How to Mount Industrial Vibrators

Global Manufacturing Inc.®
1801 East 22nd Street
Little Rock, Arkansas 72206
501.374.7416 TEL
800.551.3569 TOLL FREE USA & CANADA
501.376.7147 FAX

www.GlobalManufacturing.com **www.Viber-Vibrators.com**

Global Manufacturing, Inc ®
1801 East 22nd Street
Little Rock, AR 72206 USA

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Introduction

These are general mounting techniques that work with most applications. **Please see the individual Product Operations Manual for more details.** For further help with your unique application call our customer service department. We are happy to guide you in the process of mounting your industrial vibrator to get the performance you expect.

A Channel Iron serves as the transducer of the energy and keeps the bin wall from flexing. Placing industrial vibrators directly on the bin wall will cause damage to the structure. Do not operate the vibrator on an empty hopper as this may also cause structural damage to the hopper.

⚠ Safety Precautions

- Follow all mounting instructions.
- Always use a safety cable or chain for support.
- Do not operate vibrators when structure is empty.

Important

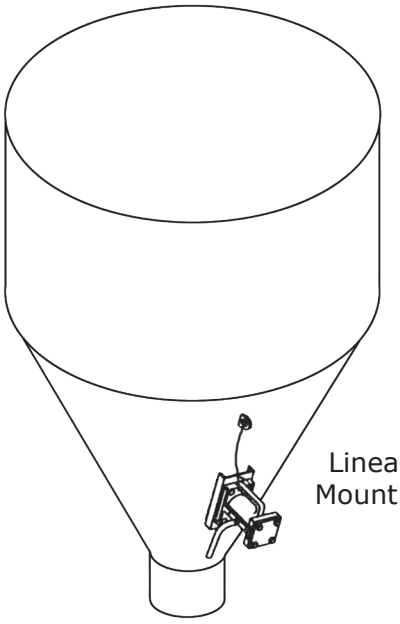
The channel iron should be at least two-thirds of the height of the sloped portion of the hopper but no greater than 10 feet (3 m).

Do not mount the vibrator directly to the structure wall. Use a channel iron stiffener for proper mount rigidity and as the transducer of the vibrational energy.

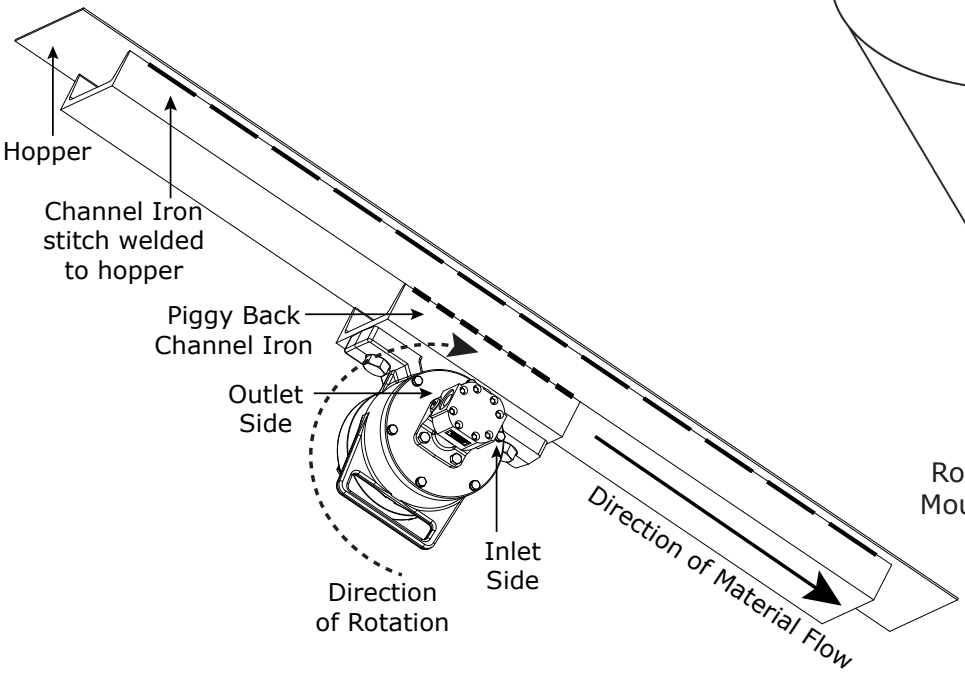
The key to successful vibration is the correct mounting procedure.

