

ERIEZ

GLOBAL LEADER IN SEPARATION TECHNOLOGIES

Installation, Operation & Maintenance Instructions



VIBRATORY FEEDER HOPPER TRANSITION & APPLICATION GUIDE

INTRODUCTION

This manual outlines proven and generally effective means to properly supply bulk material to Eriez Vibratory Feeders.

When designing a new hopper or modifying an existing one for use with an Eriez feeder, careful attention to hopper transitions is necessary to help insure peak feeder performance and feeder size selection. The information in this manual is offered as a guide only, as materials may respond differently to hoppers and bulk storage. Rated capabilities require ideal conditions. It is the responsibility of the hopper transition designer to ensure the hopper is suitable for the specific application. Eriez Manufacturing is in no way responsible for hoppers or transitions supplied by others.

If there are any other questions or comments about this manual, please contact Eriez Manufacturing at +1-814-835-6000 or eriez@eriez.com.



CAUTION

Safety labels must be affixed to this product.
Should the safety label(s) be damaged, dislodged or removed, contact Eriez for replacement.

Business Address:

Eriez
2200 Asbury Road
Erie, Pa. 16506
Phone: +1-814-835-6000
Email: eriez@eriez.com
www.eriez.com

European Authorized Representative:

Eriez - Deutschland
Henrichenburger Str. 103
D-45665 Recklinghausen
Deutschland
Phone: +44 75 5780 9761
Email: info-deutschland@eriez.com
www.eriezdeutschland.de

The following information can be found on the name tag installed on the feeder:

- Company name
- Feeder model number
- Feeder style
- The serial number for the feeder assembly
- Feeder rated voltage and frequency
- Feeder maximum current draw at rated voltage
- Feeder tuned tray stroke

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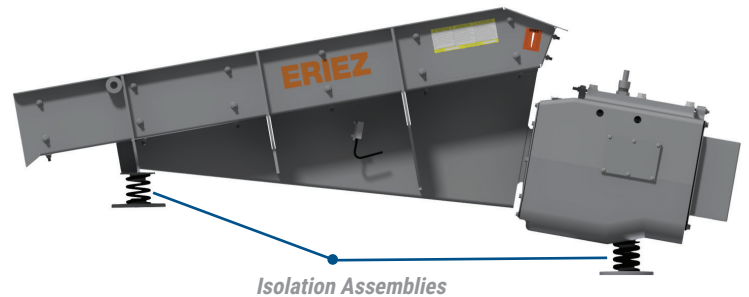
BASE MOUNTING

Base mounted feeders are generally mounted directly to either a concrete base or fabricated steel structure. If mounted on a fabricated structure, make sure the structure's natural frequency is not near the operating frequency of the feeder. If the structure is vibrating as the feeder operates, feeder capacity will be reduced, and structural failure may occur.

Isolation of vibration is either with steel coil springs or rubber isolators. When mounting, make sure the springs are vertical so maximum isolation is achieved and springs do not move horizontally.

Care must be taken to use isolation springs with sufficient stiffness to support both the static load of the material and the feeder and both the dynamic vertical and horizontal loads. If a spring is collapsed (one coil touching another), contact Eriez Manufacturing service department. Both dynamic and static loading specifications can be provided by Eriez Engineering as required.

Care must be taken that the vibrating feeder does not make contact with any rigid structure such as the hopper bottom, skirt boards, or foundation, or damage may occur, and full amplitude may not be achieved.

