

How to handle the charge volume of a ball mill or rod mill

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In physics, the charge of a volume is commonly described by a quantity called the charge density or the charge distribution. When the electric field that arises from the charge distribution exhibits a volumetric symmetry, a handy relationship known as Gauss's Law may be used to calculate the charge distribution of the volume. The charge volume of a ball or rod mill is expressed as the percentage of the volume within the liners filled with balls or rods.

When the mill is stationary, the charge volume can be quickly obtained by measuring the diameter inside the liners and the distance from the top of the mill inside the liners to the top of the charge. The percentage loading or charge volume can then be read off the graph in Figure 3 or can be approximated from the following equation: % loading = $113 - 126 H / D$ where H is distance from top of mill inside of lining to top of charge and D is diameter of mill. Maximum power is drawn by a mill when the charge occupies approximately 50% by volume.

However, as seen in Figure 4, the power curve becomes very flat in the range above 45%. As a result, mills are seldom run with charge levels greater than 45%. In rod mills, the charge is swollen by particles of feed which separate the rods. If the mill is shut down immediately after the feed is shut off, the charge level will be greater than if the mill had been “ground out” prior to shutdown. Because of this, rod mills are normally operated with a 32 to 40 percent charge by volume. In operation, this becomes a 40 to 50 percent charge, with a bulk density considerably lower than that of stacked rods.

Ball mill charge becomes measurably swollen only when there is a buildup of large unground material in the ball mill or when the density of the pulp in a wet mill is extremely high. Although these conditions are seldom encountered, it is recommended that ball mills be ground out prior to shutdown for measurement of the charge level. Ball mill: http://www.hxjqchina.com/product-list_34.html ball mills: <http://www.hxjq-crusher.com/50.html> vibrating feeder: <http://www.hxjq-crusher.com/44.html> jaw breaker: <http://www.hxjq-crusher.com/1.html> sand washer: http://www.hxjqchina.com/product-list_29.html