

# Vibrating Bin Dischargers

## Eliminate Bridging and Ratholing



# Bin Flow Problems

Bin flow problems, including bridging and ratholing, are usually related to one or more of the following conditions:

- Hopper outlet is too small
- Hopper depth is too great
- Hopper slope is too flat

A properly sized and properly operated Carman Vibrating Bin Discharger can economically eliminate bridging and ratholing.



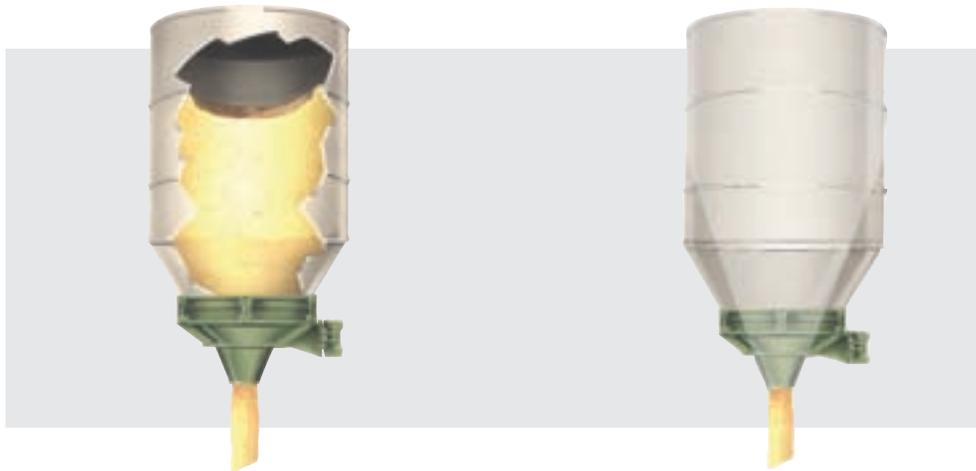
## Bridging

Bridging is a no-flow condition in which the pressure of the stored material on itself results in a self-supporting “bridge” or “arch” formation over the outlet.

## Ratholing

Ratholing is a condition in which the stored material does not slough into the central flow stream for discharge and instead forms a core. Problems associated with ratholing are flooding, substantial variation of density in product, and eventually no-flow.

# Carman Bin Discharging Solutions



## Eliminate Bridging and Ratholing

The Carman Vibrating Bin Discharger eliminates ratholing by increasing the effective hopper outlet size while the unit’s internal pressure cone eliminates bridging.

## Maximize Hopper Volume

With identical elevations and bin diameters, a 60° bin with a 5’ Carman Vibrating Bin Discharger provides 130% more hopper volume than a 70° mass flow bin design.

# Design Factors and Material Classifications

There is no average material. But, through thousands of tests, Carman has grouped materials into four classifications. These classifications give Carman engineers the basic parameters from which to design and select the proper vibrating bin discharger system.

In addition to understanding the material to be stored, several factors relating to bin construction are important to consider when specifying a Carman Vibrating Bin Discharger.

## Bin Design and Material Characteristic Factors:

### Bin Data:

- Diameter
- Sidewall Height
- Hopper Slope
- Internal Pressure (if applicable)

### Product Characteristic Data:

- Product Name
- Moisture Content
- Particle Distribution
- Bulk Density
- Temperature

### Downstream Equipment Data:

- Type of Equipment
- Feed Rate
- Inlet Dimensions



### Class I

Plastic pellets and pebble lime.



### Class II

Hard wheat flour, starch, plastic resin powders, potato flakes, activated carbon powder, hydrated lime, talc, flyash and soda ash.



### Class III

Pigments, calcium carbonate, semolina flour, soft wheat flour, soy flour, gypsum, pulverized limestone, TiO<sub>2</sub>, zeolite, kaolin clay, metal oxides and most baghouse dust.



### Class IV

Wood chips, fibrous products, sawdust, filter cakes and wood waste (mixture of sawdust, shavings, etc.).



### Testing/Pilot Plant

The flow properties of your product or raw material can be carefully analyzed in our laboratory or with rental equipment in your facility. Performance is guaranteed.