Rotary vibration resonates the material inside the structure when the vibrator is mounted correctly. The vibrator should appear motionless. There should not be a large amount of motion or noise.

Linear vibration, produced by Piston Vibrators, restores material flow by producing a series of linear shock waves that cause rapid and repeated deflection of the hopper wall. This process is sometimes referred to as 'oil canning'.



Linear Vibrator
Mount Technique



Rotary Vibrator
Mount Technique

How to Mount Rotary Vibrators

The channel iron should be at least two-thirds the height of the sloped portion of the hopper. **See Tables on pages 4-7 for recommended channel iron and mount plate sizes.** The channel iron width should not be less than the base width of the vibrator. However, for our electric vibrators, which have a wide base, a mount plate of 1/2" to 3/4" (12.7 to 19.05 mm) thick, sized to fit the foot pattern of the vibrator, may be skip welded to the channel. **The mount plate must allow the vibrator to sit FLAT on the plate with no detectable rocking.** If the vibrator does not sit flat, the plate may be warped. Shim the vibrator prior to mounting to compensate for any warping. **Do not** install more than one vibrator on the same channel iron or use a channel iron shorter than the recommended length. A short channel may flex the bin wall.

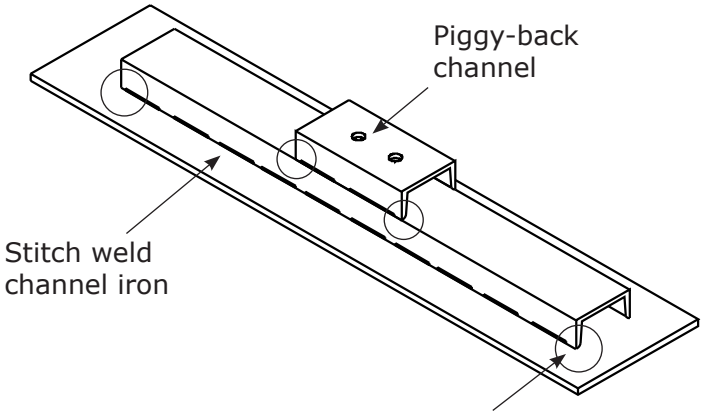
Attach the vibrator to the channel iron. Stitch weld nuts to the back of the channel iron or the channel iron may be drilled and tapped to accept the mounting bolts. An alternate method is to cut a second channel iron slightly longer than the foot-print of the vibrator (allows for easy access to nuts and bolts). Stitch weld the second channel iron to the first. Do not weld the ends. Mount the vibrator to the second channel iron.

The **axis of rotation** of the eccentric weights for all rotary vibrators should be oriented in the direction of material flow. The shaft of the vibrator should ideally be in a horizontal position to prolong bearing life. (See illustration on page 2.)

Stitch weld the channel iron vertically to the sloped portion of the bin wall. Weld 3 inches (7.5 cm), skip 1 inch (2.5 cm), weld 3 inches (7.5 cm), etc... Leave 1 inch (2.5 cm) un-welded on the ends and corners. This allows the vibration to dissipate out the ends of channel without causing stress cracks to the hopper or bin. By doing so, should the weld fail, the entire mount will not fall off. Do not mount the channel iron horizontally.

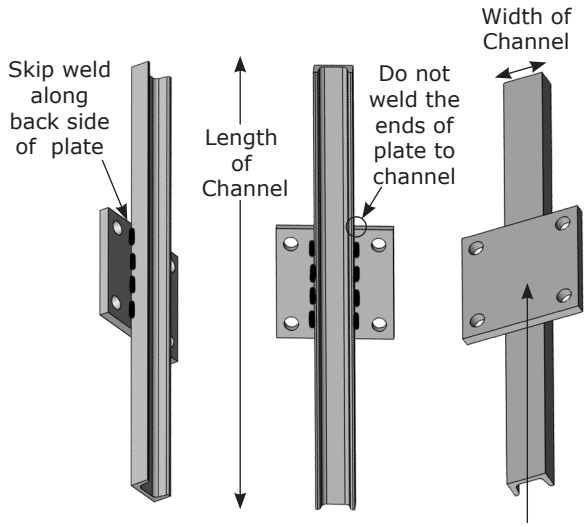
Secure the vibrator to the channel iron with SAE coarse thread grade 5 or better with lock washers or an adhesive such as Loctite® 262. Tighten bolts in a sequential process. At least two passes are required in most situations. Give all bolts the same torque value. Grade 5 bolts can handle more torque than standard bolts. If Loctite® is not used, retorque the bolt after the vibrator has operated for a few minutes and check tightness often. If Loctite® is used do not retorque the bolts as this will break the Loctite® bond.

