



LOADING BELLOW

DUST-FREE AND
EFFICIENT DRY
BULK TRANSFER

www.polimak.com



What is a LOADING BELLOW?

In bulk material handling, loading bellows are extendable enclosures designed for the safe, efficient, and dust-free loading of bulk materials into trucks, tankers, ships, and stockpiles. Loading bellows are generally installed below silos and hoppers or at the outlets of screw feeders and pneumatic conveying systems. Also known as telescopic chutes, they prevent product loss and dust formation while transferring the material from the upstream to the downstream unit.



How does a LOADING BELLOW work?

The dry bulk material is discharged through the flexible column using the material's own weight. Dust formation is inevitable during this operation and is collected as it moves upward. The flexibility of the column is provided by the mechanical winch system, which allows to adjust the height of the column.



There are mainly two types of loading systems using a loading bellow.

1. Open Loading:

The bulk material comes into direct contact with the environment during loading into open trucks, ships, and stockpiles. As loading begins, the bellow is lowered towards the flatbed of the truck, ship, or storage area and stops when it reaches the bottom. Then the material starts falling freely through the bellow.

To minimize dust formation, a flexible dust skirt is placed at the outlet of the bellow, along with a dust collection system that provides additional vacuum airflow. The collected dust is returned to the product stream, minimizing unnecessary product waste.

As the amount of discharged product increases, the loading bellow is lifted, thanks to the continuous monitoring of the system by the level sensors. When the loading process is complete, the bellow is retracted to its top standby position and product discharge valve above the bellow is closed.



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2. Closed Loading:

It is used to fill closed containers in tanker trucks, barges, and ships. The inevitable dust formation during the loading is minimised by the poliurethane coated discharge cones that fit vessel inlet.

When loading begins, the loading bellow is lowered until it reaches the inlet of the tanker. As the product falls freely through the bellow, the air inside the tanker is displaced and flows back through the bellow, eventually being released through the air vent. Once the tanker is full, the level sensor stops the discharge process. When loading is finished, the bellow is retracted to its top standby position.

Loading Bellow Types

Single Outer Bellow

It contains one bellow that enables product discharge and dust collection at the same time in an economical way.



Double Bellows

In this model, there is one outer bellow and one inner bellow. The inner bellow is responsible for discharging the product downwards, while the dust is directed upwards through the space between the two bellows. Since the product and dust flows are kept separate in this configuration, the system is more efficient than the single outer bellow.

Single Outer Bellow With Internal Wear Cones

The wear cones at the center of the system prevent the material from coming into contact with the bellow fabric, thereby reducing abrasion. Wear cones made from different materials (carbon steel, hardox steel, stainless steel) can be designed for various applications. Additionally, they can provide protection against heat damage.



Double Bellows With Internal Wear Cones

Wear cones are installed inside the inner bellow. This configuration not only prevents abrasion but also offers the benefits of double bellows.

	Single Bellow	Double Bellows	Outer Bellow + Internal Cone	Double Bellow + Internal Cone
Granular, No Dust Content, Nonabrasive	✓			
Granular, With Dust, Nonabrasive		✓		
Granular, No Dust Content Abrasive			✓	
Granular, With Dust, Abrasive				✓
Powdered, Little Dust Content, Nonabrasive	✓	✓		
Powdered, With Dust, Nonabrasive		✓		
Powdered, Little Dust Content, Abrasive			✓	✓
Powdered, With Dust, Abrasive				✓
Granular or Powdered Materials With High Temperature >90°C			✓	

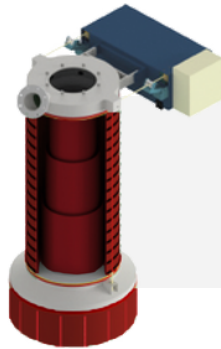
LOADING BELLOW SELECTION TABLE

Loading Bellow Types

In addition to these models, we offer also heavy-duty loading bellows. They have the following options:

Single Loading Chute

A large volume of discharge is enabled by a wide-diameter telescopic steel pipe, which is operated by a winch mechanism.



Single Outer Bellow with Internal Loading Chute

In this configuration an outer bellow covers the telescopic chute. This provides a more efficient dust collection mechanism.

Loading Chute with Double Dust Collection Bellows

For discharging bulk material with a high level of dust, a larger flexible dust skirt is installed, along with two dust collection bellows.

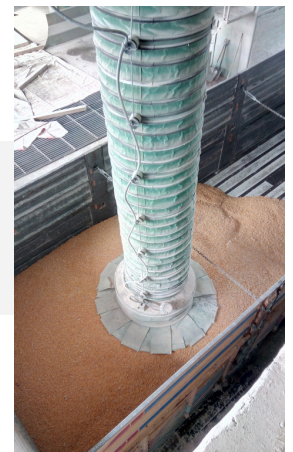


Loading Bellow Models

Polimak offers mainly four loading bellows models, each designed to meet the specific operational needs of the customer.

