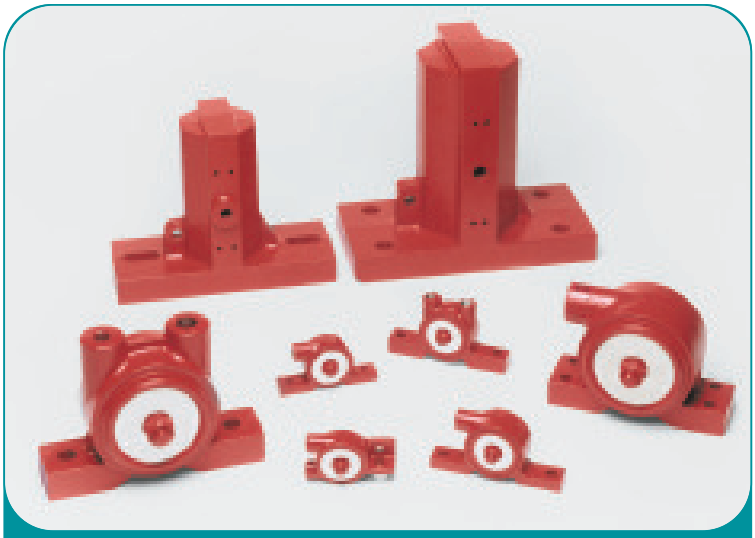
Syntron® Pneumatic Vibrators

Syntron Material Handling offers two types of Syntron® Pneumatic Vibrators — turbine and piston. Turbine models feature rotary action designed to keep noise to a minimum. Operating speed is adjusted by simply varying the air supply.

Syntron piston vibrators feature one piece, cast iron, flat base construction which produces high impact, linear force and efficient energy transfer. They are ideal for mining, chemical, concrete, plastics, steel, foundry and paper industries.

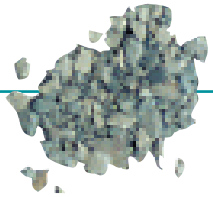
Syntron Pneumatic Bin Vibrators also come with the technical expertise of Syntron Material Handling's application specialists, who have been providing productive solutions for a wide variety of material handling problems for more than 80 years.

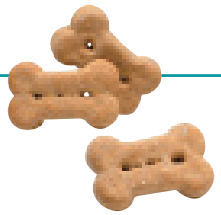


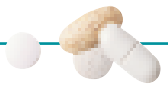
Syntron® Pneumatic Vibrators

Syntron® Pneumatic Turbine Vibrator mounted on stainless steel hopper.

Syntron® Pneumatic Piston vibrator maintains consistent flow of coal from a coal bin to a vibrating feeder.







PV and PVS Piston Vibrator Series

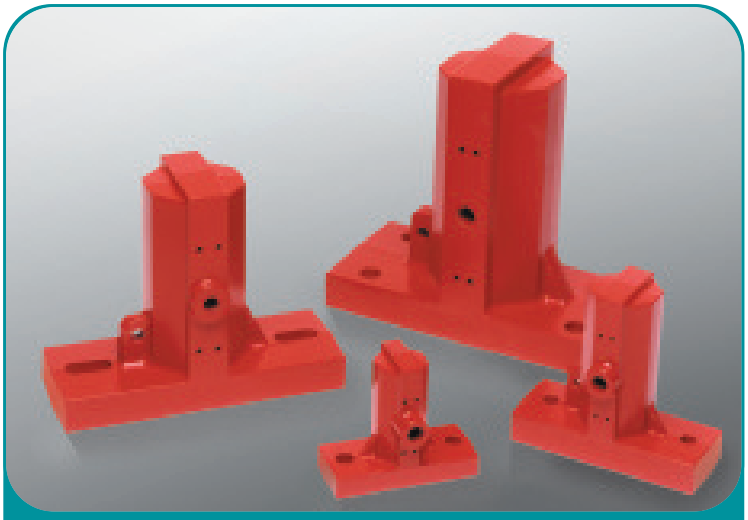
Positive Punch for Difficult Applications

Syntron® Piston Vibrators from Syntron Material Handling assure the flow of materials through bins, chutes and weigh batchers.

