

## Rema Ball Mills

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### Introduction:

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



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### Air swept milling:

Applicable to dry closed-circuit milling only, a further variation can be the introduction of an air flow 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.

### 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, liner and grinding plates; lining refurbishments; mill shells; trunnion bearings; drive and gear components; feeders, discharge hoppers and ductwork

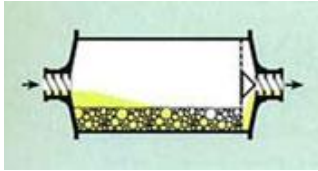
**Supply of consumables:** grinding media of all relevant sizes and materials

**Site surveys:** mechanical condition assessment; optimization 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

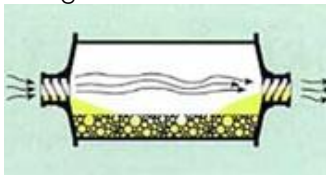
**Contact our Spares Division:: + 44 (0) 1246 296520**

## Types of Ball Mill:



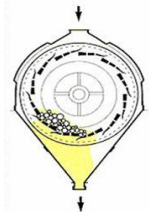
### Grate Discharge Ball Mill

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.



### Air Swept Ball Mill

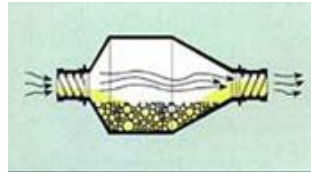
Used in dry closed-circuit grinding, air-swept ball mills allow fines to be extracted from the mill as soon as they are produced. The air flow temperature can be varied and limited drying can be achieved.



### Screen Discharge Mill

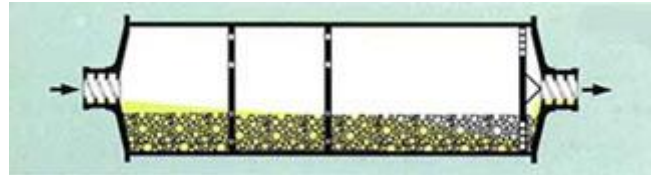
The Rema Screen Discharge Mill is designed for continuous operation and produces a relatively coarse product with minimum generation of superfines. The grinding chamber is formed from a set of replaceable cast steel perforated grinding plates bolted to shaft-mounted end-plates fitted with renewable segmented steel liners. The chamber is totally surrounded by two concentric sets of perforated screens. The chamber contains a steel ball charge. Material enters through an axially placed feed nave. 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.



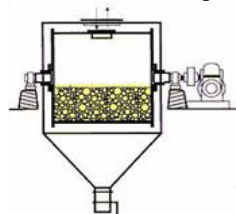
### Conical Ball Mills

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.



### 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.



### 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.



## British Rema Process Equipment Ltd

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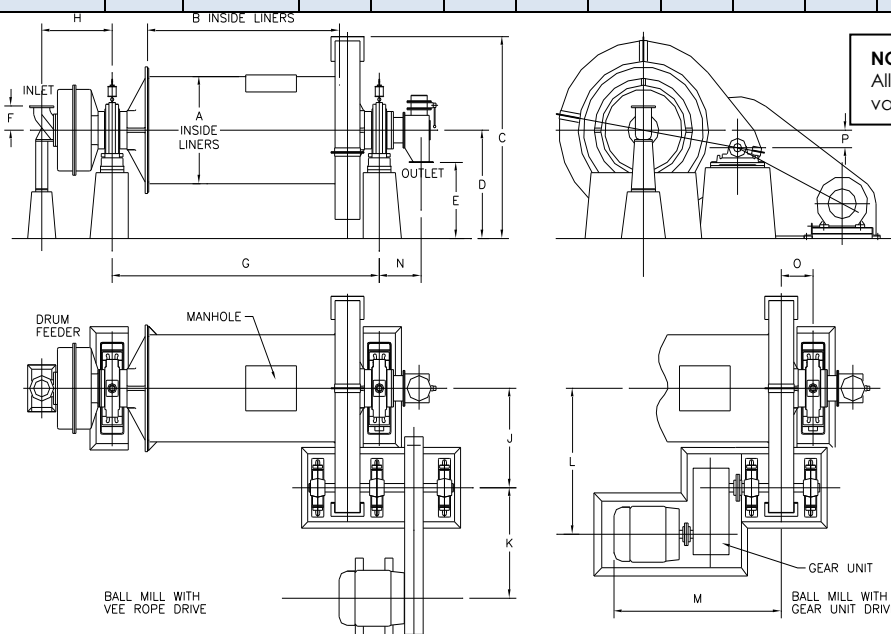
web: [www.britishrema.com](http://www.britishrema.com)