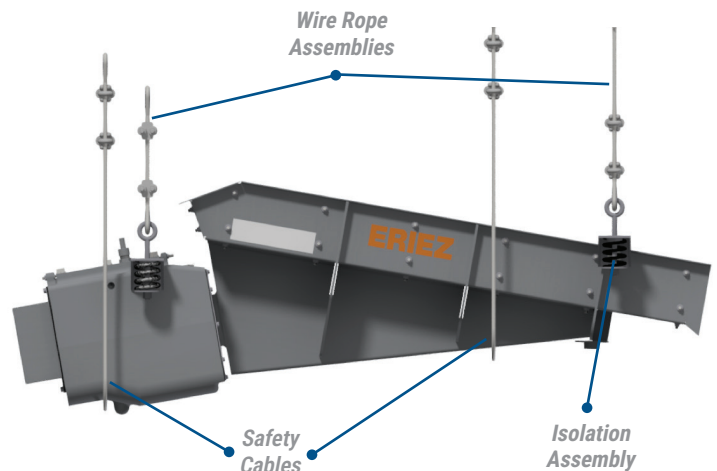


Eriez B-HC Electromagnetic Feeder

SUSPENSION MOUNTING

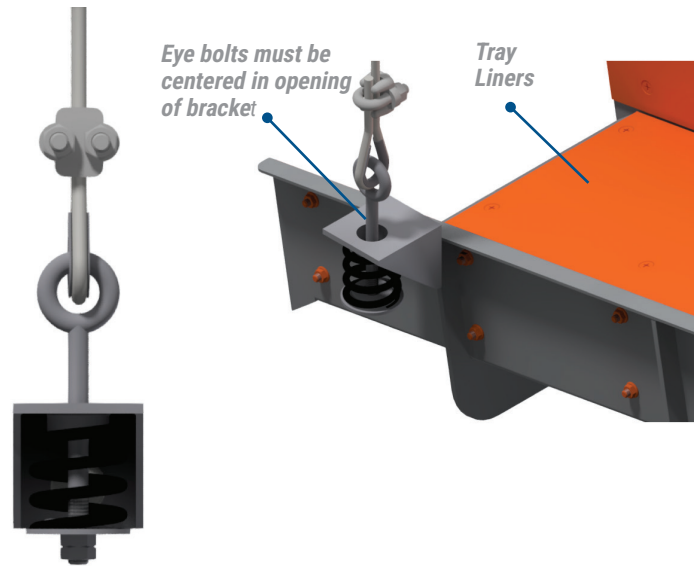
Suspension mounted feeders are normally either suspended from the hopper or other support structure with either pre-stretched wire rope or link bars of the appropriate size. Refer the chart of recommended sizes for each model of Eriez Heavy Duty Electromagnetic Feeders. Consult Eriez for the correct wire rope or link bar size for our mechanical feeders as the weight of the units vary.

Eriez does not recommend using turn-buckles or rods for suspension mounting for safety reasons. Rods and turn-buckles may also vibrate excessively and affect feeder performance.



Hangers

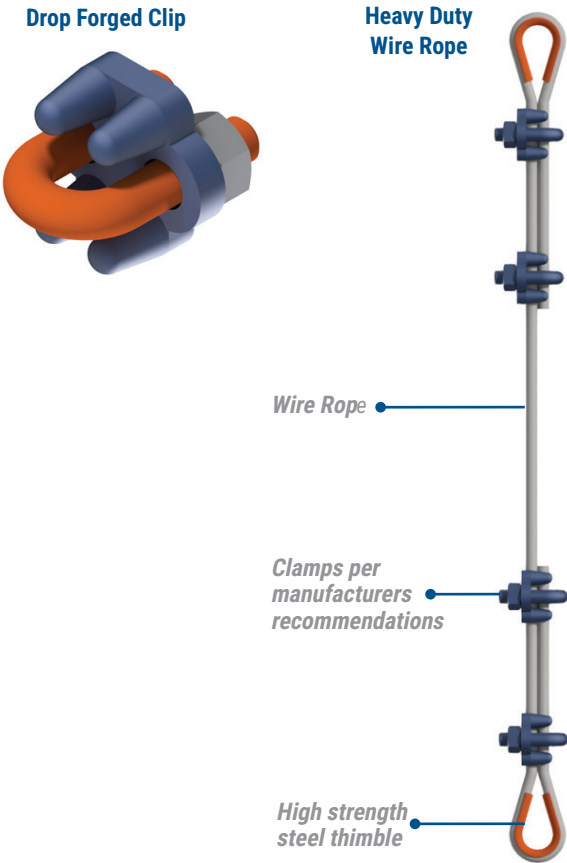
Cables should be vertical with suspension eyebolts centered in the bracket and oriented as shown. Care must be taken that suspension eyes do not rub against their mounting brackets or damage can occur. Also, isolation springs must not be fully collapsed under loaded conditions.



