

Dock Seals & Shelters 101



LODEM

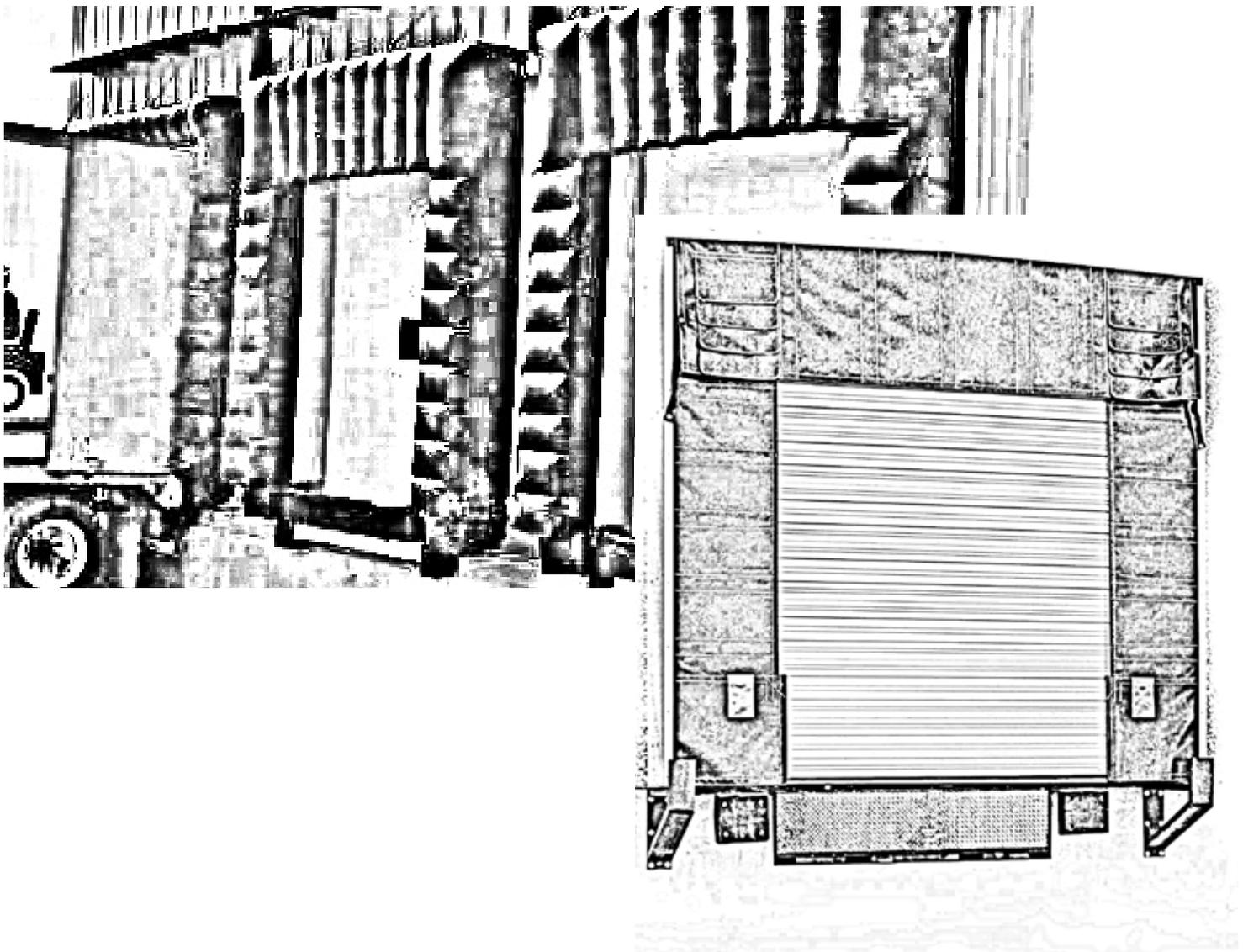
LOADING DOCK EQUIPMENT MANUFACTURERS

A Product Section of Material Handling Industry, MHI

What You Always Wanted to Know About Dock Seals and Shelters But Were Afraid to Ask

Just what the heck is a dock seal and shelter?

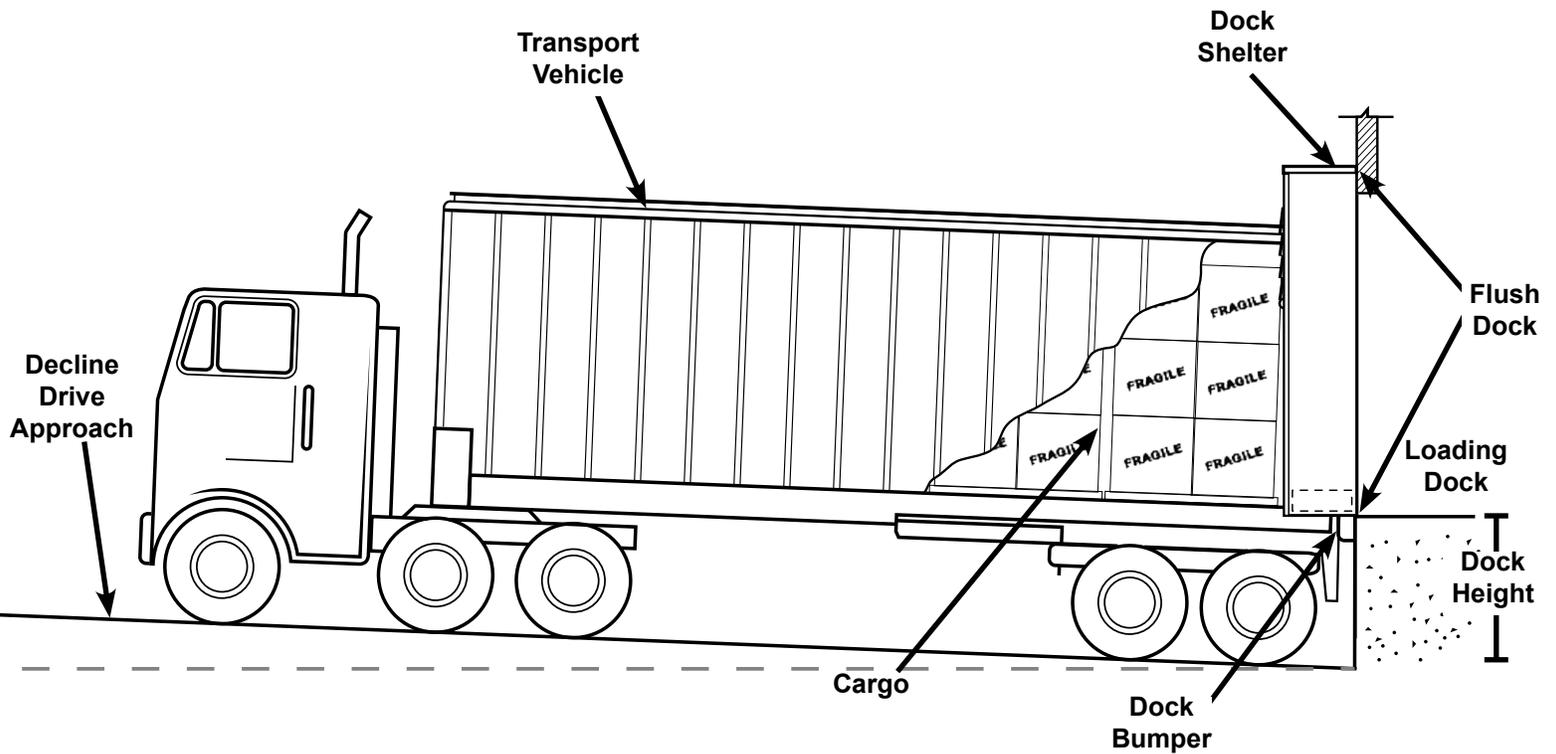
A dock seal or shelter closes the gap between the building wall and the truck by sealing the top and sides and or back of the transport vehicle, essentially creating an extension of the warehouse.