Piggy-Back Channel Mount



Do **not** *weld the ends of the channel iron - this allows the vibrational force to "escape". Solid welded ends trap the force which can cause stress cracks.*

Mount Plate for a Vibrator with a Wide Base



Attach a safety cable to a stronghold (not the channel iron mount), which is higher than the mounted vibrator and capable of holding the vibrator's weight.

Why Channel Irons are Shorter for Piston Vibrators

Unlike channel irons used with Rotary Vibrators, which are designed to prevent flexing of the bin wall, the shorter length channel iron used with Piston Vibrators allows for rapid and repeated flexing of the bin wall (often called oil canning). Please note that mounting Piston Vibrators directly to the bin wall may cause damage.

How to Mount Yellow Jacket® Piston Vibrators

See page 9 for recommendations on length and size of channel iron. Mount vibrator on a standard structural channel iron that is clean and flat (FIGURE 8, page 5). The channel iron should be no more than 1 inch (25.4 mm) wider than the vibrator base and the length should be as least two times as long as the height of the vibrator. **Do not** install more than one vibrator on the same channel iron or use a channel iron shorter than the recommended length.

Skip weld channel iron flanges to the bin wall or the structure to be vibrated. **Do not weld the ends of the channel iron to the structure.**

If multiple units are used, vibrators should not be mounted at same elevation if positioned directly opposite one another.

The vibrator has a threaded stud in one end. Use a Grade 5 NF (National Fine) thread nut to mount the vibrator (nut and washer included). This stud and nut will accommodate most mounting surfaces. The vibrator may be mounted with a Grade 5 NF bolt however, if the minimum length of engagement is less than required, the vibrator threads may strip before proper torque can be applied to the mount bolt. See Product Operations Manual for details.

Use a lock washer (provided) between the nut and the channel iron (FIGURE 10 on page 5) or weld the nut to the channel iron (FIGURE 11 on page 5).

How to Mount "P-Series" Piston Vibrators

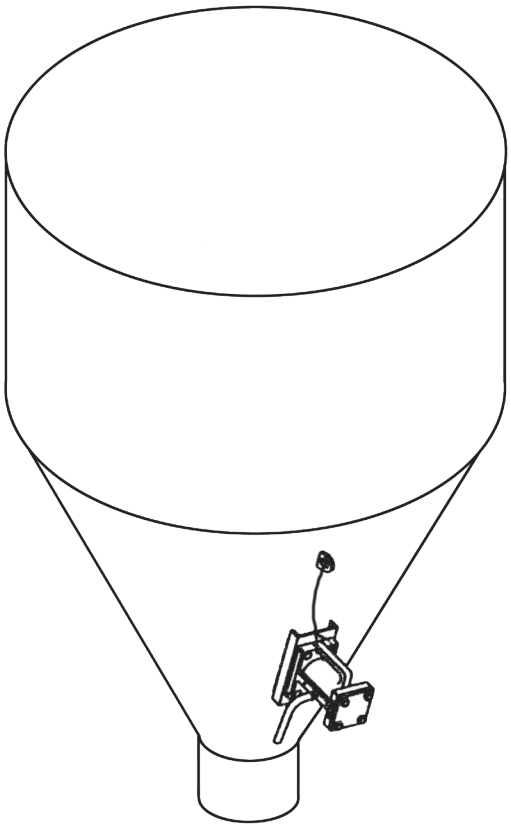
See page 9 for recommendations on length and size of channel iron. The channel iron should be at least equal to the base of the vibrator. **Do not** install more than one vibrator on the same channel iron or use a channel iron shorter than the recommended length. If bin wall thickness is less than that specified for vibrator size, then bin reinforcement may be required.

Skip weld channel iron flanges to the bin wall or the structure to be vibrated. **Do not weld the ends of the channel iron to the structure.**

If multiple units are used, vibrators should not be mounted at same elevation if positioned directly opposite one another.

