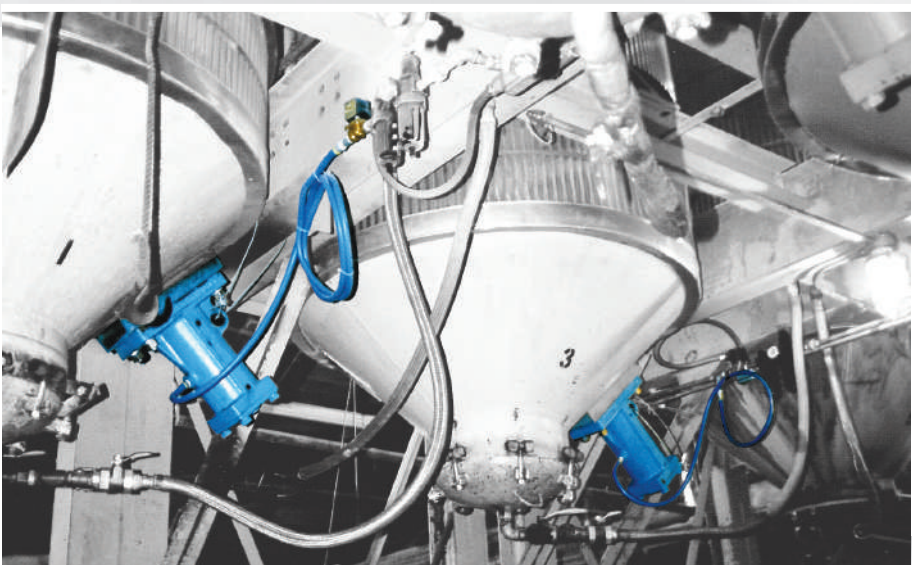


**Applied Vibration Technology
for Processing Bulk Materials**

NAVCO

CHEMICALS CERAMICS PLASTICS FEED PAPER COSMETICS



AGGREGATES COAL FOOD GRAIN PHARMACEUTICALS

INDUSTRIAL VIBRATORS

VIBRATORY EQUIPMENT

Houston, TX

832-467-3636

www.navco.us

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Request a Quote, or
Find Your Local Representative
Online at www.navco.us



Company Overview

NAVCO is a manufacturer of vibratory flow aid systems and equipment designed to assist in the handling, processing and packaging of bulk material. The NAVCO engineering team can develop customized solutions for specific applications including problem analysis, solution integration, and installation recommendations.

NAVCO has state of the art manufacturing and engineering facilities located in Houston, TX. Nationwide Technical Representatives distribute NAVCO products across North America.

Visit www.navco.us to locate the Authorized NAVCO Representative in your area.



The NAVCO manufacturing facility in Houston

We use applied vibration technology as a means to improve customers' bulk material handling processes.

We've been solving difficult flow problems for satisfied customers since 1955.

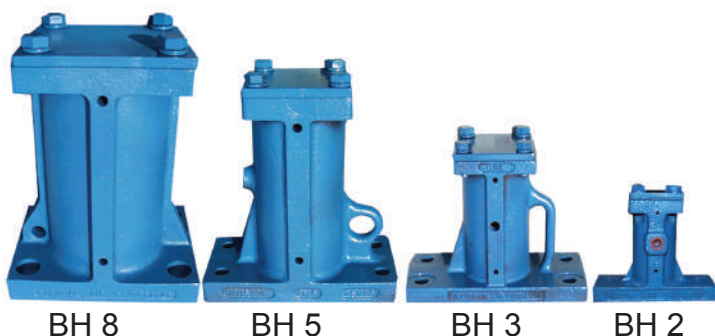
Bin Hopper Pneumatic Piston Vibrators

NAVCO BH Vibrators are available in 10 sizes to operate effectively in applications ranging from light to heavy duty. Available options include:

- Tapped exhaust ports for routing exhaust air
- Internal spring for horizontal mounting
- Specialty coatings for extended life in harsh environments

The large BH units are ideal for facilitating flow of coal, ore, steel and other bulk materials commonly stored in very large bunkers.