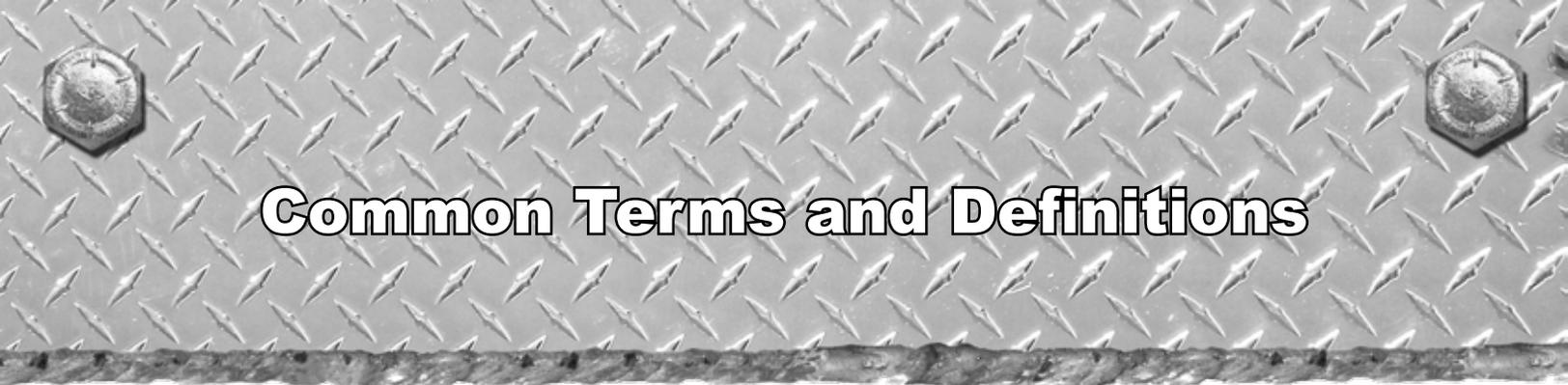


Common Terms and Definitions

What do I need to know before I can start selecting a dock seal or shelter for my application?

You might want to know some common terms and definitions:





Common Terms and Definitions

Bevel: When a dock seal's head or side pad rear framing is not as wide as the front face of the pads. Beveled pads are used to reduce the unit's front opening size on larger door openings sizes.

Bumpers: these are used to prevent the transport vehicle from directly contacting and damaging the building, dock leveler, vehicle restraint and dock seal. They are usually made of rubber. Bumper sizes and projections vary, based on vehicles serviced and other factors such as driveway slope.

Compression: The amount the dock seal is compressed when the truck is positioned at the loading dock.

Dock: This is the area of a building where loading and/or unloading of transport vehicles takes place.

Dock Bumper: See Bumpers

Dock Face: Vertical surface at the front of a dock projecting from the driveway to the dock floor.

Dock Height: Dimension from dock floor down to the top of the drive approach or to top of rail in the case of rail sidings.

Dock Level: This term involves the vertical level that conforms to the building's loading dock floor surface.

Dock Leveler: a device affixed to a dock structure to form a bridge between the dock structure and a transport vehicle, thus allowing movement of industrial vehicles between the transport vehicle and the dock structure.

Dock Pit: The pit is the recessed opening in the building's floor that accommodates the pit dock leveler. Most pits are lined along the edges with structural steel angles that are embedded in the concrete.

Dock Seal: Foam filled side pads bonded to a rigid frame and encapsulated with a fabric covering. Dock seals have several variations of head pads and curtains to accommodate different door and trailer sizes.

Dock Shelter: An enclosure which projects from the face of the building that has head and side curtains that extend toward the opening's width and height in order for the curtains to contact the vehicle body to create a seal. The projecting frames can be either rigid or flexible, spring activated.

Common Terms and Definitions

Dock Types, Common:

Cantilever Dock: When a concrete dock ledge at floor level extends beyond the foundation and building walls.

Flush Dock: Building wall and foundation wall are flush.

Extended Foundation: When foundation wall extends beyond the building wall from dock floor down to drive approach.

Driveway: The surface in front of the dock where the transport vehicle is parked. The driveway surface may be generally horizontal or may be sloped toward or away from the dock. The driveway surface is typically made of concrete, asphalt or gravel.

Drive Approach Types:

Level Drive: When the drive is flat and parallel to the building floor

Declined or Depressed Drive: (ie. Water would run toward the building) This condition frequently incorporates a trench drain near the foundation wall.

Inclined Drive: (ie. Water would run away from the building)

NOTE: An inclined or declined drive approach may require the dock seal or shelter be tapered from top to bottom. The amount of taper will be dependent on degree of the incline or decline.