MATERIAL FLOW

Wire Rope & Hardware

Drop forged clips and heavy-duty wire rope thimbles should be used per their manufacture's recommendations.



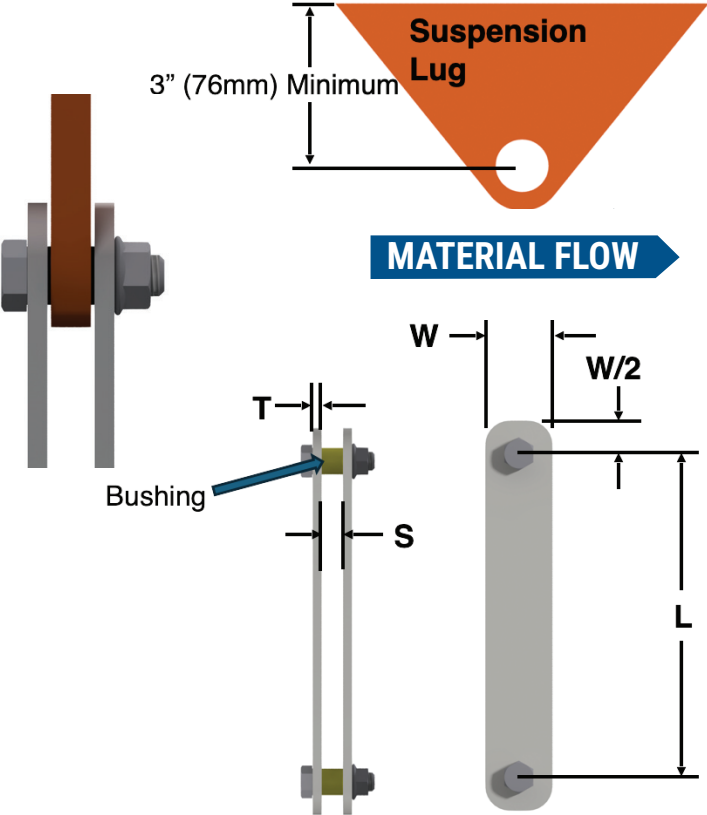
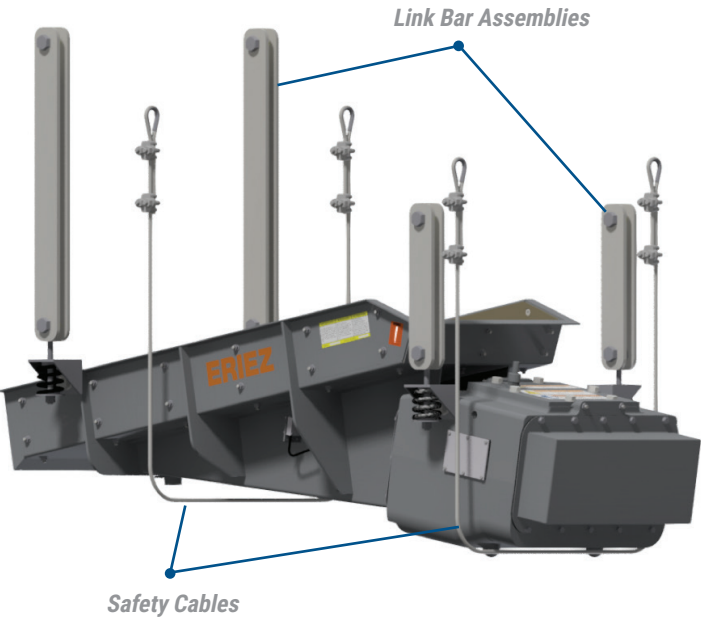
Feeder Model	Rear Suspension	Front Suspension
52A 58B 62B 65B 65B-HC	1/4" cable (7mm)	1/4" cable (7mm)
70B 75B 75B-HC	3/8" cable (10mm)	1/4" cable (7mm)
85B	1/2" cable (13mm)	1/4" cable (7mm)
98B 105B	1/2" cable (13mm)	3/8" cable (10mm)
100B-HC	1/2" cable (13mm)	1/2" cable (13mm)
115B 120B-HC	3/4" cable (20mm)	1/2" cable (13mm)

Sizing based on 6 X 25 (6 X 19 CLASS) FW EIP RRL IWRC or equivalent.