If hopper slope angle (measured from horizontal) is more than 70°, a piston return spring is recommended to ensure positive starting. Locate Vibrator approximately 1/4 of the length of the sloped wall measuring upwards from the discharge.

Use Grade 5 or better coarse thread bolts, nuts and lock washer. Allow vibrator to operate for at least five minutes and inspect installation. Re-tighten all mounting fasteners and air line connections.

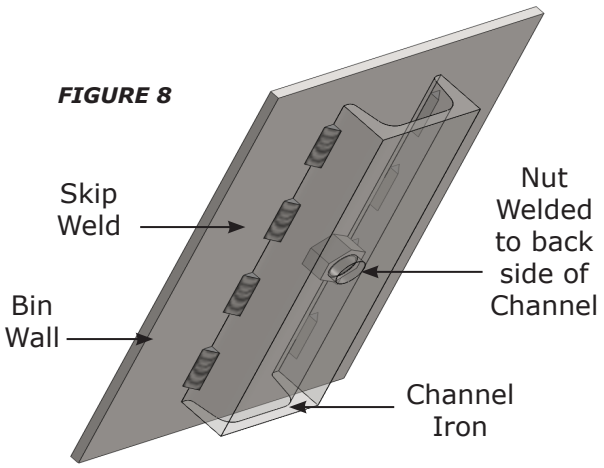


Using Yellow Jacket® PMK Mount Kits

Installation Instructions for Safety Mount Kit

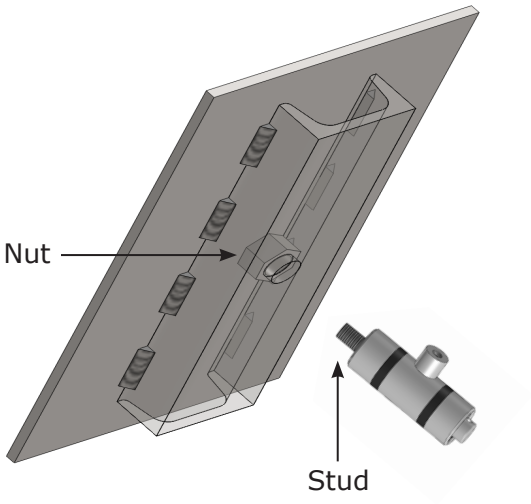
1. Skip weld mount channel to bin wall at 1" intervals, but do **not** weld ends of channel. Use "low hydrogen" filler equivalent to E7018 rod.

FIGURE 8



2. Apply Loctite® to threads of stud. Screw vibrator to mount. NOTE: A nut is welded to the inside of the mount channel. You do not need the lock washer if nut is welded to channel iron.

FIGURE 11



3. Using tools shown, tighten vibrator to mount until "solid".

FIGURE 9

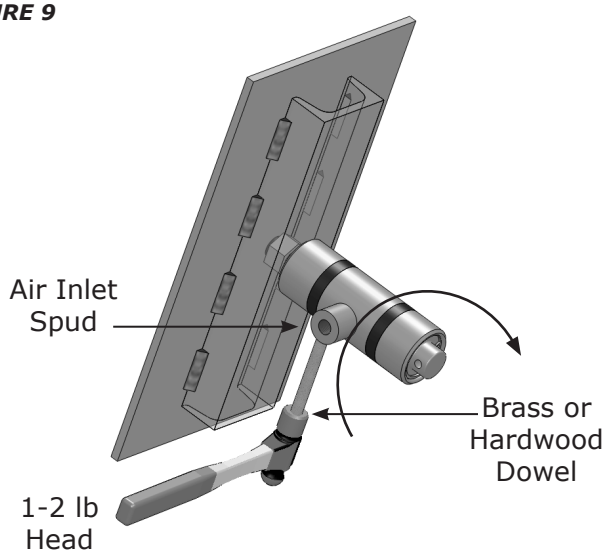
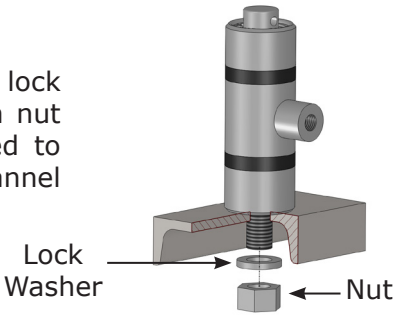