Fabric Reinforcements: The durability of dock seals and shelters can be enhanced by adding additional layers of fabric to potential wear areas. On dock seals, the entire face of both the head and side pads, which is contacted by the vehicle being serviced at the dock, can be reinforced with additional layers of fabric. The inside portion of the dock seal's side pad that is exposed in the opening's width can also be reinforced with additional layers of material to protect this area when being contacted by wide loads during the material handling operations.

Industrial Vehicle: Fork lift trucks, powered or non-powered pallet jacks, or any other form of vehicles used to load or unload material on a transport vehicle.

Loading Dock: Building area or structure where goods are moved to and from a transport vehicle. The dock is usually elevated above a driveway where the transport vehicle is parked.

Loading Dock Operating Personnel: A person or persons engaging in the process of loading and/or unloading transport vehicles whereby the activities may include the operation of industrial vehicles, dock levelers, vehicle restraints, dock doors, etc.

Common Terms and Definitions

Opening Size: The door opening size is determined at the outside face of wall where shelter/seal will be mounted. The two opening sizes to consider are “door opening” and “seal opening” size.

A) Door Opening Size - Distance between door jamb

B) Seal Opening Size - Inside dimension of dock seal side pads

The selection of the appropriate opening size should be determined by the type and size of vehicles to be serviced and the type of material handling operation in place at a particular facility.

Rail Shelter: A retractable vestibule that when extended encapsulates the loading dock area between the building wall and a rail car positioned parallel with the facility. Rail shelters can be both flexible, spring loaded and inflatable.

Taper: The projection of the dock seal or shelter is not the same on the top and bottom. Required on decline and incline approach.

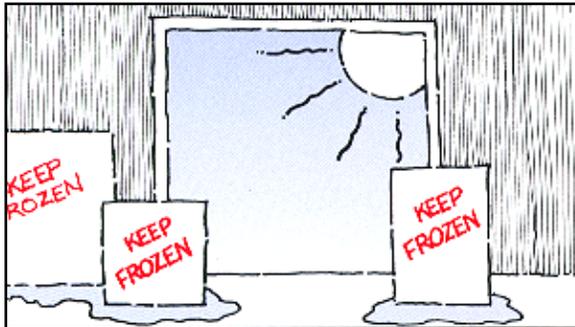
***Transport Vehicle:** A cargo-carrying vehicle (e.g., a truck, semi-trailer, trailer, or railcar) which may be entered upon by a powered or non-powered industrial vehicle or conveyors to load or unload material.

Wear Pleats: Additional individual pieces of fabric sewn on the face of the dock seal or shelter in a overlapping fashion for added wear resistance. Typically 4”, 8” or 16” exposure.

Yard Jockey: Spotter vehicles or yard jockeys are used at larger shipping facilities to position trailers at dock openings.

Why do Facilities Need Seals and Shelters?

Energy Conservation



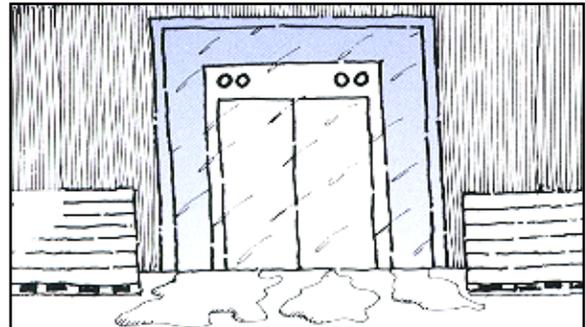
Environmental Considerations: Dock seals and shelters can help control the temperature “delta” between the “facility” and ambient exterior conditions. Reducing air flow at the dock goes a long way in conserving energy and produces tangible savings.

Employee Comfort



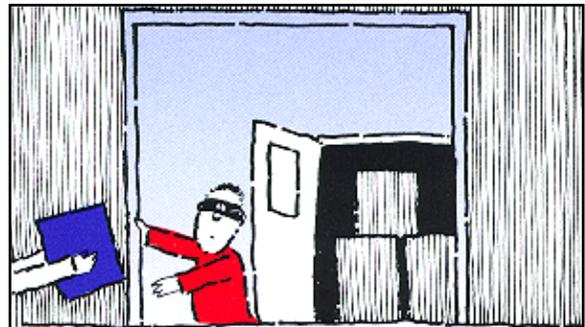
Employee Comfort: Hot or cold outside temperatures that infiltrate the building can create employee discomfort and lead to an unproductive work force. Dock seals and shelters control the facility’s environment adding to employee comfort and productivity.

Safety



Safety: The infiltration of snow and/or rain can make floors and dock levelers slippery and unsafe. Dock seals and shelters protect workers and products from outside elements and enhances overall safety at the dock.

Security and Theft

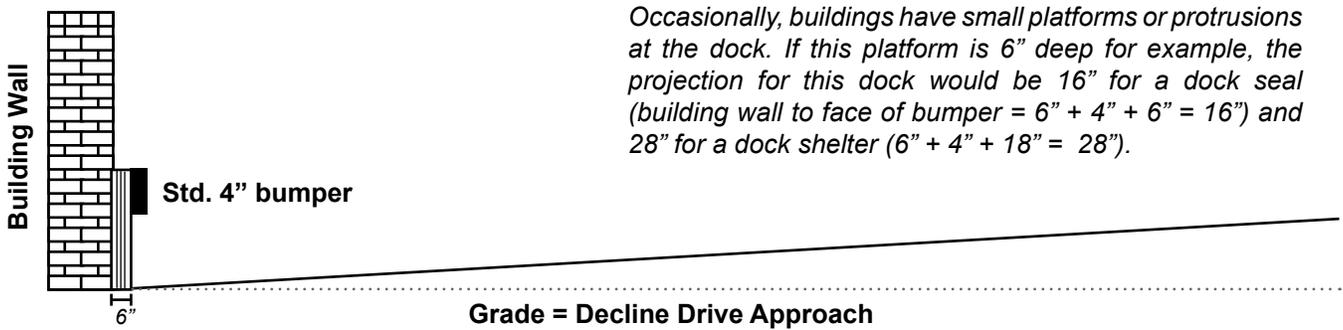
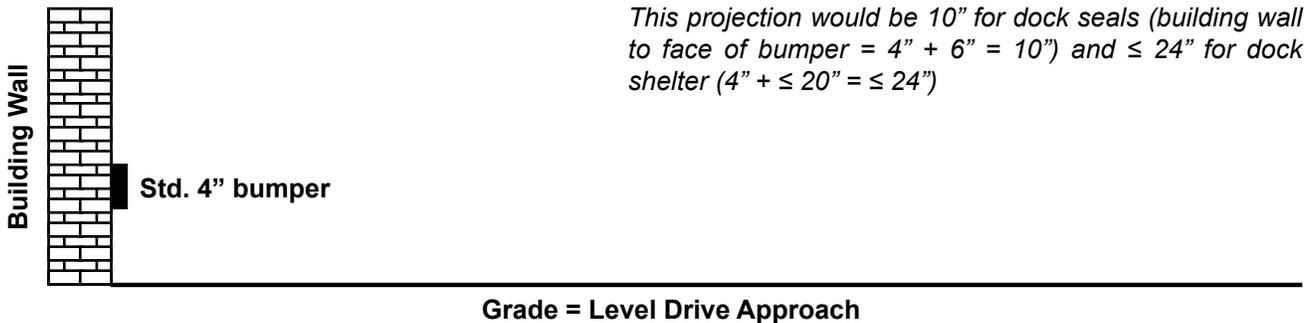