The smaller BH units are the optimal flow aid for bulk materials in a large variety of industries, including chemical, food, grain, and pharmaceutical.

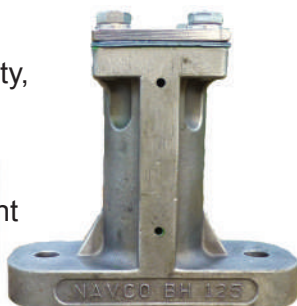


Stainless Steel Bin Hopper Vibrators

Stainless Steel Pneumatic Piston Vibrators

The Stainless Steel NAVCO BH 1.25 is a Pneumatic Piston Vibrator designed to provide reliable performance and easy cleanability, crucial to the food, chemical and pharmaceutical industries.

The Stainless Steel BH 1¼ is ideally suited to ensure consistent material flow of light duty bulk material in any environment.



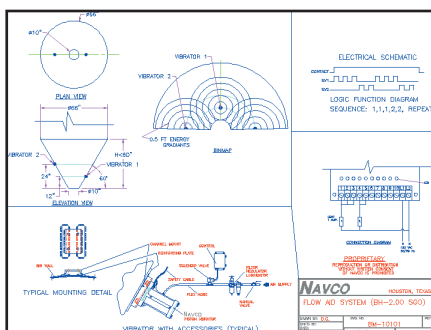
Benefits include:

- **Cleanability** – Great for wash-down environments
- **Weather-Proof** – The compressed air exhaust can be ported away from the production environment or to the atmosphere
- **Low Friction Coating** means BH 1.25 can be operated without oil

Bin Mapping: A Scientific Approach

The unique NAVCO **Bin Mapping** methodology involves a detailed evaluation of the storage vessel geometry and the bulk material.

Engineers create visual maps of vibrator placement, size and control logic for the bin. Vibrators are located on the bin to optimize the area of influence, ensuring artificial flow points are affected. This approach eliminates typical “trial and error” type installations.



A Typical Bin Map Diagram

Bin Hopper Vibrator Installations



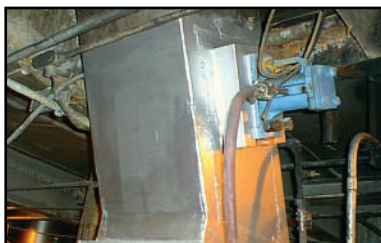
This BH 2 was installed to a hopper using a channel mount. This installation is ideal for round or flat body hoppers and installs easily.

BH 5 Vibrators work to aid the flow of slurry in a waste removal process.



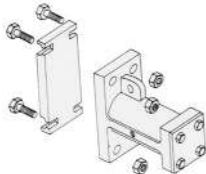
At left: Don't hammer your hopper, get a BH vibrator to move the material.

At right: Big BHs work hard to keep coal flowing in the winter.