Link Bars

Wire rope is the recommended method for suspension mounting Eriez vibratory feeders. However, there are instances when there is not adequate room to accommodate the minimum length of a wire rope to make a suitable suspension assembly. The minimum length will be determined by the length required to incorporate the wire rope manufacturers recommended cable clamping arrangement. For these installations, Eriez recommends link bar assemblies.

Link bar assemblies are comprised of two parallel steel bars that incorporate bushings, bolts and locking nuts to support the feeder suspension assemblies and allow the feeder to freely pivot in the direction of material flow on the feeder tray. It is important the guidelines below are followed to ensure the feeder has proper isolation and is free the move unimpeded.

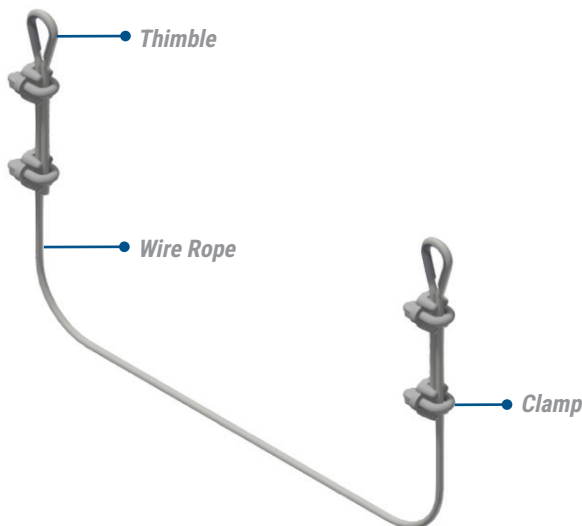
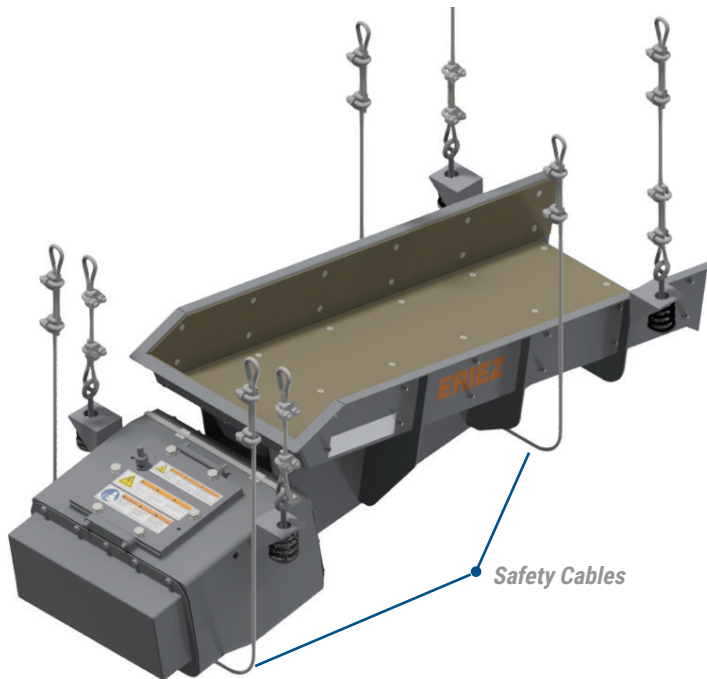


The outside diameter of the bushing should be 2mm less than the lug, hanger assembly, or eyebolt hole it must fit in. The inside diameter of the bushing as well as the holes in the link bars should be 2mm greater than the bolt diameter. Eriez can provide link bar assemblies in 51mm increments.