Security and Theft: Dock seals and shelters substantially limit the open area between trucks and the warehouse, which can greatly decrease the likelihood of pilferage at the dock area.

Application Considerations

Determining Proper Projection

To determine projection, take the measurement from the face of the building wall, to the face of the dock bumper and add 4 to 6 inches for dock seals and approximately 18 to 20 inches for dock shelters.

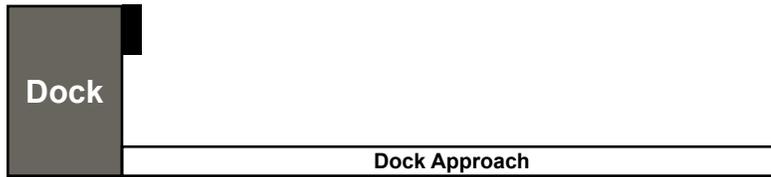


Application Considerations

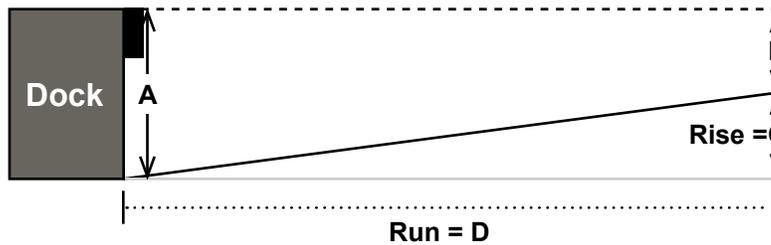
Determining Slope

Percent of slope is a necessary calculation when sizing dock seals or shelters. Without it, your seal or shelter, dock leveler, and building wall can be subject to absorbing more of the impact from approaching trucks than desired, decreasing life expectancy of the dock seal or shelter. Percent of slope will determine how much taper is required to uniformly accommodate incoming truck penetration into the seal or shelter.

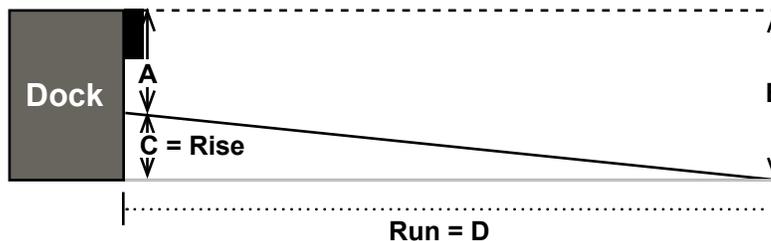
The correct slope calculation is $\frac{\text{RISE}}{\text{RUN}}$ This is the amount of height increase or decrease divided by the length of your drive. If your drive rises 10" in 50 feet of drive, the calculation would be 10" divided by 600" (50 feet x 12 inches per foot) = 1.6% slope. A general rule to follow is for every 1% of slope you need 1" of tapering. It is good practice among manufactures of dock seals and shelters to taper the units 1" for every 1% when the incline or decline is $\geq 2\%$.



This type of dock approach is level, which means there is no change in rise over run. No taper is required to dock seals.

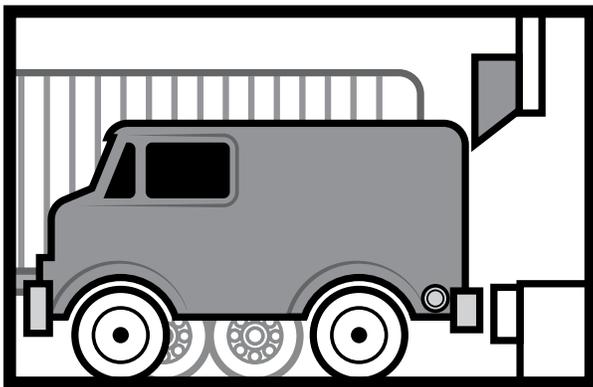


A decline type of dock requires taper. The calculation is $A - B = C$; C divided by $D =$ percent of slope. Projection at a decline dock is less at the top than bottom.



An incline type of dock also requires taper. The calculation is $A - B = C$. C divided by $D =$ percent of slope. Projection at an incline dock is greater at the top than bottom.

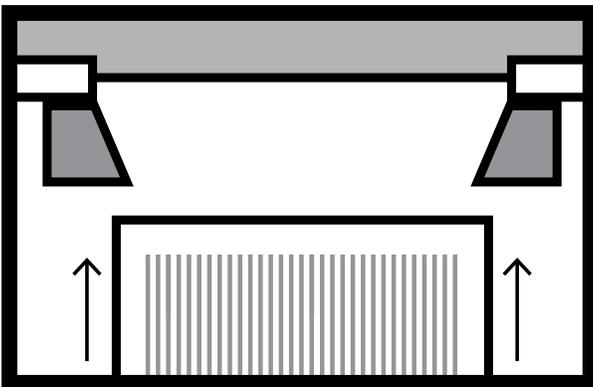
Common Design Options of Dock Seals



Beveled Head Pad

Description:

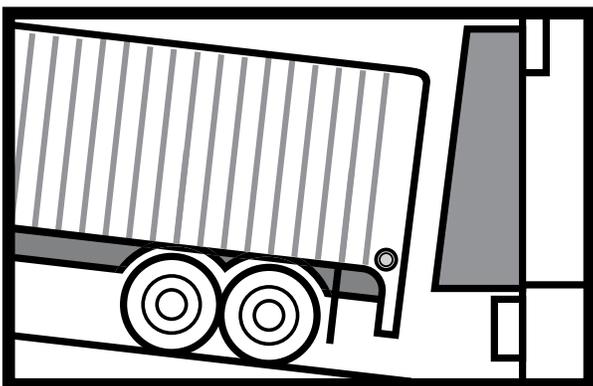
This will allow for the accommodation of a wide range of vehicle and door height variations



Beveled Side Pads

Description:

This allows standard vehicle widths to be serviced at wider door openings. The “bevel” serves the purpose of reducing the opening size.