Their cast iron, flat base construction provides an efficient means of transmitting shock energy developed by the reciprocating piston to the mounting surface.

Syntron Piston Vibrators are available in two models: High impact (PV) and Reduced Noise (PVS). PVS vibrators (impact against a cushion of air) can be used where noise is objectionable.

Unlike turbine vibrators, piston vibrators require lubrication with oil, SAE-10 or lighter. Lack of oil in the air rapidly wears down the piston and cylinder wall.



Syntron® PV and PVS Pneumatic Piston Vibrator models.

Features and Benefits

- Cast iron, flat base construction.
- One-piece housing
- Flange mounted
- Ideal for use in mining, chemical, concrete, plastics, steel, foundry and paper industries
- Available in high impact (PV) or reduced noise (PVS) models
- High thrust reciprocating action of PVS models permits operation at low air pressures
- High impact, linear force and efficient energy transfer assures flow of materials through bins, chutes and weigh batchers
- Linear vibration
- Impacts in both directions

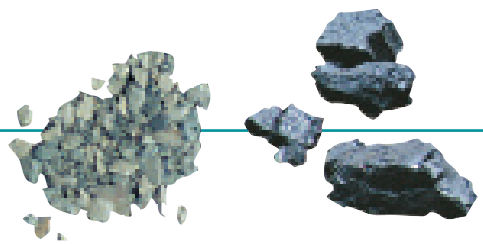
Piston Vibrator Selection

In order to move material in a bin or hopper, the friction between the material and the bin wall must be broken. Once the friction is broken, material cannot cling to the sides of the bin and it will flow out through the discharge. A prime consideration in selecting the correct piston bin vibrator is wall thickness. The following formulas calculate material in the restricted area which is used as a guide to determine the number of piston bin vibrators necessary.

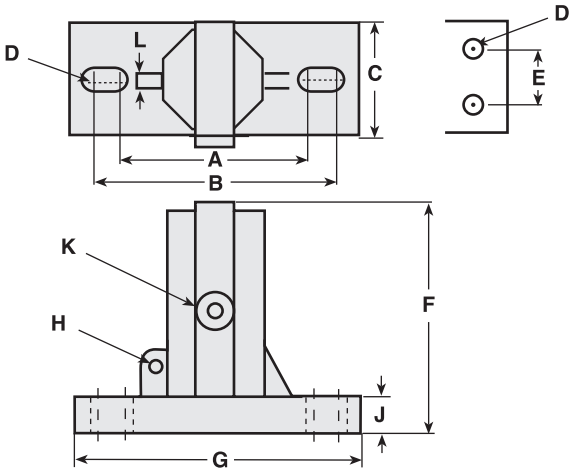
- Calculate the weight of the material in the transition or sloping part of the bin. Normally, this is the only place where the friction between the material and the bin side has to be broken. Do not calculate the total weight, only what is in the transition part of the bin.
- For conical bins, calculate as follows:
  0.261 x dia.^{2} x height x material density in lb/ft^3 (kg/m^3)
- For rectangular bins, calculate as follows:
  Length x width x height x 1/3 x material density.

Chutes

The force required of the vibrator is equal to the weight of the chute plus vibrator plus maximum material in the chute. See page 43 for more detail.



PV and PVS Specifications



Syntron® piston vibrators also come with the technical expertise of Syntron Material Handling's application staff who have been providing productive solutions for a wide variety of material handling problems for more than 80 years.