# The Carman 30°/60° Vibrating Bin Discharger

A unique design with all the hardware to install quickly...and the ruggedness to stay on-line.

Carman's 30°/60° cone design offers proven performance advantages when compared to competitive single slope or dished-head designs including the ability to discharge some products that cannot be discharged from shallower sloped designs.

## Adapter Ring

The adapter ring is used to attach the vibrating bin discharger to the bin or hopper section of the bin. It provides an attachment point for the inlet sock and properly positions the hanger arm support points.

Adapter rings are available for either weld-on or bolt-on installation. The typical weld-on adapter ring simply welds directly to the bin. When a bolt-on adapter ring is supplied, there must be a mating flange on the outlet of the storage bin.

Some customers prefer the less expensive weld-on adapter ring, while other customers prefer the bolt-on adapter ring option which permits the bin discharger to ship fully assembled and greatly simplifies final installation in the field.

## Inlet Sock

The inlet sock provides the seal between the storage bin and the bin discharger. Carman's standard sock material is a reinforced EPDM elastomer... extremely tough, yet flexible to allow proper vibratory motion. Our EPDM elastomers are superior to neoprene connectors regarding resistance to the effects of both sunlight and ozone.

Other elastomers, including FDA-approved connectors, 3A sanitary 18-03 connectors and high temperature/pressure connectors, are also available.

## Sock Fasteners

Stainless steel fasteners are used to secure inlet socks.

Standard double drawbands are used for low pressure applications (up to 5 psig). 10 psig and 14.5 psig designs are also available.

## Hanger Arms

Carman hanger arms are custom engineered for vibratory service and matched to your application. They are constructed of high strength ductile iron.

Rubber bushings, located in the top and bottom eyelets of the hanger arm, allow maximum horizontal bin discharger movement to promote material flow, yet limited vertical movement to minimize stress on the support flange above. The bushings have 3/16 inch thick metal sleeves to give the hanger bolts a close tolerance fit and protection. Special bushings are available for high temperature use.

## Drive Motor

Vibratory motors used to drive Carman bin dischargers are foot-mounted and include a 30 month warranty. Motors have double extended shafts complete with adjustable eccentric weights.

Totally enclosed non-ventilated (TENV) and explosion-proof designs are available. Explosion-proof ratings are Class I, Groups C and D; and Class II, Groups E, F, and G service.

## Pressure Cone

Individually engineered for each application, the Carman pressure cone provides relief of headload pressure off the outlet.

## Special Equipment and Accessories

Carman has developed special equipment and accessories to solve unique storage flow problems including:

- Carbon steel, stainless steel and other special materials of construction
- UHMW and urethane linings
- Special paint finishes including epoxy and high temperature finishes
- Sanitary designs
- Flanged outlets
- Flanged inlet and outlet connectors
- Maintenance gates

# Carman Vibrating Bin Dischargers

# On-The-Job In These Industries



## Power and Water Treatment Industries

This model 8GBD dual outlet Bin Discharger promotes flow from a single tank into two independent feeders. Typically, pantleg bin dischargers work best when product is simultaneously withdrawn from both legs, but occasionally, these units can be used in situations in which one leg acts as a backup. Reinforced EPDM inlet connector with double drawbands prevents leakage of fine products. Rugged TENV motors include adjustable eccentric weights for field tuning.

## Glass and Plastic Industries

Finely ground, difficult-to-handle minor ingredients and additives are stored and discharged at high rates to downstream "loss in weight" feeding equipment using a self-contained Model 3GBD storage bin. Large diameter outlet assures high discharge rates while in volumetric mode. Pneumatically operated gate assures positive shut-off for accurate feeding in the gravimetric mode.



## Food Industry

Cut carrots, lettuce and cabbage are stored and positively discharged at a controlled rate to a salad packaging system by a vibrating feeder. Total washdown is accomplished by easily cleanable 304 stainless steel construction including exclusive connectorless overlap design, CIP spray head under pressure cone, access doors, and waterproof drive motor.

## Chemical Industry

12' diameter electrically heated and insulated Bin Discharger eliminates problems which occur during start-up and shutdown when handling hot products in a wet atmosphere. 300°F skin temperature eliminates condensation and the sticking and flow problems which result when product build-up occurs. This unit includes a flanged flexible inlet connector and retaining rings suitable for up to 14.5 psig of internal pressure.