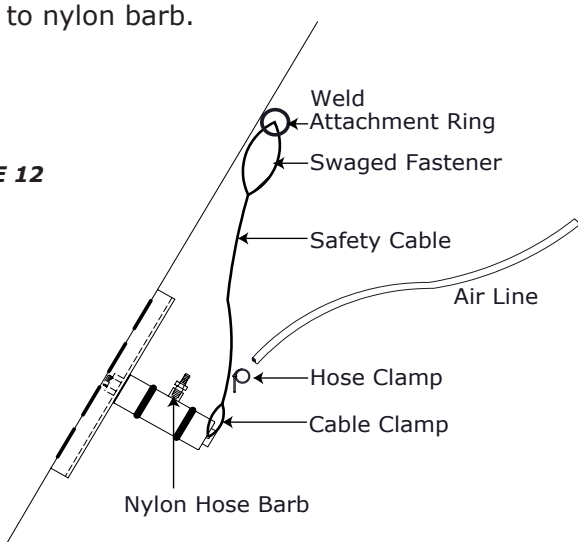
FIGURE 10

NOTE: Use lock washer when nut is **not** welded to back of channel iron.



4. Weld safety cable attachment ring to a surface, which is not vibrated, above the vibrator. Loop cable through the hole in the vibrator cap and secure with the cable clamp. Leave some slack in the cable. Screw in the nylon hose barb until it seals in the inlet spud. Use a hose clamp to attach airline to nylon barb.

FIGURE 12



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Recommended Channel Iron Sizes

The channel iron should be at least two-thirds the height of the sloped portion of the hopper, *but no less than the minimum length* specified below.

Vibrator Type	Vibrator Model	Channel Iron	Minimum Length
BALL VIBRATORS - Global and Findeva			
Global Ball Vibrators	BS-10, BS-16, BS-19, BS-25	C2" x 1" x 3/16"	36"
		C50 x 25 x 4.76 mm	914 mm
	CS-19	C2" x 1" x 3/16"	36"
		C50 x 25 x 4.76 mm	914 mm
	US-13, US-19	C2" x 1" x 3/16"	36"
		C50 x 25 x 4.76 mm	914 mm
	CS-25,CS-35	C3" x 4.1 lb/ft	36"
		C75 x 6 kg/m	914 mm
	DS-41, DS-52	C3" x 4.1 lb/ft	48"
		C75 x 6 kg/m	1219 mm
	US-25, US-38, US-44	C3" x 4.1 lb/ft	48"
		C75 x 6 kg/m	1219 mm
Findeva Ball Vibrators	K-8, K-10, K-13, K-16	C2" x 1 x 3/16"	36"
		C50 x 25 x 4.76 mm	914 mm
	K-20, F-25, K-30	C3" x 4.1 lb/ft	48"
		C75 x 6 kg/m	1219 mm
	K-36	C3" x 4.1 lb/ft	60"
		C75 x 6 kg/m	1524 mm
TURBINE VIBRATORS - Global and Findeva			
Silver Sonic® Turbine	SST-12	C2" x 1 x 3/16"	24"
		C50 x 25 x 4.76 mm	610 mm
	SST-16	C3" x 4.1 lb/ft	36"
		C75 x 6 kg/m	914 mm
	SST-25	C3" x 4.1 lb/ft	48"
		C75 x 6 kg/m	1219 mm
	SST-35	C3" x 4.1 lb/ft	60"
		C75 x 6 kg/m	1524 mm
Mount Kits for the Silver Sonic Turbine Vibrators are available. Kit includes a channel iron drilled and tapped for the bolts, and a hose barb and hose clamp.			
Findeva Turbines	GT-8, GT-10, GT-10-RF	C2" x 1 x 3/16"	36"
		C50 x 25 x 4.76 mm	914 mm
	GT-13, GT-16, GT-16-RF	C3" x 4.1 lb/ft	36"
		C75 x 6 kg/m	914 mm
	GT-20, GT-25, GT-25-RF	C3" x 4.1 lb/ft	48"
		C75 x 6 kg/m	1219 mm
	GT-30, GT-36, GT-40, GT-48	C3" x 4.1 lb/ft	60"
		C75 x 6 kg/m	1524 mm