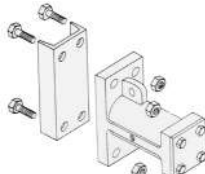
BH Mounting Options

T Slot Mount



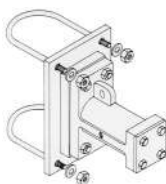
For flat walled hoppers

Channel Mount



For curved hoppers

for Chutes & Pipes:
U Mount Saddle Mount

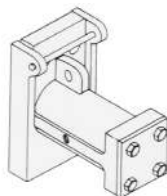


Light Duty



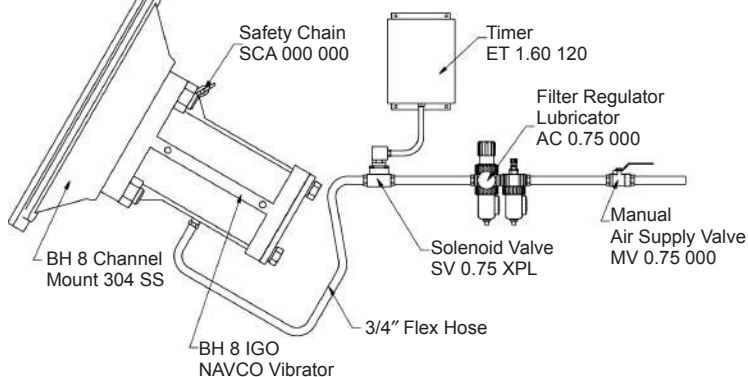
Heavy Duty

Slip Mount

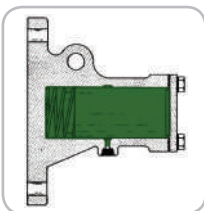


Portable

BH Installation

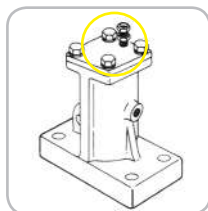


BH Options and Accessories

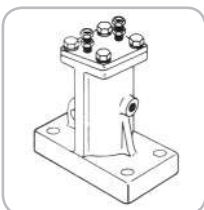


Interior Specialty Coating
for less wear and longer life

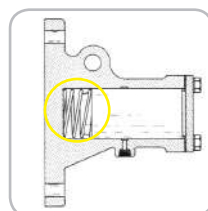
Single Tapped
Exhaust



Dual Tapped
Exhaust



Start Spring
for horizontal mounting



BH Models: Types of Vibration

NAVCO manufactures over 70 different sizes and models of pneumatic piston vibrators for use in a wide range of bulk material handling and processing applications. NAVCO Pneumatic Piston Vibrator configurations are described below.

The Impacting model develops a high amplitude repetitive impulse when the piston strikes the base of the bore sharply on each cycle. The piston is air cushioned at the head plate on the upward stroke. Energy is transmitted through the bin wall and into the material with each impact. Repetitive impacts allow the vibrator to overcome bulk material strength, affect a large area of influence, and reduce the wall friction. Impacting vibrators are ideal for bulk material that is cohesive or has poor flow characteristics. They are also effective for cleaning out adhering material from empty bins and process vessels.

The Silent model generates a sinusoidal output by creating an air cushion at each end of the piston stroke. NAVCO Silent Pneumatic Piston Vibrators are effective where non-cohesive or free flowing material requires only a small amount of energy to produce flow or linear motion is needed.

The Timed Impact model delivers a single, high amplitude impulse each time it is energized. They are operated by a control device that sends intermittent signals to the unit. The impulse of this unit is ideal for evacuating hoppers and process vessels. Specific advantages of the timed impact unit are low noise level, controlled impact, and low air consumption.

Controls and Timers

Control systems reduce utility consumption and increase system life. A successful vibrator system installation requires a full understanding of the affected process. Integration of the vibrator system into the process can be accomplished via process feedback signals, simple timers, PLC or a combination.

NAVCO offers simple to sophisticated control systems depending on the application.

Turbine, Ball, and Form Vibrators

Pneumatic Ball Vibrators

provide high-frequency, directional and reliable vibration in multiple configurations. These vibrators emit minimal noise levels and can be operated in on/off cycles.



Turbine Vibrators utilize high frequency, low amplitude vibration that is well suited for aiding flow of fine materials. Turbine vibrators ship complete with mufflers and fasteners.

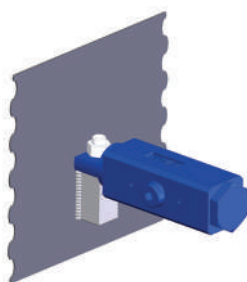


High-frequency **Pneumatic Concrete Form Vibrators** provide a portable, reliable, and economical solution to consolidating concrete. The concrete form vibrators contain no bearings or motors, and feature a unique dual-roller design that significantly boosts performance and reliability.