Tapered Units

Description:

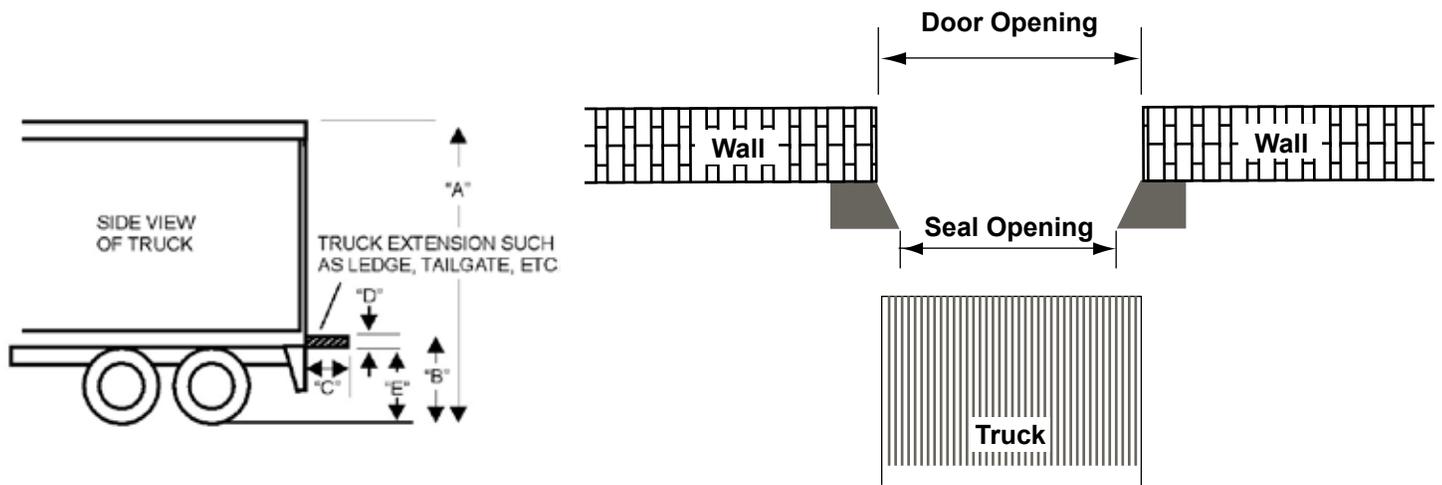
This will provide a uniform seal when accommodating an inclined or declined drive approach. This option reduces the potential of overcompression.

Application Considerations

Facility Owner Considerations:

Selecting the optimal product for a particular application is a trade-off of compromised considerations, which will direct you to the best solution for the majority of the fleet. To properly size and select a specific product for a user receiving a high range of trailer variation, it may be important to consider the common 80% of the fleet. A trained professional will consider many factors when recommending a product such as:

- **Door Sizes**
- **Building Structure**
- **Material Handling**
- **Cargo**
- **Truck Types/Sizes**



Fabric Types:

The durability of dock seals and shelters can be enhanced by the selection of quality fabric covers. Traditional fabrics were hypalons, vinyls and neoprene. Over time, performance fabrics offering premier tear and abrasion characteristics as well as UV inhibitors and fabric with fire retardant qualities have replaced the hypalon and neoprene products. The weight of a particular fabric is stated as "oz" per yard. Tear and abrasion data can be requested from manufacturer as a basis of comparison.

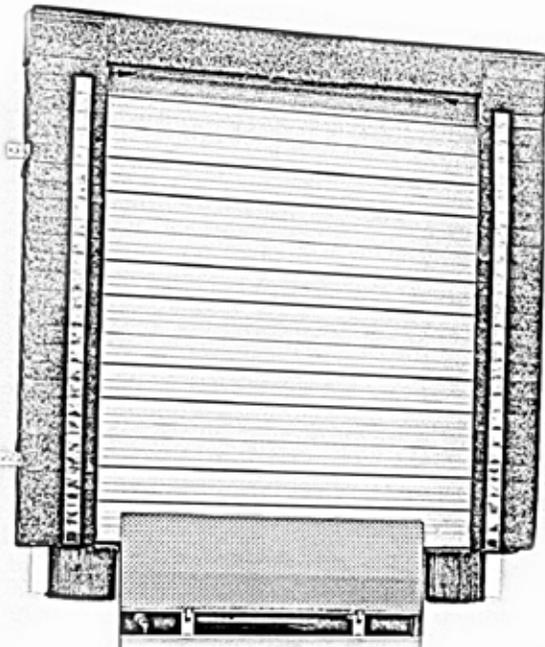
Common Types of Dock Seals

What kinds of dock seals and shelters are there?

There are many different kinds of dock seals and shelters.

Dock Seal: In general dock seals are constructed of foam covered fabric sized to compress and seal against the rear of a trailer. A dock seal is typically applied with smaller door openings and can achieve up to 90% efficiency when controlling air flow at the dock.

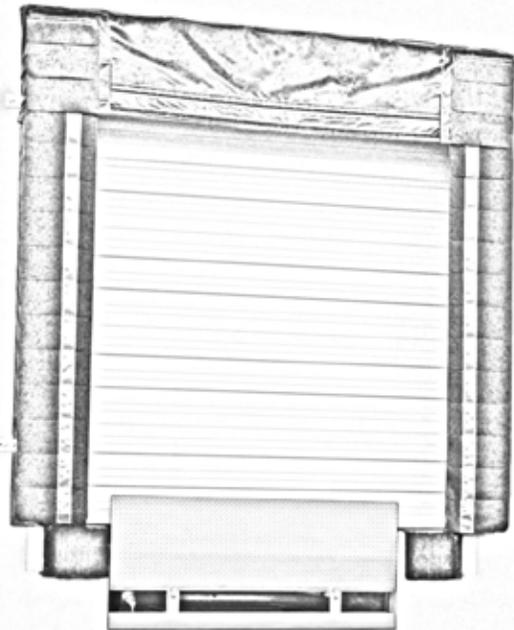
Fixed Head Dock Seal



Description:

This type of dock seal incorporates a foam filled side and head pad. It is one of the more popular and effective dock seals when the application calls for common dock parameters and uniform trucks at the dock.