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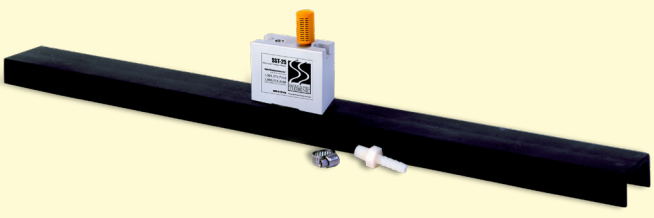
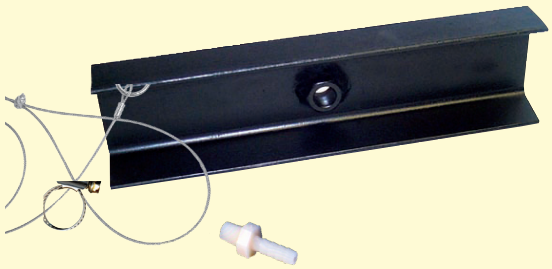
Vibrator Type	Vibrator Model	Channel Iron	Minimum Length
continued **TURBINE VIBRATORS - Global and Findeva**			
Turboviber®	TV-3X, TV-5X	C4" x 5.4 lb/ft	48"
		C100 x 8 kg/m	1219 mm
	TV-7X	C4" x 5.4 lb/ft	60"
		C100 x 8 kg/m	1524 mm
TCL-Cradle Lug	TCL-2500	C4" x 5.4 lb/ft	48"
		C100 x 8 kg/m	1219 mm
	TCL-4000	C4" x 5.4 lb/ft	60"
		C100 x 8 kg/m	1524 mm
	TCL-6000	C4" x 7.25 lb/ft	72"
		C100 x 11 kg/m	1829 mm
ROLLER VIBRATORS - Global and Findeva			
High Frequency Dual Roller	GCL-4400, GCD-4400	C4" x 5.4 lb/ft	60"
		C100 x 8 kg/m	1524 mm
	GCL-5000, GCD-5000	C4" x 5.4 lb/ft	72"
		C100 x 8 kg/m	1829 mm
	GCL-5500, GCL-6500, GCD-5500, GCD-6500	C4" x 7.25 lb/ft	72"
		C100 x 11 kg/m	1829 mm
Findeva R-Series	R-50, R-65, R-80	C3" x 4.1 lb/ft	48"
		C75 x 6 kg/m	1219 mm
	R-100, R-120	C4" x 5.4 lb/ft	48"
		C100 x 8 kg/m	1219 mm
Findeva DAR-Series	DAR-2	C2" x 1" x 3/16"	36"
		C50 x 25 x 4.76 mm	914 mm
	DAR-3, DAR-4	C3" x 4.1 lb/ft	48"
		C75 x 6 kg/m	1219 mm
	DAR-5, DAR-6	C3" x 4.1 lb/ft	60"
		C75 x 6 kg/m	1524 mm
	DAR-7	C4" x 5.4 lb/ft	60"
		C100 x 8 kg/m	1524 mm

Mount Kits available for Silver Sonic Turbine® and Yellow Jacket® Vibrators



Mount Kits for the Silver Sonic Turbine Vibrators are available. Kit includes a channel iron drilled and tapped for the bolts, and a hose barb and hose clamp.



Mount Kits for YJ models are available. Kit includes channel iron with nut welded to back, safety cable, clamp, and hose barb.