Specialty Vibrators

Pin Mount Vibrator

Pneumatic Ball Vibrators provide high-frequency, reliable, sinusoidal vibration in multiple configurations, with minimal noise. Simply weld the Pin Mount mounting blocks wherever vibration is needed. Move the portable Pin Mount to the appropriate mounting block as required.



ST Stud Mount Vibrator

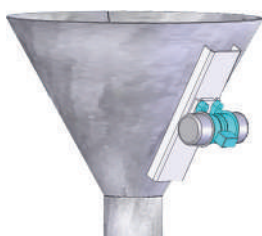
ST portable vibrators are light-weight vibrators for high force output. These handy units have a wide variety of uses from foundry core machines and cement forms to bulk material flow chutes. They are easily mounted at any location where vibration is required.



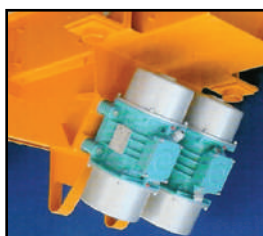
Electromechanical Vibratory Drives



Used as both a flow aid and a drive mechanism on feeders and screens, the electromechanical vibratory drive (UV) is an eccentric weight vibratory motor designed to run continuously at 100% force output. These UV drives are TENV and built to withstand the harshest conditions. Many of the 50 plus models are available in CSA explosion proof configurations.



A flow aid device
on a storage vessel



Drives on a
vibratory feeder

110 V models are available

Other Vibratory Drives

The Electromagnetic Drive is ideal for use on vibratory feeders and conveyors. It features instant On / Off and 0-100% feed rate adjustability.



The Dosing Drive is an electromagnetic drive often used for feeding accuracy on small dosing, batching and mixing feeders.



The Exciter Drive is a unitized vibratory drive ideal for very heavy duty large screens and conveyors, especially in mining.



Matchplate Foundry Vibrators

The MP Vibrator Series delivers high force vibration that improves mold densities and results in smoother finishes for foundries. The mounting base is universal and designed for all types of matchplates. This allows for one MP unit to be easily moved between multiple molds. The MP is also effective as a light duty material flow solution for flow chutes, small hoppers, bins, and totes.

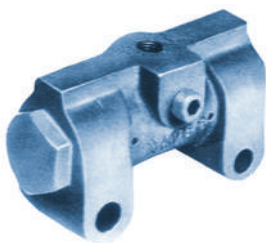


Molding Core/Machine Vibrators for Foundries

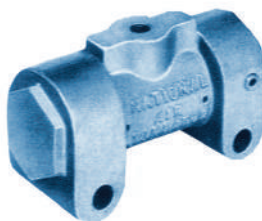
NAVCO piston-driven Mold/Core Machine Vibrators (MC series) are repeat impacting vibrators that ensure rapid, efficient core drawing and smooth surface finish of castings.

These vibrators fit the Hunter Roll-Over, the Herman Roll-Over, and various other Molding/Core machines commonly used throughout North America.

MC 1 "