Specifications

Model	Piston Size	40 psi		60 psi		80 psi		Max Material in Bin		Bin Wall Thickness	
		Speed vpm	cfm	Speed vpm	cfm	Speed vpm	cfm	lb	kg	in	mm
PVS-55-100	1	3,700	2	4,150	2.2	7,200	3	200 - 400	91 - 181	20 ga - 1/16	1 - 1.5
PV-55-100	1	6,100	2	8,100	3	10,500	3.5	200 - 400	91 - 181	20 ga- 3/16	1 - 5
PVS-55-125	1-1/4	2,900	3.5	3,400	6	4,500	7	200 - 400	91 - 181	20 ga - 3/16	1 - 5
PV-55-125	1-1/4	4,600	3.5	5,750	5.5	6,800	6.5	400 - 1,000	181 - 454	1/8 - 1/4	3 - 6
PVS-55-150	1-1/2	2,200	5	3,200	7.5	3,500	8.5	400 - 1,000	181 - 454	1/8 - 1/4	3 - 6
PV-55-150	1-1/2	4,500	5	3,900	8	4,400	10	1,000 - 4,000	454 - 1,814	1/4 - 3/8	6 - 9
PVS-55-200	2	2,800	5	3,300	8.5	4,800	11	1,000 - 4,000	454 - 1,814	5/16 - 7/16	8 - 11
PV-55-200	2	4,000	5.5	5,350	9	5,500	12	4,000 - 10,000	1,814 - 4,536	3/8 -1/2	9 - 13
PVS-55-300	3	1,700	13.5	1,950	20.5	2,200	28	8,000 - 20,000	3,629 - 9,072	7/16 - 1/2	11 - 13
PV-55-300	3	3,000	16.5	3,750	25.5	4,000	30	10,000 - 30,000	4,536 - 13,608	1/2	13

Data obtained on laboratory test block. Frequency and force will decrease on less rigid mount. Data subject to design changes.

⚠ **NEVER** operate without piston vibrator securely bolted to mounting plate or channel.

Dimensions

Model	A		B		C		D ■		E		F		G		H		J		K ★	L	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in-NPT	in	mm
PV-55-100 PVS-55-100	0	0	3 1/2	88.9	2	51	1/2	13	0	0	3 7/8	98	4 1/2	114	0	0	9/16	14	1/4	1/4	6
PV-55-125 PVS-55-125	0	0	4 1/2	114.3	2 1/2	64	1/2	13	0	0	5 5/16	135	6	152	1/4	6	7/8	22	1/4	1/4	6
PV-55-150 PVS-55-150	6	152	7 1/2	190.5	3 1/2	89	11/16	17	0	0	7 1/4	184	9	229	1/2	13	1	25	1/4	1/2	13
PV-55-200 PVS-55-200	6	152	7 1/2	190.5	3 1/2	89	11/16	17	0	0	7 1/4	184	9	229	1/2	13	1	25	1/4	1/2	13
PV-55-300 PVS-55-300	7 3/4	197	0	0	5	127	15/16	24	3 1/4	83	9 7/16	240	10 1/2	267	1/2	13	1 1/8	29	3/8	3/4	19

■ Bolt size ★ NPT pipe tap size

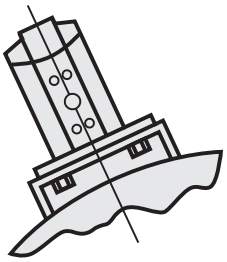
Mounting Syntron® Pneumatic Piston Vibrators

To obtain maximum efficiency from pneumatic piston vibrators, correct location is important. Mount the vibrator with the centerline of the piston a minimum of 15 degrees from the horizontal. For free-flowing bulk material installations, vibrators on hoppers should operate only when the hopper is open to flow. Otherwise, packing of material can result.

NOTE: Never mount the vibrator directly to the skin of the bin. Always mount the vibrator on a mounting plate or channel iron.

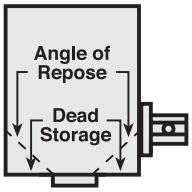
Curved Surfaces

To mount a vibrator to a curved surface, select a bracket made from a channel section or bent plate. Mounting bolt heads can be welded to the underside of the bracket.



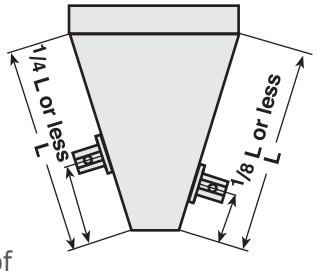
Rectangular or Cylindrical Bins with Flat Bottom and Center Discharge.