Prepared cake mix products are stored in activated surge hopper prior to packaging. Full diameter Bin Discharger creates uniform flow throughout the bin, remixing stored materials as it discharges. 304 stainless steel construction, white EPDM flexible connectors and white epoxy paint system meet FDA standards for bakery operations.

## Dairy Industry

Producer of dairy by-products requires equipment with a finish satisfying 3-A Dairy requirements for dry solids. Carman has received an equipment acceptance certificate from the USDA stating that our equipment complies with USDA guidelines for the sanitary design and construction of dairy processing equipment. To satisfy finish requirements, interior surfaces are ground and polished to the equivalent of a #4 finish or a maximum  $R_a$  of 32 micro-inch. Exterior surfaces are glass bead blasted for a uniform appearance.



## Land Remediation Industry

Incinerated hazardous waste is stabilized and neutralized by mixing with hydrated lime before disposal. This 5' diameter Model 5GBD Bin Discharger discharges -300 mesh hydrated lime at a constant density to volumetric feeding equipment.

## Grain and Wood Industries

Fibrous materials interlock when stored. This Model 6GBD Bin Discharger includes a special steep-angle pressure cone that penetrates deeply into stored product. This eliminates bridging by permitting direct transmission of vibration.



# Other Carman Vibratory Equipment

Carman manufactures the most complete line of vibratory material processing equipment in the industry. For more information, call and ask for the bulletin listed under the product you're interested in.

## Vibrating Spiral Elevator



### Heat, Cool, Dry, Cure, Dewater, or Quench While Elevating.

- Long retention with minimal floorspace requirements.
- Direct or indirect processing capability.
- Integral isolation system minimizes force transmission.
- Non-resonant drive with long-life vibrating service motors.
- Process Guarantee.



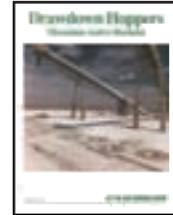
Ask for Bulletin No. 910

## Drawdown Hopper



### Reclaim Coal, Potash, Salt, Aggregate and Other Materials

- Projection ring transmits vibrations to encourage "slough-in".
- Increase active reclaim.
- Cycled operation eliminates compaction.
- Rugged design for dependable operation.



Ask for Bulletin No. 1100

## Adjust-A-Flow Vibrating Feeder



### Feed, Meter, Scalp, Charge or Distribute.

- Rugged design well suited for impact loading and handling sticky materials.
- Non-resonant drive.
- Designed and constructed to suit application.
- Isolation system reduces force transmissions.
- Variable capacity control.



Ask for Bulletin No. 610

## Vibrating Conveyor



### Convey, Inspect, Orient, Pick, Screen, Clean, Cool, Dry, Feed, Fluidize, Freeze, Heat, Mix, Quench, Size or Sort.

- "Natural frequency" spring system.
- "Positive arm" drive.
- Standard-duty, fiberglass leaf spring or heavy-duty coil spring designs available.



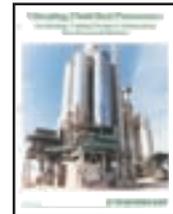
Ask for Bulletin No. 700

## Vibrating Fluid Bed Processor



### Heat, Cool, Dry, Classify, Moisturize, Toast De-Dust, Crystallize or Freeze.

- Controlled process air and vibration combine for efficient fluidization.
- Intensive intermixing for direct heat and/or moisture transfer.
- Process flexibility.
- High thermal efficiencies.
- Process Guarantee.



Ask for Bulletin No. 1200

**carman**<sup>®</sup>  
Industries, Inc.

**ci**<sup>®</sup> P.O. Box 579  
1005 W. Riverside Drive  
Jeffersonville, IN 47130  
800-456-7560  
FAX: 812/288-4708  
[www.carmanindustries.com](http://www.carmanindustries.com)

Tip for Printing:

This document uses page sizes optimized for viewing on a computer monitor.

For best printing results, select “Fit to Page” or “Shrink to Fit” from your print menu.

Thank you for considering Carman equipment.

***carman***<sup>®</sup>  
Industries, Inc.