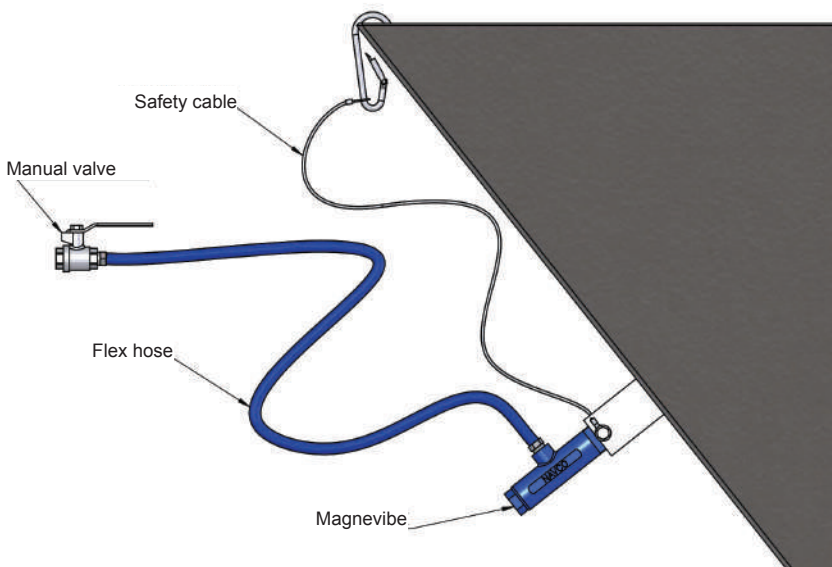


MC 1-1/4 "



Magnevibe Portable Vibrator

Designed for use on small bins, totes, and hoppers, this completely portable unit magnetically mounts on ferrous surfaces. A ferrous adhesive back mount pad is available for use with nonferrous hoppers. Ideal for totes and small storage bins, a ferrous adhesive back mount pad is available for use with nonferrous hoppers.



FV Quick Clamp Portable Vibrator



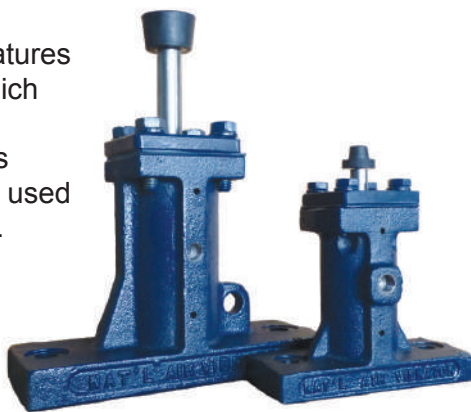
The FV is ideal for any industrial application where a clamp-on portable is preferred over a permanently mounted vibrator.

The FV is equipped with its own built-in clamp and eliminates the need for special mounting brackets often required by other portable models.

Extendovibe—Extended Bin Reach Vibrator

The NAVCO Extendovibe can be used as a flow solution when other vibrators are not feasible due to hopper wall thickness or inability to weld. The Extendovibe can be supported by a form of brace or bracket and is positioned a 1/4 to 1/2 inch from the surface to be impacted. It functions by rapidly tapping an interchangeable rubber knob to the surface in a predetermined location. This effectively reduces the sliding friction and strength of the bulk material to allow for improved flow. Common applications for the Extendovibe include improved unloading and discharge of IBCs, bulk bags, tote bins, other plastic hoppers and bulk bag conditioning.

The Extendovibe's extended piston features a threaded end, which may allow use of different geometries and materials to be used as the impact knob.



Pneumatic Precipitator Rappers

Proven performers, NAVCO Rappers are the most effective rappers available to clean electrostatic precipitator plate and wire electrodes.

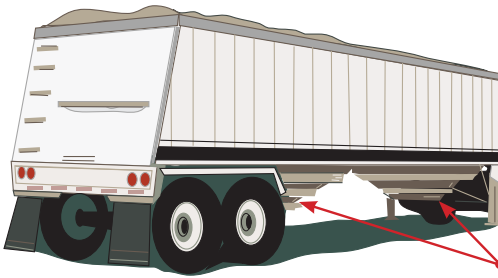


Rapper 3® installed

Reliability
Durability
Dependability

Vibrators for Trucks

The NAVCO BH Model Vibrator can be attached to a dump body, hopper trailer or belly dump trailer to increase material flow, eliminate “dead” cargo, and improve safety during dumping.



A BH vibrator on dump truck beds makes unloading easier and safer.



Dump trucks can tip over backwards when trying to “shake out” a load. NAVCO truck vibrators can help eliminate this possibility.



Volumetric Mixing Truck Vibrators



Mobile concrete mixers, volumetric mixers, and gunite trucks require vibrator assistance to promote constant, reliable flow of the mixture. NAVCO BH Truck Mounted Vibrators are proven reliable and have been installed on thousands of mixing trucks across North America.