Mount directly to the side of the bin, just below the point where the materials' natural angle of repose intersects the side, as shown.



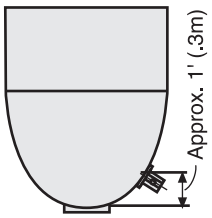
Rectangular Hoppers

Mount vibrator and mounting channel as for a conical hopper or a curved surface. If a stiffener obstructs mounting, mount the vibrator in the middle of the panel next to the stiffener. If required, a second vibrator should be mounted on the opposite face at a slightly higher elevation.



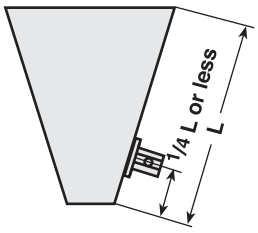
Parabolic Bins or Hoppers

Mount the vibrator within one foot of each discharge opening and in line with center of opening.



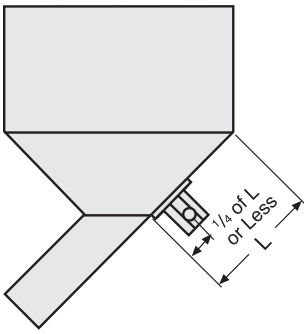
Conical Hoppers

Mount the vibrator to the hopper (as for a curved surface) 12 to 18 inches (300 to 450 mm) or less from the discharge.



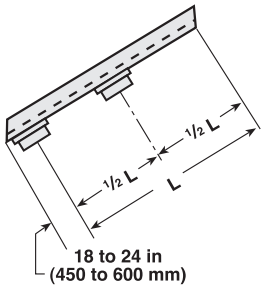
Hopper with Sloping Discharge

Mount the vibrator on the center line of the hopper, as close to the discharge as possible. An additional vibrator may be required on the discharge chute.



Inclined Chutes

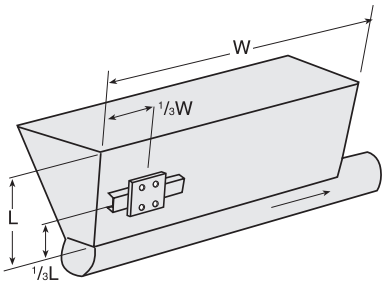
Chutes less than 10 to 12 feet (3 to 3.6 m) long are usually equipped with just one vibrator located well below the center. Allow for the vibrator to be moved about one foot (300 mm) in either direction. On chutes requiring more than one vibrator, the first one should be located 18 to 24 inches (450 to 500 mm) from the outlet. The second unit should be mounted about half-way between the first vibrator and the upper end. Allow for the vibrator to be moved about one foot (300 mm) in either direction.



Note: Drawings illustrate typical installations. Specific installations may require slight variations. For other applications not covered here, please consult factory for recommendations.

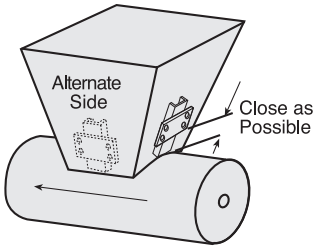
Screw Feeder

Screw conveyors feed from the back of the hopper. Vibrator should be 1/3 from the inlet. If two vibrators are used, place second vibrator on opposite side, 1/3 from the discharge. Do not operate the vibrator at the discharge end until the back of the bin is empty and the vibrator at the inlet is shut off.



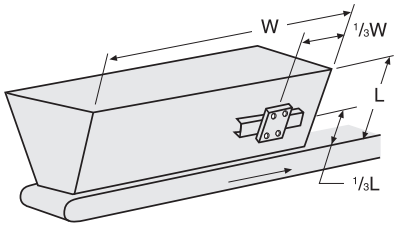
Short Screw Feeder

Place vibrator as close as possible to feeder.



