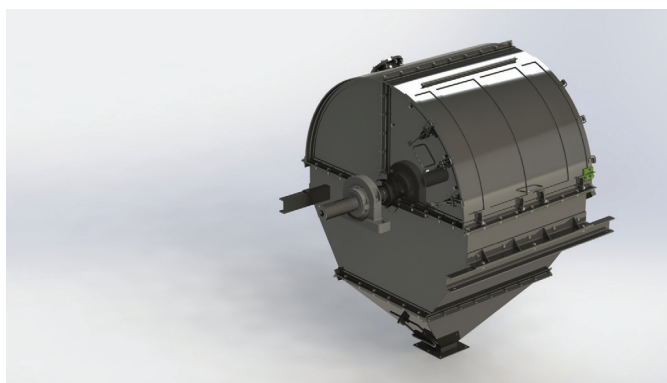


Ball Mill

Models

Available in various sizes, typically in the range of 0.9m x 0.9m to 3.67m x 6.4m.



Applications

Ball Mills and other forms of tumbling mills such as Tube Mills, Rod Mills and Batch Mills form a significant type of equipment used for the size reduction of a wide variety of materials such as minerals, ores, coal, carbon products and general chemicals. Generally used in high volume applications, there are a many types, sizes and system configurations and British Rema has long experience in the selection, design and sizing of such systems.

Operating principles

Ball Mills operate by introducing the material to be milled into a rotating vessel which contains a grinding medium (e.g. high-density balls or rods) and the material is ground (wet or dry) by attrition through the tumbling action of the mill. Slow rotational speeds combined with simple and robust construction make them ideal for grinding hard and abrasive materials where continuity of service, low maintenance and minimum downtime are a necessity. Ball Mills can be designed to operate continuously (fed at one end of the system and discharged at the other), or on a batch basis for smaller, or intermittent, volumes.

System configuration

Ball Mills can be operated either on a stand-alone basis ('open-circuit grinding') or in conjunction with a classifier which returns oversize product to the mill for further grinding ('closed-circuit grinding'). With open-circuit systems, finished product is obtained from a single pass through the mill which typically produces a relatively wide particle size distribution. Special care has to be taken selecting the geometry of the mill (length, diameter, rotational speed, grinding media etc.) to ensure that the desired particle size is obtained. If operated in conjunction with the correct air classifier (closed-circuit), the grinding system is capable of achieving a much narrower particle size distribution, with an accurate control of the maximum particle size.

A closed system minimises over-grinding, resulting in improved efficiency, and allows a smaller mill to be used for any given capacity.

Air-Swept Milling

Applicable to dry closed-circuit milling only, a further variation can be the introduction of an airflow through the mill ('air-swept milling'). This provides a form of elementary pre-classification and typically produces narrower size distributions but less fine particles than its non air-swept equivalent. Typically suitable for end product falling in the range of 50 to 200 microns, this system can also be used to achieve a limited drying capability, handling product of up to 8% moisture content.

Ball Mill equipment range

After sales service, spares and on-site services

British Rema can service, repair or replace the mechanical and wear parts for a wide range of Ball Mills.

Ball Mill parts: Include diaphragms, grates and screens; lifters, liners and grinding plates; lining refurbishments; mill shells; trunnion bearings; drive and gear components; feeders, discharge hoppers and ductwork.

Supply of consumables: Grinding media of all relevant sizes and materials.

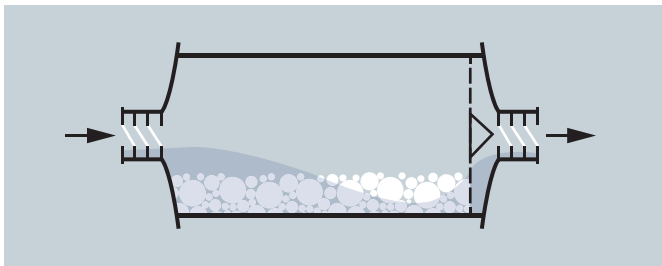
Site surveys: Mechanical condition assessment; optimisation of speed of rotation; shell re-alignment, internal plate mapping.



Troubleshooting: Temperature and vibration checks; air supply checks; monitoring the efficiency of closed-circuit systems; energy consumption monitoring.