Truck Tipper

The NAVCO LC-313, for adding to an existing trailer lift dump, incorporates BH vibrators to facilitate flow from trailers on the lift. The LC-313 is especially useful for moving difficult material that tends to cling to the floor and sides of the trailer.



Hopper Car Portable Vibrators (HCP)

The Hopper Car Portable Vibrators (HCP) are available in four sizes, all internal surfaces on the HCP are coated for less wear and longer life in even the harshest conditions.



Benefits:

- Reduces unloading time
- Produces greater energy than rotary vibrators
- Consumes less air than rotary vibrators
- Free-ride design prevents HCP from getting stuck in the bracket
- The mounting head of the HCP fits all universal dovetail brackets found on hopper cars



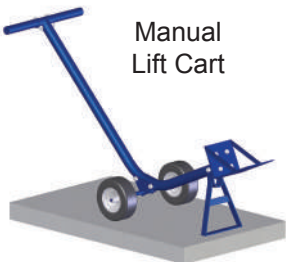
The unique free-ride design is the most effective method of transmitting vibration energy into a railcar.

HCP Portable Railcar Vibrator Sizes

Model	Weight lb.	PSI SCFM @ 50 psi	Frequency VPM
HCP 2.00	42	8.5	2100
HCP 3.00	72	14	1800
HCP 3.L0	80	18	1450
HCP 4.00	115	26	1400

Safety Lift Carts for the HCP

NAVCO lift carts facilitate the safe installation, transportation and removal of the HCP Hopper Car Portable Vibrator. The carts are available in manual or rack and pinion models.



Railside Car Shaker

The NAVCO Railside Car Shaker is a permanently mounted vibration system designed for the loading and unloading of dry bulk material from bottom dump railcars.

The Railside Car Shaker improves operator safety and reduces labor costs.

Both the pneumatic and electric Railside Car Shaker are easily integrated with existing processes and systems.



Unloading Benefits:

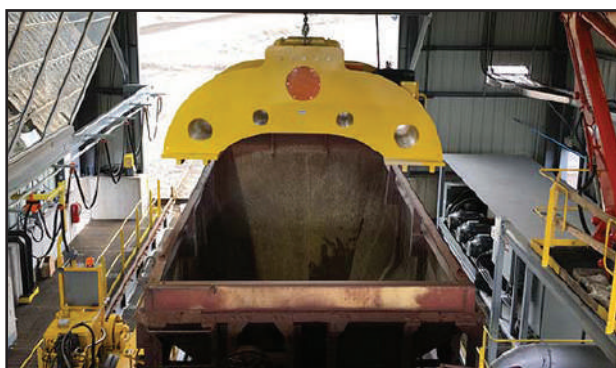
- Reduces carry-back
- Faster unloading

Loading Benefits:

- Increases railcar tonnage
- Reduces transportation costs



Overhead Car Shaker



The NAVCO Overhead Car Shaker is a heavy duty unit designed for assisting in the removal of material from open top, bottom discharge railcars when unloading bulk material.

Pneumatic Feeders

NAVCO designs and manufactures many types of pneumatic vibratory feeders. Ideal for processing dry bulk material, especially where explosion proof requirements do not allow use of electrically operated feeders.



NAVCO feeders are available with vertical or horizontal discharge, stainless steel troughs, and integrated hoppers.

NAVCO feeders utilize the reliable NAVCO Pneumatic Vibrator as the vibratory drive mechanism. The drive can be Teflon coated if required so the feeder can be run without lubrication.

Vibrahoist

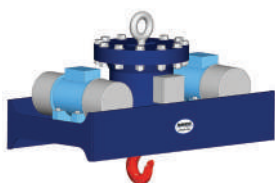
Most often used in the galvanizing industry to remove excess zinc from recently treated large and heavy parts, the Vibrahoist can be used in any application that requires vibration to heavy loads. Multiple units may be used in conjunction for extra heavy loads.