Head Curtain Dock Seal

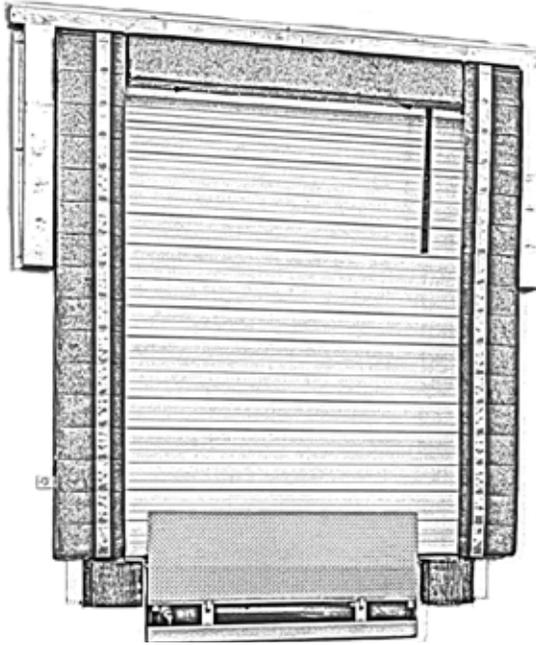


Description:

This type of dock seal incorporates foam filled side pads and is popular and effective in applications where a wide variety of trailer heights are experienced and/or a wide range of facility door heights are present. It is common for the unit to have either a fixed or adjustable fabric head curtain specific in length to service known fleets of trailers. Optional foam filled curtains can help seal the trailer and provide greater energy efficiency.

Common Types of Dock Seals

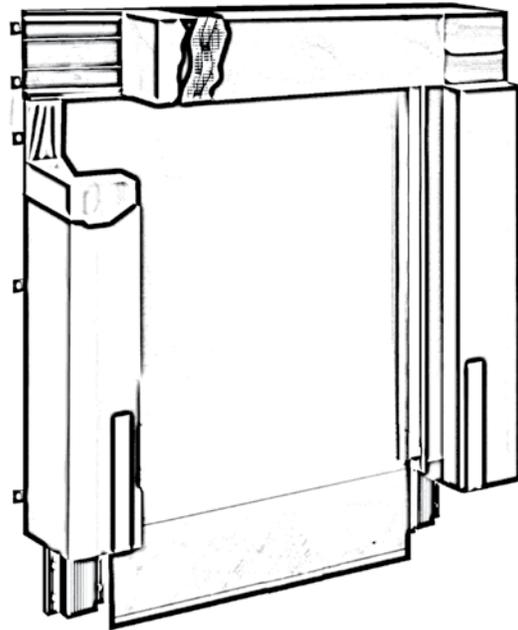
Adjustable Head Pad



Description:

This type of seal was once popular years ago but has since lessened in popularity due to the required moving parts and cost of ownership versus other acceptable models. Similar to the “Head Curtain” seal, this product can service varying height vehicles at a wide range of door heights. Similar to the “Fixed Head” dock seal it incorporates a foam pad proving a higher level of energy efficiency.

“L” Shaped Dock Seal



Description:

The name of this dock seal originates from its “L” shaped side pads. The shape of the seal and the increased projection makes it ideally suited to work on wider door openings. The shape and projection are designed to seal the sides of the trailer rather than the back enabling wider and improved access to the rear of the trailer. The “L” shaped seal can have either a “fixed head” or “curtain” header.

Common Types of Dock Seals

Inflatable Seal



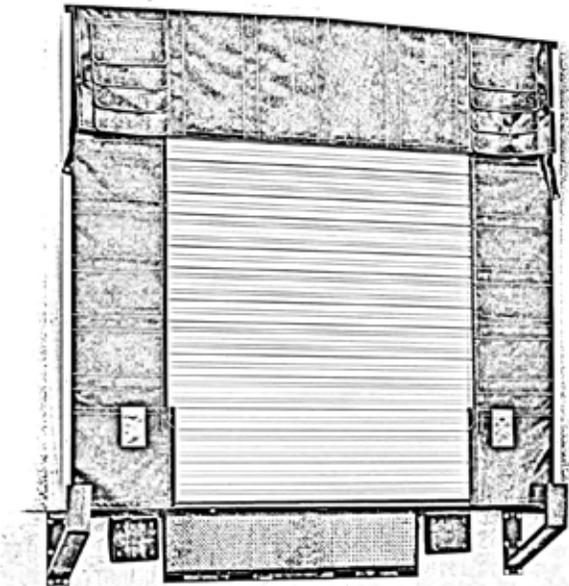
Description:

The inflatable seal incorporates an external blower/fan assembly and inflates after a trailer is positioned at the dock. Since the unit is electrical in nature, it is common to interlock these units with the dock equipment or overhead door so to activate only when truck is actively serviced. A variety of shapes and sizes are available.

Common Types of Dock Shelters

Dock Shelter: General dock shelters are constructed of wood or metal frame and can be rigid or flexible. Fabric and/or fiberglass generally attached to the outer surface and fabric curtains attach to the face of the unit and seal the sides and top of the transport vehicle as it backs through the product. A dock shelter is typically applied to larger door openings where truck configurations may vary and achieve up to 70% efficiency when controlling air flow at the dock.