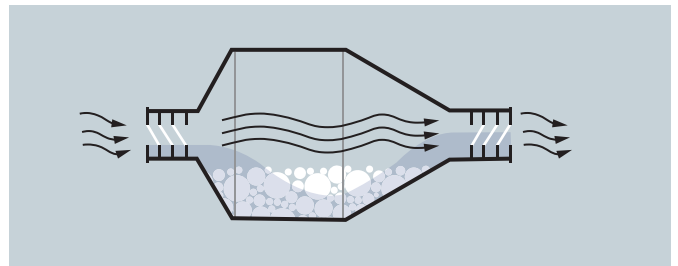
Contact our spares division:
sparesknowhow@britishrema.com

Types of Ball Mill



Grate Discharge Ball Mill

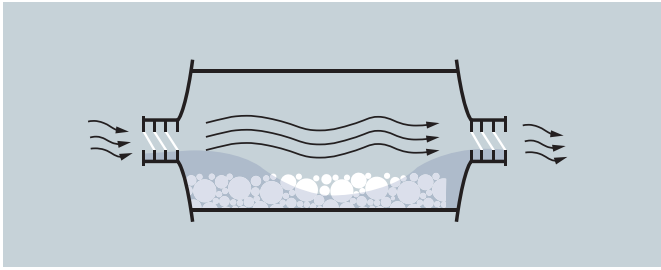
Used in wet and dry grinding in both open and closed circuits, a grate discharge ball mill (sometimes known as a 'diaphragm discharge mill') incorporates a slotted discharge diaphragm with lifters at the discharge end of the mill. The diaphragm, or 'grate', serves to retain the balls and any coarse material, with finished product passing through.



Conical Ball Mills

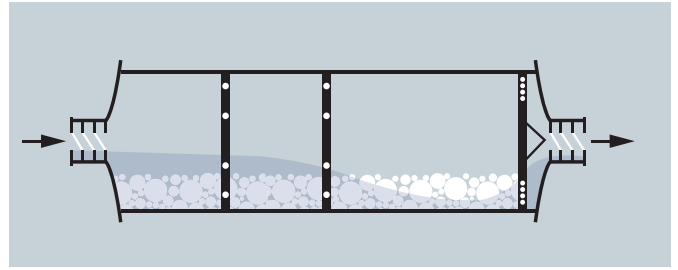
Used wet or dry, closed or open circuit, conical ball mills provide a classifying action within the body of the mill due to particles of greater size tending to reside at a point of greater diameter. This characteristic delivers increased efficiency and lower power consumption. Conical mills may also be air-swept when run dry.

Ball Mill equipment range continued...



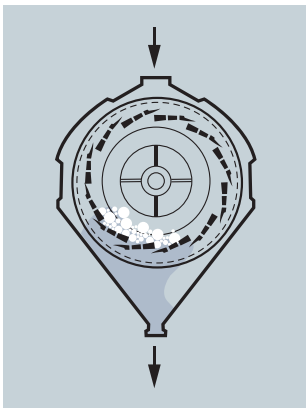
Air-Swept Ball Mill

Used in dry closed-circuit grinding, air-swept ball mills allow fines to be extracted from the mill as soon as they are produced. The airflow temperature can be varied and limited drying can be achieved.



Tube Mill

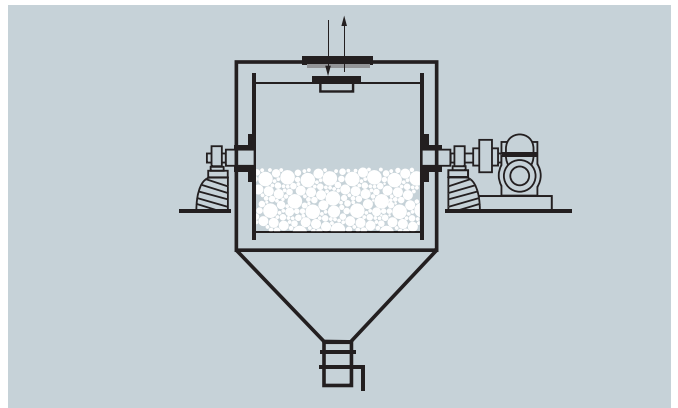
A parallel mill of large length to diameter ratio, a tube mill is used for wet or dry grinding in open circuit. This is a grate discharge mill which may be fitted with additional internal diaphragms of different specifications to control the flow of material through the mill.



Screen Discharge Mill

The Screen Discharge Mill is designed for continuous operation and produces a relatively coarse product with minimum generation of superfines. The grinding chamber is formed from a set of replaceable cast steel perforated grinding plates bolted to shaft-

mounted end-plates fitted with renewable segmented steel liners. The chamber is totally surrounded by two concentric sets of perforated screens. The chamber contains a steel ball charge. Material enters axially. Ground material passes through the perforated grinding plates onto the inner screen surface. Material then passes through this screen continuing to the outer screen which controls the final product size. Oversize (or semi-ground) material retained on each screen is returned to the grinding chamber through a series of return plates. Product is collected within a surrounding dust-tight casing with integrated discharge hopper.



Batch Mill

Batch mills are appropriate for relatively small-scale or intermittent operation where continuous milling would be inappropriate and enable extended and variable residence/grinding times to be accommodated.

Note: British Rema only supply systems for dry grinding.