The Vibrahoist shakes excess zinc from galvanized steel rods.



BENEFITS

- Improves finish
- Conserves zinc
- Reduces labor

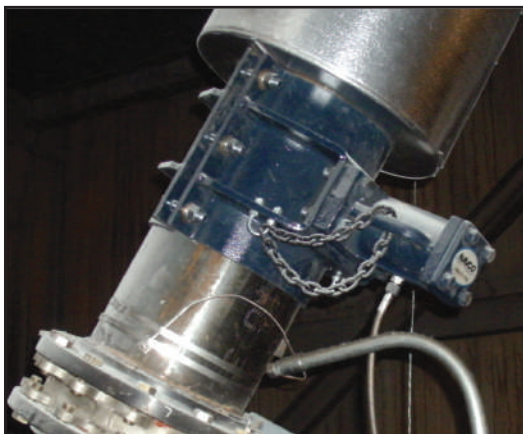


The Electromechanical Vibrahoist
Height: 29" Weight: 750 lb.



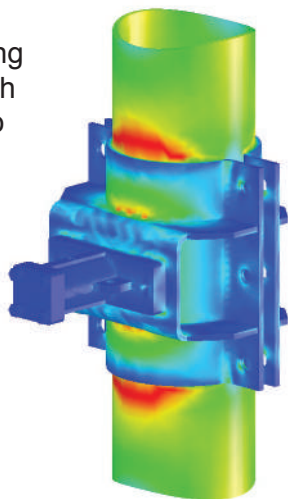
The Pneumatic Vibrahoist
Height: 57"
Weight: 700 lb.

Saddle Mount Vibrator for Pipes and Chutes



The NAVCO Saddle Mount for vibrators (for pipes and chutes) was developed in the late 1980's to assist a customer in transporting wet drill tailings. This proven field solution continues to add value to bulk material processes from freeing coal chutes in power plants to assisting in the Fukushima Daiichi nuclear clean-up.

The simple, bolt-on saddle mount is designed for easy installation. The saddle mount optimizes vibration energy transmission while protecting chute integrity. Each saddle mount is custom designed for the application. NAVCO's expertise is used to assure the right size and type of vibrator for the application. Industrial vibrator applications for processing bulk materials cross a multitude of industries. From freeing aggregate flow through bunkers and chutes to loading mineral in railcars for transport and anything in between.



Vibrating Tables

NAVCO Vibrating Tables are custom engineered to application requirements. The tables are available with several drive options, depending on the power source and application requirements. NAVCO is extremely experienced at seamlessly integrating custom vibratory tables into existing processes and providing the controls needed to maintain precise control of your vibrating table.

Vibrating tables have been successfully utilized in a diverse set of applications, including densification, vibration/fatigue testing, packaging, and shakeout.



This flat top table has plastic sleeves over the isolation system for added safety.

Roller Grid Top Tables are ideally suited for roller conveyor applications.



The Jolt Table above produces a sharp jolt to compact light, fluffy material effectively.

An ergonomic height adjustable table



A low profile table

Services

NAVCO offers a variety of technical services related to material flow solutions, including:

- **Process Integration**

NAVCO can provide recommendations for control schema based on experience. Specialized controls manufactured to meet customer needs are also available.

- **Bin Mapping**

Given complete bin geometry, material, and process information, NAVCO can provide a “bin map” analysis. This analysis illustrates recommended vibrator locations, installation recommendations, and system control sequence recommendations.

- **Customization and Engineering**

NAVCO engineers design custom equipment and systems that provide value added solutions for our customers’ processes.

- **In-House Material Testing**

NAVCO’s test lab is available to determine material response to compaction or feeding with vibration.

- **Trial Equipment**

NAVCO has various compaction tables and our Railside Car Shaker available for field trial.

- **Field Service**

NAVCO technicians and engineers are available for on-site startup and troubleshooting assistance.

- **Network of Field Representatives**

Local assistance is available through the NAVCO network of technical representatives.



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