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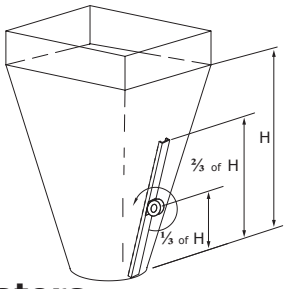
Vibrator Type	Vibrator Model	Channel Iron	Minimum Length
DESIGN SERIES - HYDRAULIC			
Design 2 Hydraulic	C2-0.5-2HM, C2-1.0-2HM, C2-1.4-2HM	C3" x 4.1 lb/ft	48"
		C75 x 6 kg/m	1219 mm
Design 3* Hydraulic	C3-1.5-2HC, C3-2.0-2HC, C3-2.5-2HC, C3-3.0-2HC	C5" x 6.7 lb/ft	72"
		C130 x 10 kg/m	1829 mm
	C3-4.0-2HC, C3-6.0-2HC	C6" x 13 lb/ft	72"
		C150 x 19 kg/m	1829 mm
Design 4.5* Hydraulic	D4.5 - All Models	C8" x 18.7 lb/ft	72"
		200 x 27.9 kg/m	1829 mm
Design 7 Hydraulic	D7-12-8HC	C8" x 18.7 lb/ft	96"
		200 x 27.9 kg/m	2438 mm
	D7-18-8HC, D7-25-8HC	C10" x 25 lb/ft	96"
		C250 x 37.2 kg/m	2438 mm
	D7-50-8HC	C12" x 30 lb/ft	96"
		C310 x 45.5 kg/m	2438 mm
*The last three digits in model number is the motor size, e.g., "2HC ". The C3 and D4.5 models are available with either a 2HC or 5HC motor. The motor size does not change the channel iron recommendation.			
Design 3 Pneumatic	C3-1.5-4AC, C3-2.0-4AC, C3-2.5-4AC, C3-3.0-4AC	C5" x 6.7 lb/ft	72"
		C130 x 10 kg/m	1829 mm
	C3-4.0-4AC, C3-6.0-4AC	C6" x 13 lb/ft	72"
		C150 x 19 kg/m	1829 mm
Design 4.5 Pneumatic	D4.5 - All Models	C8" x 18.7 lb/ft	72"
		200 x 27.9 kg/m	1829 mm
Design 7 Pneumatic	D7-12-6AC	C8" x 18.7 lb/ft	96"
		200 x 27.9 kg/m	2438 mm
	D7-18-6AC, D7-25-6AC	C10" x 25 lb/ft	96"
		C250 x 37.2 kg/m	2438 mm
	D7-50-6AC	C12" x 30 lb/ft	96"
		C310 x 45.5 kg/m	2438 mm
ELECTRIC VIBRATORS - AC MODELS - QUIET THUNDER®			
AC Models	QT2-40X, QT2-80X, QT2-100X, QT2-130X	C3" x 4.1 lb/ft	24"
		C75 x 6 kg/m	610 mm
	QT2-150X, QT2-300X, QT2-450X	C5" x 9 lb/ft	36"
		C130 x 13 kg/m	914 mm
	QT2-600X, QT2-800X, QT2-1000X	C6" x 13 lb/ft	72"
		C150 x 19 kg/m	1829 mm
	QT2-1500X-3, 2000X-3, QT2-2500X, QT2-3500X-3, QT2-4500X-3	C8" x 18.7 lb/ft	72"
		C200 x 28 kg/m	1829 mm

Vibrator Type	Vibrator Model	Channel Iron	Minimum Length
ELECTRIC VIBRATORS - DC MODELS - QUIET THUNDER®			
DC Models	CEG-0400-12V, CEG-0400-24V CEG-0800-12V, CEG-0800-24V CEG-1200-12V, CEG-1200-24V	C3" x 4.1 lb/ft	48"
		C75 x 6 kg/m	1219 mm
	CEG-2000-12V	C5" x 6.7 lb/ft	72"
		C130 x 10 kg/m	1829 mm
	CEG-3200-12V	C6" x 13 lb/ft	72"
		C150 x 19 kg/m	1829 mm
	CEG-4200-12V	C6" x 13 lb/ft	72"
		C150 x 19 kg/m	1829 mm
Channel iron width should not be less than the base width of the vibrator. However, a mount plate of 1/2" to 3/4" (12.7 to 19.05 mm) thick, sized to fit the foot pattern of the vibrator, may be skip welded to the channel iron.			
Piston Vibrators - Yellow Jacket™ and P-Series			
Vibrator Model	**Bin Wall Thickness**	**Channel Iron**	**Minimum Length**
YJ-1.00, P-1 AC or IM	1/16" - 1/8"	C2" x 1 x 3/16"	8"
	1.6 - 3.2 mm	C50 x 25 x 4.76 mm	200 mm
YJ-1.25, P-1 1/4 AC or IM	1/16" - 1/8"	C3" x 4.1 lb/ft	10"
	1.6 - 3.2 mm	C75 x 6 kg/m	250 mm
YJ-1.50, P-1 5/8 AC or IM	3/16" - 1/4"	C3" x 5 lb/ft	12"
	4.7 - 6.3 mm	C75 x 7 kg/m	300 mm
YJ-2.00, P2 AC or IM	3/16" - 1/4"	C3" x 5 lb/ft	16"
	4.7 - 6.3 mm	C75 x 7 kg/m	400 mm
YJ-3.00 AC or IM	1/4" - 3/8"	C4" x 7.25 lb/ft	24"
	63 - 9.5 mm	C100 x 11 kg/m	600 mm
P-3 AC or IM	1/4" - 3/8"	C7" x 12.25 lb/ft	24"
	63 - 9.5 mm	C180 x 18 kg/m	600 mm
P4 AC or IM	3/8" and >	C9" x 15 lb/ft	48"
	9.5 and > mm	C230 x 32 kg/m	1219 mm
Mount Kits for YJ models are available. Kit includes channel iron with nut welded to back, safety cable, clamp, and hose barb.			

