



SEPOR, INC.  
718 N. FRIES AVE.  
P. O. BOX 578  
WILMINGTON, 90748  
PHONE: 310-830-6601  
FAX: 310-830-9336  
Web Site: <http://www.sepor.com>

## Sepor's Batch Ball/Rod Mill Drive



Sepor's 5 Series Batch Ball and Rod Mill Drive is a rugged, heavy duty mill drive especially suited for steel grinding jars, or large porcelain grinding jars (5 gallon size). The drive mechanism is a 1/2 HP gear motor with a variable speed, capable of roll speeds between 40 RPM's and 230 RPM's. The rolls are 5 inches in diameter by 24 inches long, covered with rubber, set on 10 inch centers. A work shelf and built in ball discharge grate is contained on one end of the mill frame.

CATALOG NUMBER	DESCRIPTION	NO. ROLLS	SHIPPING WT. LBS.	DIMENSIONS L,H,W (IN.)
010E-001	Drive Roll, 110 V/1 Ph/60 Hz	2	250	43" x 33" x 30"
	Drive Roll, 220 V/1 Ph/50 Hz	2	250	43" x 33" x 30"
010E-002	Drive Roll, 110 V/1 Ph/60 Hz	3	300	43" x 33" x 30"
	Drive Roll, 220 V/1 Ph/50 Hz	3	300	43" x 33" x 30"
010E-003	Drive Roll, 110 V/1 Ph/60 Hz	4	350	43" x 33" x 30"
	Drive Roll, 220 V/1 Ph/50 Hz	4	350	43" x 33" x 30"

Specify Voltage, 110 V or 220 V when ordering

## Table of Grinding Jar, Roll Speeds for 5" Diameter Roll Drive

GRINDING JAR DIAMETER (INCHES)	JAR GRINDING SPEED, @ 75% CRITICAL SPEED (RPM'S)	DRIVE ROLL SPEED REQUIRED TO OBTAIN JAR GRINDING SPEED (RPM'S)
8.0	70	113
9.0	66	119
10.0	63	126
11.0	60	132
12.0	57	138
13.0	55	144
14.0	53	149

### Grinding Media

Generally, steel grinding balls are used with steel mills, ceramic balls are used with porcelain or ceramic lined mills and steel, ceramic, or other high density media is used with elastomer lined mills. Porcelain balls have a SG of 2.3 and have an average weight/volume of 12.8 pounds per gallon. High density alumina (ceramic) balls have a SG of 3.2 and have an average weight/volume of 17.5 pounds per gallon. Steel balls have a SG of 7.7 and have an average weight/volume of 40 pounds/gallon.

Higher density grinding media generally results in faster grinding in a ball mill. An optimum grinding charge for a ball mill is approximately 50% of the mill volume, or to the center line. However experimentation will determine the best grinding charge for a given application. Generally, the grinding charge will be in the range of 30% to 50% of the mill volume. Approximately 30-40% of the ball charge will be void space.

### Dry Grinding

Material loads for ball mill dry grinding generally fall into the 25% to 50% of the mill volume range. If the mill is loaded with a 50% grinding charge and a 50% ball charge, it will not be 100% full, since approximately 30% of the ball volume is **void** space. Some experimentation will be required to obtain the proper mill charge for the most efficient grinding for various materials. If the mill is overloaded, it may not be possible to obtain fine particle sizes by grinding and the mill grinding efficiency decreases exponentially, as the grinding time increases exponentially. Therefore, mill overloading should be avoided.

### Wet Grinding

Material loads for ball mill wet grinding generally fall into the 30% to 50% of the mill volume range. The slurry could range from 30% to 60% solids by weight.. Some experimentation will be required to obtain the proper mill charge for the most efficient grinding for various materials. If the mill is overloaded, it may not be possible to obtain fine particle sizes by grinding and the mill grinding efficiency decreases exponential, as the grinding time increases exponentially. Therefore, mill overloading should be avoided.

Sepor has laboratory size grinding ball mills in a variety of materials of construction, including carbon steel, stainless steel, urethane lined, porcelain, and ceramic. Our grinding media includes balls, cylinders and rods (for rod mills). Materials of construction include carbon steel, stainless steel, chrome steel, flint pebbles, porcelain, ceramic, and zirconia. Most grinding media is available in a variety of sizes to suit many grinding applications.

# General Grinding Information For Ball Mills

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