Open Truck Loading Bellows

Open truck loading bellows are used for dust-free loading of powdered and granular bulk solids into flatbed open trucks. Free-flowing dry bulk solids in powder and granule form are easily transferred from silos, hoppers, containers, and screw feeders to open trucks. The built-in flexible dust skirt prevents dust emissions outside the loading area.



Loading Bellow Models



Tanker Truck Loading Bellows

Bulk tanker loading bellows are used for dust-free loading of powdered and granular bulk solids into bulk tanker trucks. Free-flowing dry bulk solids in powder and granule form are efficiently transferred from silos, hoppers, containers, and screw feeders to tanker trucks.

Ship Loading Bellows

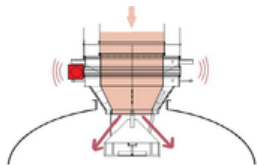
Ship loading bellows are used for dust-free loading of powdered and granular bulk solids into dry bulk ships. Free-flowing dry bulk solids in powder and granule form are efficiently transferred from silos, hoppers, containers, and screw feeders to dry bulk carrier ships. The built-in flexible dust skirt prevents dust emissions outside the loading area.



Stockpile Loading Bellows

Stockpile loading bellows are used for dust-free discharging of powdered and granular bulk solids into stockpiles. Free-flowing dry bulk solids in powder and granule form are efficiently transferred from silos, hoppers, containers, and screw feeders to the stockpile basement. The built-in flexible dust skirt prevents dust emissions outside the loading area.

Feeding Equipment Used with Loading Bellows



Vibration Motor

Vibration motors are used for discharging residues of bulk solids from the inner bellow parts.



Sampler

During loading, a manual or automatic sampler takes out some amount of material from the material flow.



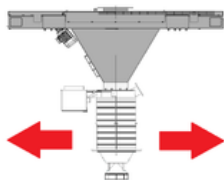
Spreader

Spreader is used to distribute the material uniformly inside the tanker truck.



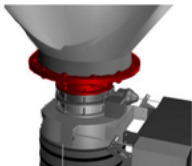
Safety Light

Signals while loading process continues and warns the operator not to move the loading medium.



Positioner

Instead of repositioning the bulk truck, positioning system moves the loading bellow to the desired location rapidly and accurately.



Connection Adapter

Connection adapter is used to connect the loading bellow product inlet to the source system with different dimensions.



Bottom Closure Cone

Bottom closure and sealing cone is used in tanker loading bellows to prevent any product spillage after loading.



Magnetic Seperator

Magnetic separators are used to detect metallic particles in bulk solids and separate them from main product stream.



Butterfly Valve

Used to start and stop product flow in short time.



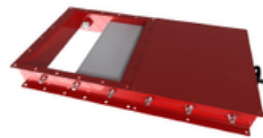
Weighing System

Weighing hoppers, dosing belt scales, silo weighing systems and truck weighing scales to send signal to command loading bellow to start or stop loading.



Lump Braker

Lump breakers are used to break compacted lumps of bulk solids.



Slidegate Valve

Product flow speed can be controlled by adjustable valve blade.

Bulk Materials Handled by Loading Bellows

Depending on the handled dry bulk material being handled, our loading bellows are manufactured from carbon steel, stainless steel or other types of steel. These bellows are used in various industries to handle different dry bulk materials.



Food industry

Some food bulk materials can be handled with standard loading bellows because of their physical characteristics. However, fine particle sized dry bulk materials like baby food, high fat milk powder etc., require the use of food grade loading bellows. Cornstarch, protein powders, cornflour, and spices are some of the dry bulk materials that can be handled with our loading bellows.



Plastic industry

Plastic powders are simply bulk raw materials used in the synthesizing of plastic. Plastic powders such as PVA PVC powder, polyethene powder and protein powders, are some of the dry bulk materials that can be handled with our loading bellows.



Mining and aggregate industries

Mining and aggregate industries are concerned with the handling of abrasive dry bulk solid materials. Due to the nature of the industries, ideal loading bellows are wear-resistance loading bellows constructed from hardox steel. Iron ore concentrates, copper powder, limestone, foundry sand, coal ash, cement etc., are some of the bulk materials processed by our loading bellows.



Chemical industry

Similar to the food industry, loading bellows used in the chemical industry must be corrosion resistant and able to withstand harsh conditions. Standard and food-grade loading bellows are an ideal choice for bulk material handling in this sector. Some of the handled bulk materials are urea, soda ash, chlorine powder, sulfur powder, activated carbon etc.

Loading Bellow Benefits

- Dust-free loading and a clean working environment
- No product waste
- Time-saving with the bellow's automatic raise feature
- Suitable for dry bulk material with temperatures up to 300°C
- Simple operation and easy maintenance
- A wide range of configurations tailored to user's needs

Other Polimak Products



Pneumatic Conveying Systems



Silo Top Jet Filter



Rotary Valves



Loading Bellows



Big Bag Unloader



Mobile Bulk Truck Loader



Roots Blowers



Storage Silos

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