Sales Director: David Bugler

Technical Sales Manager: Peter Broughton

## Ball Mills - General Technical Data

SIZE	SIZE	POWER	GRINDING CHARGE WTS	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P
FT	MM	KW																
3 x 3	915 x 915	7.5	624	838	762	1850	1000	650	250	1415	750	850	1000	-	-	400	250	150
3 x 6	915 x 1830	15	1372	838	1677	1850	1000	650	250	2360	750	850	1000	-	-	400	250	150
4 x 4	1220 x 1220	18.5	1624	1143	1067	2200	1200	750	250	2150	750	1065	1065	-	-	450	350	175
4 x 6	1220 x 1830	30	2552	1143	1677	2200	1200	750	250	2750	750	1065	1065	-	-	450	350	175
4 x 8	1220 x 2440	41	3480	1143	2286	2200	1200	750	250	3170	750	1065	1150	-	-	450	350	175
5 x 4	1525 x 1220	30	2481	1448	1016	2700	1450	1000	400	205	1000	1300	1250	-	-	500	400	230
5 x 6	1525 x 1830	45	3970	1448	1626	2700	1450	1000	400	0	1000	1300	1250	-	-	500	400	230
5 x 8	1525 x 2440	60	5458	1448	2235	2700	1450	1000	400	2660	1000	1300	1250	-	-	500	400	230
6 x 6	1830 x 1830	64	5650	1727	1626	3100	1525	1140	570	3270	1120	1400	1600	-	-	560	450	250
6 x 8	1830 x 2440	90	7768	1727	2235	3100	1525	1140	570	2840	1120	1400	1800	-	-	560	450	250
7 x 8	2135 x 2440	120	10752	2032	2235	3600	1900	1500	600	3450	1500	1500	1800	-	-	600	500	270
7 x 10	2135 x 2050	165	13685	2032	2845	3600	1900	1500	600	3550	1120	1500	-	2000	3000	600	500	270
8 x 8	2440 x 2440	165	14220	2337	2235	3900	2200	1500	800	4260	1120	1605	-	2000	3000	680	550	305
8 x 10	2440 x 3050	205	18098	2337	2845	3900	2200	1500	800	3590	1200	1605	-	2000	3250	680	550	305
8 x 11	2440 x 3355	224	20037	2337	3150	3900	2200	1500	800	4200	1200	1605	-	2155	3500	680	550	305
8 x 12	2440 x 3660	261	21976	2337	3454	3900	2200	1500	800	4505	1200	1605	-	2155	3750	680	550	305
8 x 14	2440 x 4270	299	25854	2337	4064	3900	2200	1500	800	4810	1200	1605	-	2200	4200	680	550	305
8.5 x 13.5	2590 x 4115	317	28236	2489	3912	4300	2300	1600	800	5420	1200	1750	-	2300	4350	680	575	340
9 x 14	2745 x 4270	373	33038	2642	4064	4250	2400	1650	900	5500	1200	1980	-	2400	4600	750	585	380
9.5 x 14	2895 x 4270	410	36960	2794	4064	4500	2600	1750	1000	5480	1300	2070	-	2400	4750	800	600	395
9.5 x 17	2895 x 5180	504	45276	2794	4978	4500	2600	1750	1000	5500	1600	2070	-	2400	4900	800	600	395
10 x 17.5	3050 x 5335	560	51000	2921	5131	4700	2750	1900	1100	6415	1600	2270	-	2600	5000	825	625	415
10.5 x 18	3200 x 548	634	57181	3048	5283	5400	2900	2050	1100	6600	1800	2500	-	2800	5200	850	640	430
11 x 19.5	3335 x 4594	746	67892	3200	5690	6000	3200	2200	1200	6820	2000	2750	-	3100	5600	885	660	445
11.5 x 20	3505 x 6095	858	76507	3353	5842	6500	3400	2450	1200	7300	2200	3000	-	3500	6000	925	685	465
12 x 21	3660 x 6400	970	87983	3505	6145	7000	3700	2700	1300	7400	2500	3300	-	4000	6500	950	715	490
										7900	2750							



**NOTE:**  
 All data provided is for guidance only and may be varied at any time by the Company.

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