Feeder Model	Width (W)	Thickness (T)	Spacing (S)	Minimum Length (L)	Bolt Size
52A 58B 62B 65B 65B-HC	2.125" (54mm)	0.25" (6.5mm)	0.625" (16mm)	2" (51mm)	M16
70B 75B 75B-HC	3" (76mm)	0.375" (9.5mm)	0.875" (22mm)	4" (102mm)	M24
85B 98B 105B 100B-HC	3" (76mm)	0.375" (9.5mm)	0.875" (22mm)	4" (102mm)	M24
115B 120B-HC	4" (12mm)	0.625" (16mm)	1.375" (35mm)	4.5" (115MM)	M30

Safety Cables

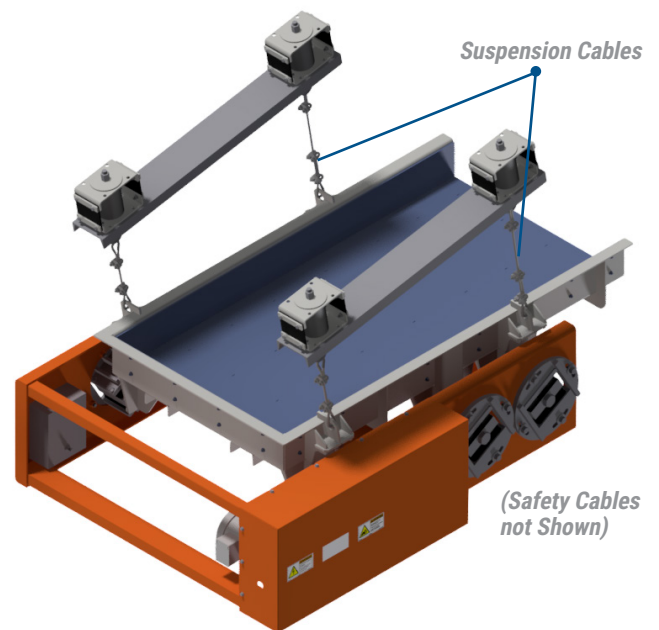
A safety cable should always be used both around the feeder tray and drive unit to keep them from falling should the suspension cables or brackets fail.



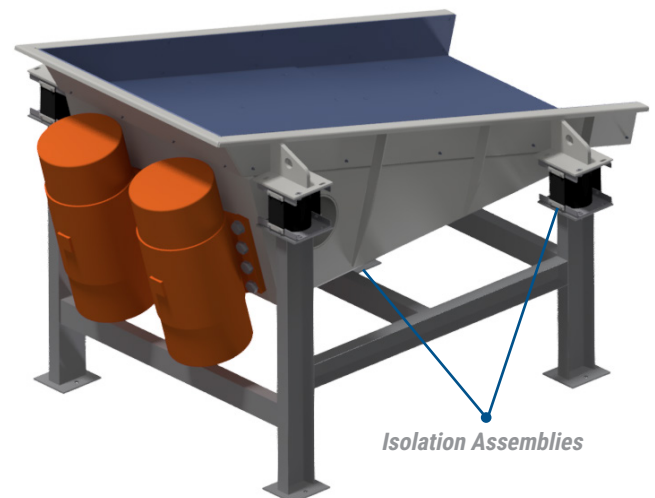
HVF and Brute Force Mechanical Feeders

The guidelines for suspension or base mounting Eriez HVF and Brute Force mechanical feeders are the same as the B and B-HC model heavy-duty electromagnetic feeders.

HVF and Brute Force feeder sizes vary depending upon the specific application they are designed. Therefore, it is necessary to calculate the appropriate suspension and safety cable and link-bars on a case-by-case basis. Consult the static and dynamic loading information provided by Eriez and the cable manufacturers recommendations.