Long Bin

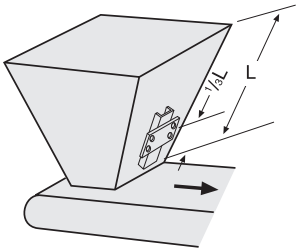
Belt conveyors feed from the front of the hopper. Vibrator should be 1/3 from front. If two vibrators are used, place one on opposite side and 1/3 from back. Do not operate the back vibrator until the front is empty and the front vibrator is shut off.



Note: Drawings illustrate typical installations. Specific installations may require slight variations. For other applications not covered here, please consult factory for recommendations.

Belt Conveyor and Standard Bin

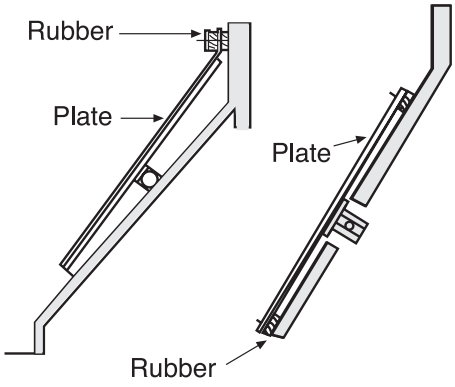
Mount vibrator on the belt discharge side of the hopper. Follow mounting instructions for the appropriate bin type on page 44.



Concrete Hopper or Lined Wooden Hopper

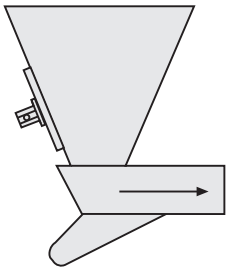
For wooden hoppers lined with thin sheet metal, attach vibrator mounting bolts to the hopper lining.

For concrete hoppers, secure a steel plate across the top inside of the hopper to the discharge opening along the side to which the vibrator will be mounted. At about 1/4 or less of the distance from the discharge to the vertical side, cut an opening to allow the vibrator to be bolted to the steel plate.



Vibrating Feeder and Standard Bin

Mount vibrator on the feeder infeed side of the hopper. Follow mounting instructions for the appropriate bin type on page 44.



Optimized Operation of Syntron® Turbine and Piston Pneumatic Vibrators

1. **Air Line to Vibrator** — In order to minimize pressure loss from the compressor, the inner diameter (ID) of the hose to the vibrator should be the same as or larger than the inlet ID (pipe size) of the vibrator.
2. **Flow Valve** — A flow control valve can tune the vibrator to the required force. The flow volume determines the force and frequency of the vibrator. Throttling the flow enables you to find the desired material discharge rate and avoid the natural frequency of the bin or hopper. If the bin wall and vibrator shake violently, increase or decrease the speed to run with minimum movement. Do not exceed the maximum air pressures shown on pages 35, 36, 38 and 43.
3. **Quick-Opening Valves** — Quick-opening valves can be used between the air regulator and vibrator to allow air to enter the vibrator at full starting force, even at low regulator valve settings. However, the air regulator must be installed at a sufficient distance from the quick-opening valve so that the air pressure between the two valves will build up enough to yield the necessary starting force.
4. **Water in the Line** — Water in the line should be avoided because it will remove the protective film of lubrication necessary to ensure proper operation.
5. **Air Filter** — Use an air cleaner in the line to prolong vibrator life and keep it at maximum efficiency and lowest energy consumption. In turbine vibrators, unclean air will accelerate wear of the housing and clog the muffler. In piston vibrators, unclean air will considerably diminish vibrator life and clog clearance between the cylinder and piston. It will also increase wear on the piston, as well as increase air consumption and diminish vibrator efficiency.
6. **Air Lubrication** — Lubrication is necessary ONLY for Piston Vibrators. Turbine vibrators have prelubricated bearings. Lubricated air may clog the muffler on turbine vibrators.
7. **Operation Requirements** — Do not operate a piston vibrator prior to mounting it to a mounting plate or channel.
8. **Using a Timer** — For better efficiency and longer vibrator life, operate the vibrator only as required to maintain flow.
9. **Empty Bin** — Do not operate a vibrator on an empty bin.
10. **Ambient Temperature** — Do not install pneumatic vibrators in environments where ambient temperatures exceed 180˚F.