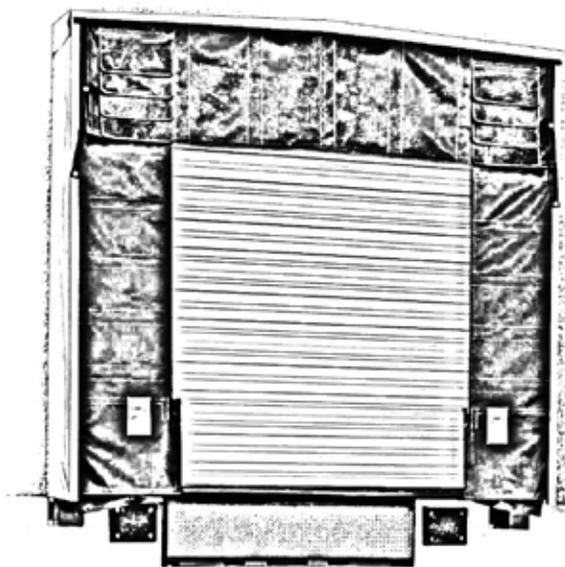
Rigid Dock Shelter



Description:

The most popular shelter, the “Rigid Dock Shelter” is widely accepted for oversized doors, a variety of trailer heights are present and where full access to the rear of the trailer is important. Rigid sides and head frames are supported by steel supports and typically are constructed with either fiberglass sides or a “light emitting” fabric to illuminate the dock area during daytime loading. The head member also acts as a “canopy” and can even support a snow load reducing the need for expensive architectural canopies popular with dock seals.

Flexible Shelters

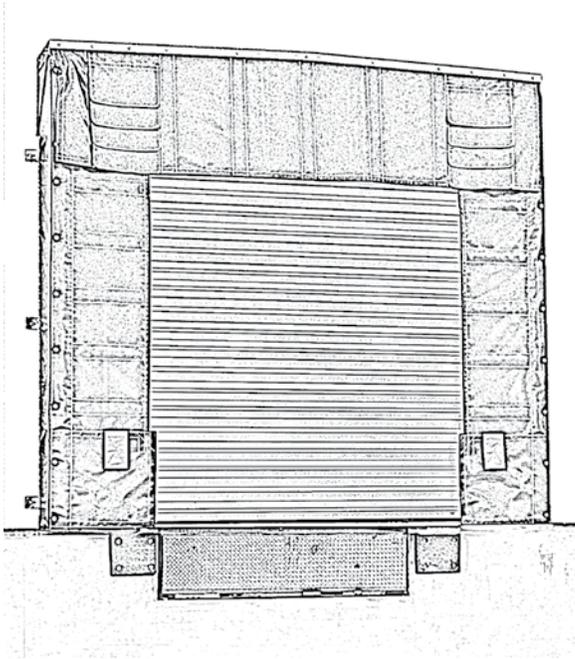


Description:

This shelter fits on oversized doors and services a wide variety of trailer types and sizes while providing wide access to the back of the trailer. The shelter is either gravity or spring biased to hold tight to the trailer, yet yield should an off-center trailer approach and impact the sides. The “flexible nature” of the product is designed to reduce building and shelter damage should an approaching truck impact the unit.

Common Types of Dock Shelters

Combo Shelter or Soft Sided Shelter



Description:

This shelter combines the flexibility of a seal with full vehicle access of a shelter. The sides are constructed similar to a foam filled dock seal, while the head member is constructed similar to a rigid frame dock shelter. The units seal the sides of the trailer and provide a higher efficiency rating than a conventional rigid shelter. It also provides a degree of protection for the building and units due to its “flexible” side member construction.

Shelter Weather Canopy

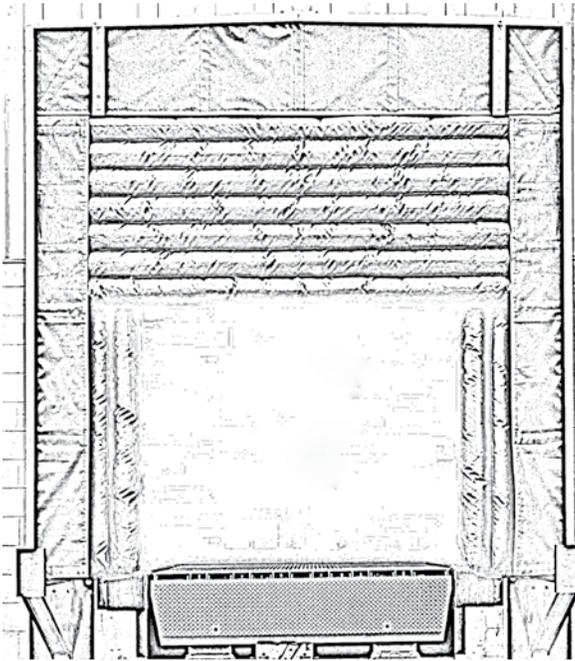


Description:

Several versions of the “Weather Canopy” are available on the market. The head member assembly can be combined with a “Shelter” or “Seal” to provide a higher degree of rain protection than conventional rigid shelter tops and seal curtains. It is also ideally suited where application dictates a “decline” dock and where trailer heights are fairly consistent.

Common Types of Dock Shelters

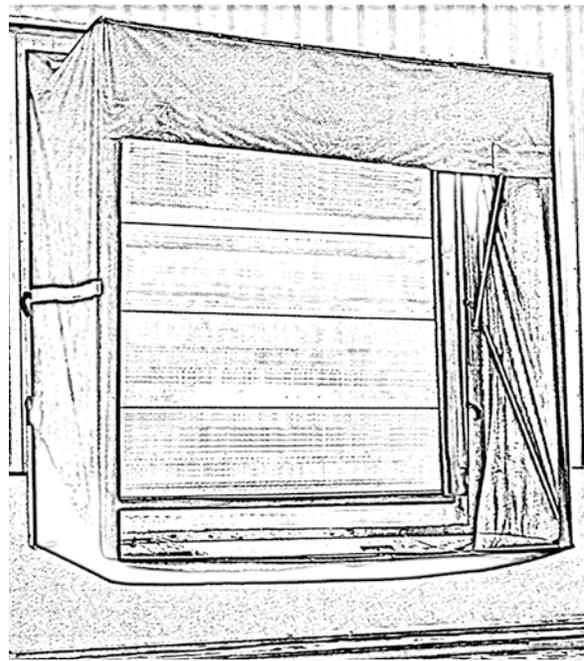
Inflatable Shelter



Description:

Similar to other shelter products this unit seals the sides of the trailer permitting full access to the rear of the trailer. An integral blower assembly inflates the side members. Since the unit is electrical in nature, it is common to interlock these units with the dock equipment or overhead door so to activate only when truck is actively serviced. A variety of shapes and sizes are available.