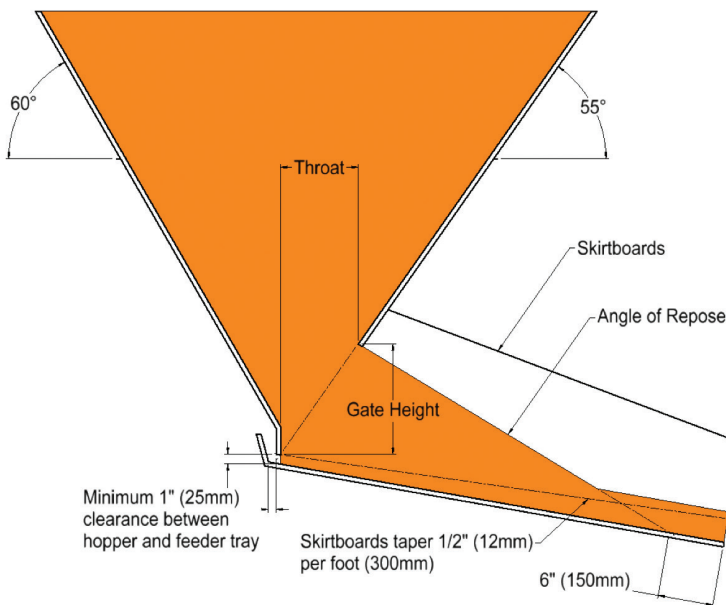
Eriez HVF Mechanical Feeder



Eriez HVF Mechanical Feeder

IDEAL HOPPER DESIGN

The hopper's transition section, the part of the structure between the main hopper and the feeder plays a very significant role in obtaining the rated capacity of the feeder. An improperly designed hopper or transition can reduce feeder capacities by as much as 30%. The bottom of the hopper for example should be almost as wide as the feeder tray to provide full width feeding.



Throat Opening

For random sized materials, the throat opening (T) should be at least 2 times the largest size particle size, for near sized materials the throat (T) should be at least 3 times the largest particle size. The throat should never exceed 30% of the tray length, or excessive material head loading may occur, overpowering and damaging the feeder and reducing capacity.

Gate Height

The gate height (H) should increase proportionally to the particle size and the flow depth (B) (measured at the end of the tray), to deliver the desired feed rate (FR). Generally, the height should be at least twice the size of the largest particle and should be 1.2–1.5 times the material burden depth (B).

The gate height should also increase with the throat (T), with T staying between 0.6 - 1 times H. Ideally $T = 0.6 \times H$. When H becomes less than T, material flow patterns are not uniform, resulting in areas of little or no flow.

Make sure the angle of repose of the material being fed reaches the bottom of the tray at least 6" (150mm) before the end of the feeder tray. If not, material will flow off the tray with the feeder shut off.

When adjustable gates are used, the gate must be parallel to the front wall of the tray length, or excessive material head loading may occur, overpowering and damaging the feeder and reducing capacity.

Hopper Opening Width

The width of the hopper opening, between the skirtboards should be a minimum of 2-1/2 times the largest particle for random size material and a minimum of 4 times the particle size for near size materials.

Hopper Walls

The main portion of the hopper will have sloped walls, which must be steeper than the angle of repose of the material, or the hopper will not self empty. Too steep walls however, put excessive head load on the feeder and promote uneven flow. With sloped walls, a flow aid such as vibrators may be required to keep materials free flowing.

The front wall should sit at an angle of between 50° and 65° to satisfy the relationship between the throat and gate height mentioned previously. There is a natural tendency for feeders to draw material from the front portion of the hopper. Thus, it is necessary to make the rear wall 5-10° steeper than the front wall. Additionally, the projected angle of the front wall should meet the bottom of the rear wall (see figure to the left).

IDEAL HOPPER DESIGN *(cont.)*

Clearance

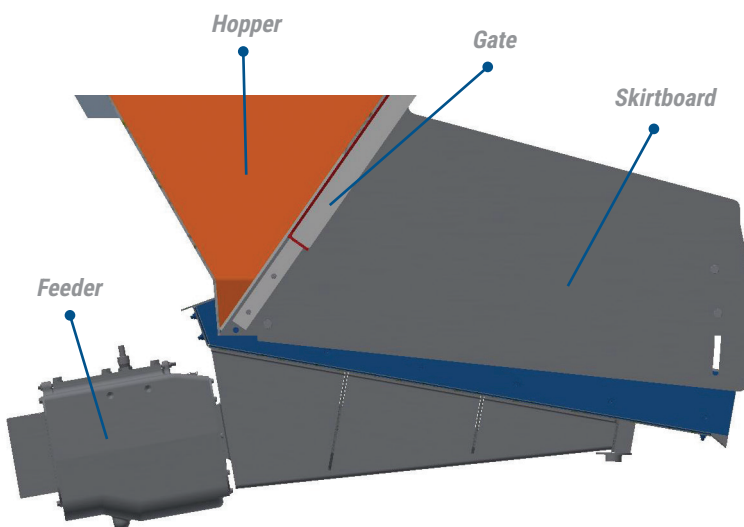
For Eriez B and B-HC model electromagnetic feeders it is critical that 1" (25mm) minimum clearance between feeder tray and all other structures be maintained. Insure adequate clearance with feeder and hopper in both empty and full condition. Movement must not be restricted by rigid attachment to structures.