MOUNTING LOCATIONS

Single Vibrator

Install a channel iron stiffener on the outside of the sloping wall 1/3 the distance above the discharge opening.

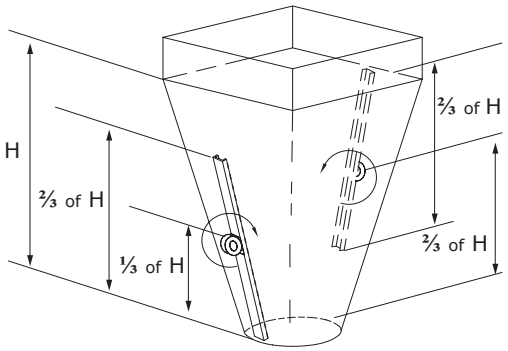


Multiple Vibrators

Use more than one vibrator when the diameter or width of any wall is greater than 12 feet (3.66 m). Always mount the vibrators on different planes.

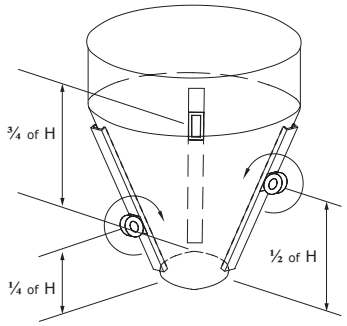
Two Vibrators on Round or Square Hoppers

Install channel iron stiffeners 180° apart. Install one vibrator on the outside of the sloping wall 1/3 the distance above the discharge opening. Install the second vibrator on the outside of the opposite sloping wall 2/3 the distance above the discharge opening.



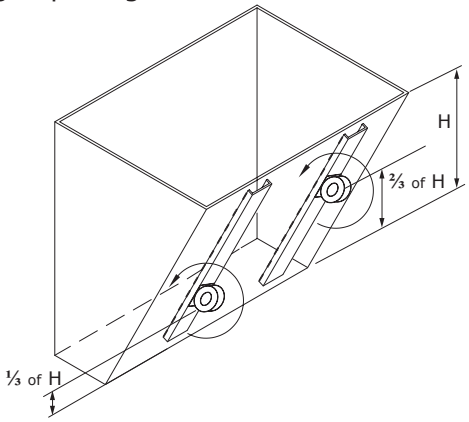
Three Vibrators

Install channel iron stiffeners mounted 120° apart. Install the first vibrator on the outside of the sloping wall 1/4 the distance above the discharge opening. Install the second vibrator on a separate channel iron at 1/2 the distance above the discharge opening. Install the third vibrator on the remaining channel iron at 3/4 the distance above the discharge opening.



Two Vibrators on Rectangular Hoppers

Install channel iron stiffeners on opposite sides of the long walls. Install one vibrator on the outside of the sloping wall 1/3 the distance from the discharge opening. Install the second vibrator on the outside of the opposite sloping wall 2/3 the distance above the discharge opening. When only one wall slopes, mount both stiffeners on it. Equally space the stiffeners on the wall. Place one vibrator 1/3 above the discharge opening on one channel iron and the other vibrator 2/3 above the bin's discharge opening on the second channel.



Installation on Chutes and Flow Pipes

Mount channel iron stiffeners vertically or in the direction of material flow. Center the channel if the chute is less than 6 feet (1.83 m) in width. If the chute is greater than 6 feet in width, use two vibrators on separate channel irons. To maximize each vibrator's radius of influence; center each channel iron in each half of the chute. Each channel iron should be located ¼ of the chute width from the edge and ½ of the chute width apart. (e.g. – for a chute 8' wide, the channel iron locations would be 2' from each edge and 4' apart.) When wall thickness is less than 1/8", additional reinforcement may be required.