Mechanical Rail Shelter

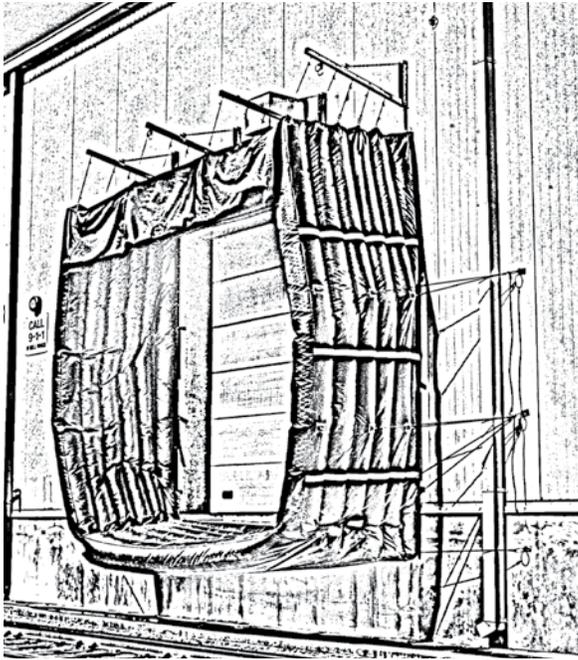


Description:

A basic shelter that is spring loaded or counterweighted and designed to extend once the rail car is positioned at the opening. The unit is available in an array of sizes given the doors in a rail area are often oversized to allow flexibility to the positioning of a heavy rail car. These shelters can be three sided or four sided to reduce air flow at the opening. It is good practice to combine the shelter with an overhead “canopy” to protect the unit in the stored position.

Common Types of Dock Shelters

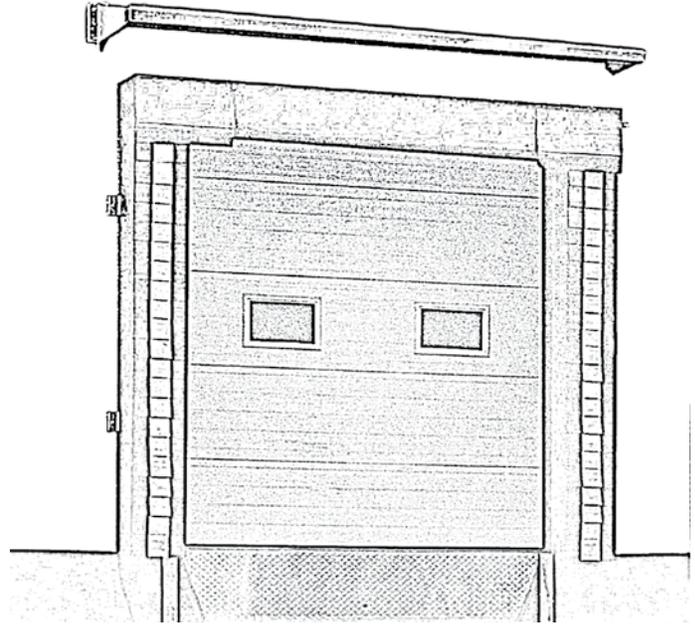
Inflatable Rail Shelter



Description:

Becoming increasingly popular at rail sidings is the "Inflatable Rail Shelter." The unit incorporates an external blower(s) and is designed to extend against the rail car once it is positioned at the rail siding. The inflatable bag adheres to the contours of the rail car providing a better seal than a mechanical unit. An optional fourth sided draft extension can also help reduce air flow at the dock. Since the unit is electrical in nature, it is common to interlock these units with the dock equipment or overhead door so to activate only when rail car is actively serviced. A variety of shapes and sizes are available.

Metal Hoods



Description:

Many facilities design architectural type canopies extending four (4) feet or more over the dock area. The combination of a canopy and shelter or seal provides the most protection against inclement weather. Alternatively, a manufactured canopy or hood is available from most loading dock equipment manufacturers and can be an economical alternative at the dock area. It is highly recommended you consider some type of canopy to augment curtain style seals, inflatable seals, flexible shelters and all rail products, especially in northern climates.

For More Information

How do I find out more?

You can contact the Loading Dock Equipment Manufacturer's website at www.MHI.org/LODEM

At the time this resource document was published, LODEM consisted of the following member companies:

4-Front Entrematic
Blue Giant Equipment Corporation
Bluff Manufacturing, Inc.
NOVA Technology
Pentalift Equipment Corporation
Rite-Hite Corporation
Systems, Incorporated

DISCLAIMER OF LIABILITY. LODEM, the Material Handling Industry, MHI, and their members assume no responsibility and disclaim all liability of any kind, however arising, as a result of acceptance or use or alleged use of this Guide. User specifically understands and agrees that LODEM, the Material Handling Industry, MHI, their members, their officers, agents, and employees shall not be liable under any legal theory of any kind for any action or failure to act with respect to the proper selection of a material handling system as well as matters such as the service for which it will be used, the frequency of its use, matching its speed with manufacturing needs, budget or any other activity covered by This Guide. Any use of this information must be determined by the user to be in accordance with applicable federal, state, and local laws and regulations.

DISCLAIMER OF WARRANTY. LODEM, the Material Handling Industry, MHI, and their members make NO WARRANTIES of any kind, express, implied, or statutory, in connection with the information in this Guide and SPECIFICALLY DISCLAIM ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR PARTICULAR PURPOSE.

INDEMNIFICATION. By referring to or otherwise employing This Guide, the user agrees to defend, protect, indemnify, and hold LODEM, the Material Handling Industry, MHI, their members, their officers, agents, and employees harmless from and against all claims, losses, expenses, damages, and liabilities, direct, incidental, or consequential, arising from acceptance or use or alleged use of this Guide, including loss of profits and reasonable attorneys' fees which may arise out of the acceptance or use or alleged use of this Guide. The intent of this provision and of the user is to absolve and protect LODEM, the Material Handling Industry, MHI, their members, their officers, agents, and employees from any and all loss relating in any way to this Guide, including those resulting from the user's own negligence.

LODEM

LOADING DOCK EQUIPMENT MANUFACTURERS

Loading Dock Equipment Manufacturers Product Section of
The Material Handling Industry, MHI
8720 Red Oak Boulevard, Suite 201
Charlotte, NC 28217-3992
Telephone: (704) 676-1190
Fax: (704) 679-1199
www.MHI.org/LODEM

© LODEM 2013

LODEM
LOADING DOCK EQUIPMENT MANUFACTURERS