For Eriez HVF and Brute Force model feeders a minimum of 1-1/2" (37 mm) clearance be maintained.

For Eriez compact feeders, a minimum of 1/4" - 1/2" (6 - 12 mm) clearance must be maintained around the tray during all operating conditions.

Skirtboards

To obtain the rated capacity of Eriez "B" feeders or HV mechanical feeders, a burden depth deeper than the feeder sides must be carried in the feeder. To contain the material and prevent spill over, skirtboards should be installed on both sides of the gate opening and extend to the end of the trough, while gradually tapering upwards to prevent material jamming (*see figure*). Skirtboards are nearly always required in installations where the feeder pan is given a downslope.



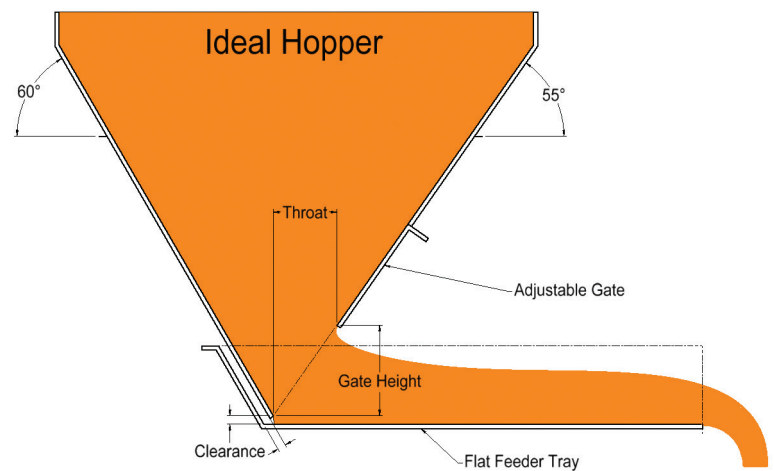
TYPICAL HOPPER TRANSITIONS

Flat Trays

Hoppers are ideally designed in a “wedge” or “chisel” configuration with an adjustable gate on the front wall. The wedge shape reduces material load on tray and promotes good flow characteristics. Note: not all materials flow well from a “wedge” shaped hopper, careful attention should be given to the hopper design for your specific application. Interference with the vibrating will result in reduced capacity and/or failure. Ideally the bottom of the hopper should be designed so when the gate is completely lowered, the material flow will be shut off. In place of an adjustable slide gate, a complete adjustable collar can be used.

NOTE: Fine Materials that “flush” or become fluid-like may require an alternative hopper transition design.

Flat Trays

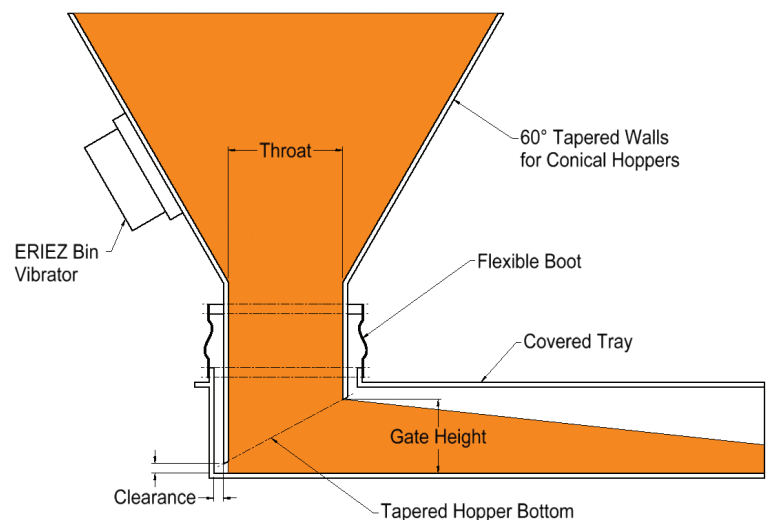


Tubular or Covered Trays

Tubular or covered trays are typically utilized when feeding dusty materials or when material being fed must be otherwise isolated. Its important to allow for adequate clearance around the infeed spout or hopper to allow the feeder to vibrate with no interference under any condition. Hopper transitions should be designed to permit optimal material flow while minimizing the amount of material load on the feeder. The diagrams below illustrate the typical methods of transitioning into a covered or tubular tray.

