Vibrator Selection Guide for External Vibrators

Below is a vibrator features chart (PART 1) and a series of application-based formulas (PART 2) to help you select the proper vibrator for your particular application.

PART 1: SELECT ELECTRIC VS. PNEUMATIC VIBRATOR

In general, electric vibrators are initially higher in cost than pneumatic vibrators; however, the operational cost of electric vibrators is considerably less than that of pneumatic vibrators, so the difference in price and installation cost is recaptured in a few months of operation. Electric units have the lowest noise reading, 60 to 70 dB—no more sound than an electric motor. Turbine vibrators have a dB reading of 60 to 80. The life expectancy of an electric vibrator is two to three times that of an air-operated unit. The life of an air-operated unit is, to a great extent, determined by the cleanliness of the available compressed air and the operating pressure. Maximum operating pressure is 80 psi; above 80 psi, the life of the pneumatic vibrator diminishes rapidly.

	Electric Vibrators				Pneumatic Vibrators (Air Powered)		
	Heavy Duty	Adjustable Speed and Force	Small Impact	12VDC	Turbine	Piston	Ball
Power Source							
115V Electricity	X	X	X				
Single- or 3-Phase Electricity	X						
12/24 Volt Battery				X			
Compressed Air					X	X	X
Applications							
Bins or Hoppers	X	X	X	X	X	X	X
Vibrating Tables	X	X			X	X	X
Screens	X	X			X	X	X
Feeders	X	X				X	
Conveyors	X				X	X	X
High Frequency		X			X	X	X
Low Frequency	X		X	X			
Adjustable Speed		X			X	X	X
Environment							
Mobile/Truck				X	X	X	X
Dirty/Dusty	X	X	X	X	X	X	X
High Temperature	X					X	X
Outdoor	X	X	X	X	X	X	X
Food Grade	Available For Specific Applications. Consult VIBCO						
Hazardous	Available For Specific Applications. Consult VIBCO						
Maintenance							
Lubrication Required						X	X
Pre-Lubricated For Life	X	X	X	X	X		
Low Noise	X	X	X	X	X		
Clean Air Required						X	
Threaded Exhaust Port					X	X*	X

PART 2: CALCULATE NEEDED VIBRATOR FORCE

A. Bins and Hoppers

Calculate the weight of the material in the transition or sloping part of the bin only. Do not calculate the total weight.

For conical bins, calculate as follows: 0.261 x dia.^{2} x height x material density in lbs./cu. ft.

For rectangular bins: length x width x height x 1/3 x material density in lbs./cu. ft.

When the weight of the material has been calculated, divide by 10—this is the centrifugal force (lbs.) or impact needed for your vibrator. For example, the conical part of a 25-ton bin contains 9000 lbs. Divide 9000 by 10: you need a vibrator with 900 lbs. of centrifugal force.

B. Vibrating Tables

For packing material: dense materials respond best to high-frequency vibration (3600 RPM or more); light, fluffy, or flaky materials respond best to low-frequency vibration (1800 RPM or less). For efficient packing or settling of materials, use a vibrator with an impact force that is 1.5 to 2 times greater than the weight of the material plus the container.

C. Vibrating Screens

For self-cleaning screens, use a vibrator with a centrifugal force (impact) that is 4 times the weight of the materials plus the weight of the screen. Sticky, wet, coarse, and lumpy materials respond best to frequency vibrations over 3600 RPM. Powdery and dry materials respond best to low-frequency vibration (1800 RPM or less).

D. Consolidating Concrete

For 3" slump concrete, use a vibrator with the same force (impact) as the weight of the concrete plus the form. For 1 to 2" slump concrete, an additional 30 to 50% of force is needed. For dry mixes (0 slump), add 100 to 200% of force.