Spring ring type flexible dust boots can typically be utilized at the discharge of a vibratory feeder with no issues. The spring ring boot should only be utilized at the infeed of the vibratory feeder when material is being meter fed to the feeder. For example, if the feeder is supplied with material from a rotary valve or screener and the flex boot will not be filled with material or otherwise become stiff and prevent the feeder from vibrating or moving freely.

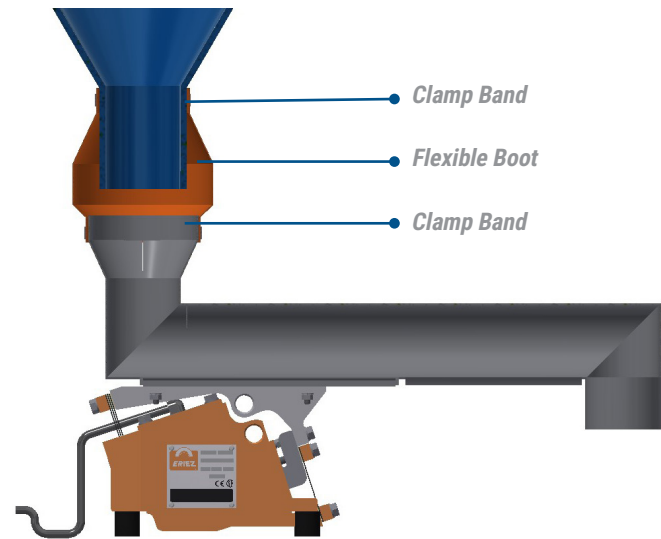
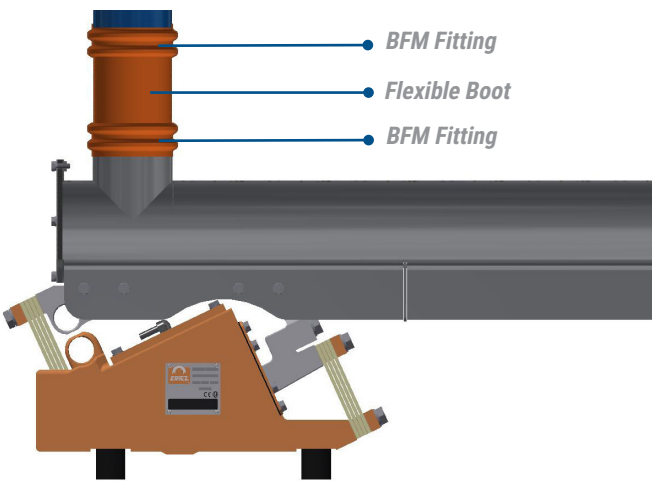
Tubular or Covered Trays



TYPICAL HOPPER TRANSITIONS *(cont.)*

Feeder without Hopper or Material Column Above Tray

When the feeder is meter fed with material and there is no material surge or column above the tray, it is acceptable to make a boot connection from the bottom of the hopper to the inlet of the tray. This is acceptable since the feeder remains unrestricted and free to vibrate since the flexible boot will not fill with material and restrict the feeder from vibrating. This is typical of a BFM style flex boot. If there is a hopper or column of material above the tray is necessary for the hopper transition to end into the feeder tray as shown below.



ERIEZ



HEADQUARTERS

2200 Asbury Road • Erie, PA 16506-1402 U.S.A. • +1-814-835-6000 • eriez@eriez.com • www.eriez.com

Manufacturing Facilities: AUSTRALIA • BRAZIL • CANADA • CHILE • CHINA • GERMANY • INDIA • JAPAN • MEXICO • PERU • SOUTH AFRICA • UNITED KINGDOM • UNITED STATES

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