



# Bulk Solids Industry Capabilities







## *Centro Bulk Solids Industry Capabilities*

### Integrated Bulk Solid Solutions for Industry

- Optimize manufacturing by integrating best in class product to meet/exceed Customer Goals:
  - Lower Manufacturing Costs
  - Increasing Process Reliability
  - Enhancing Process Information/Feedback for Operators
  - Improving Product Quality
  - Lowering Energy Costs
- Achieve your goals by finding opportunities for improvement in the context of the total manufacturing system including:
  - Bulk Solid Mechanical, Bulk Solid Pneumatic, Bulk Solid Unloading/Loading Equipment, Bulk Solid Storage, Bulk Solid Conveyance-Mechanical, Bulk Solid Conveyance-Pneumatic, Bulk Solid Components & Accessories, Dust Collection, Fume Management



## *Centro Bulk Solids Industry Capabilities*

### Dry Bulk Process Equipment

- Bulk Solid Unloading/Loading Equipment:
  - Rail Car
  - Truck
  - Bulk Bag
  - 25kg bag
  - drums
  - totes
- Bulk Solid Storage
  - Silo
  - Day Bins
- Bulk Solid Conveyance-Mechanical
  - Bulk Bag Filler/Discharger
  - Belt Conveyor
  - Drag Conveyor
  - Bucket Elevator
  - Screw Conveyor
  - Vibratory Conveyor
  - Tube Conveyor
  - Tubular Conveyor

### Dry Bulk Process Equipment

- Bulk Solid Conveyance-Pneumatic
  - Pressure or Vacuum Convey
  - Dilute or Dense Phase Convey
  - Eductor
  - Vacuum Loader
- Bulk Solid Components & Accessories
  - PD Blowers
  - Pneumatic Receiver
  - Airlock
  - Mixers
  - Delumper
  - Myrlen Airsweeps
  - Air Knives
- Dust Collection
  - Blowers
  - Fan
- Fume Management
  - Electrostatic Precipitator



## *Centro Bulk Solids Industry Capabilities*



## Truck Unloading Systems



- Properly Sized Truck Unloading System:
  - Unload Truck in a timely manner
  - Reduce Product Degradation



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### Bulk Bag Unloading

- The Proper Bulk Bag Unloading System will allow:
  - 1 person operation
  - Reduce Dusting, providing a cleaner environment for personnel.
  - Partial Bag Charging if needed
  - Providing Precise Charging with the use of Load Cells



### Bag Break Station for 25 kg bags and minor adds

- Bag Break Stations
  - Reduce Dusting Issues while adding powders.
  - Allows precise charging of raw materials





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### Tote Dumper

- Tote Lift, Seal and Dumpers allow:
  - Efficient way of discharging totes
  - Reduce dusting issues
  - Allows partial tote discharge



### Silos

- Properly Sized Silos allow:
  - Efficient Inventory Control
  - Reduce Raw Material Costs by buying in bulk





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### Storage Bins

- Allow Accurate Control of Inventory
- Increase Production Efficiencies
  - Having Smaller Batches ready to charge

### ASME Vessels

- Custom ASME Vessels
  - Allow us to provide exactly what the customer needs

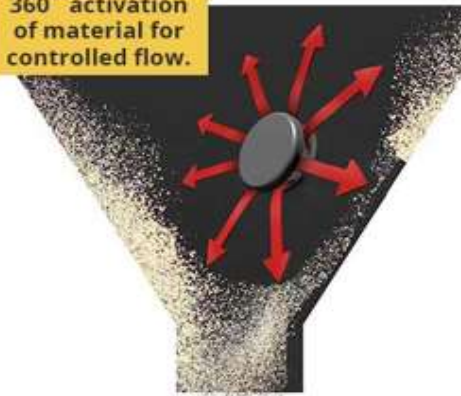




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360° activation  
of material for  
controlled flow.



### Storage Accessories

- Level Indication and Flow Aids
  - Allow Control of Processes controlling your raw material inventories.
  - Help keep the products moving through the system
    - Prevent Product Build-up, Bridging, Ratholing
    - Ease Flow of Materials

### Storage Accessories

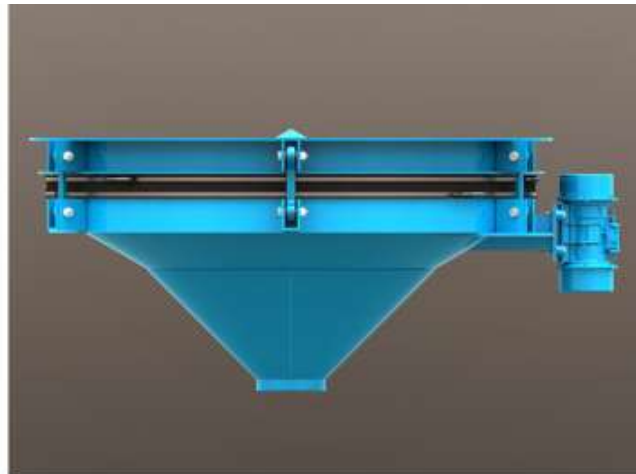
- Load Cells and Strain Gauges
  - Accurate Weighment of batches or continuous loading or unloading of product.
  - Repeatability of recipes.

KM KISTLER-MORSE  
Division of Senco





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### Bin Activators

- Prevent Ratholing, build-up of product, keep materials flowing.
- Allow de-densification without the addition of air.



### Bulk Bag Dischargers & Fillers

- Allow the customer to either empty or fill bulk bags of raw materials or final product.
- Allow easier and safe handling of bulk bags by personnel.



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### **Screw Feeders**

- Gravimetric or Volumetric Screw Feeders allow batch or continuous feeding of raw materials
- Accurate Feedrates of raw materials

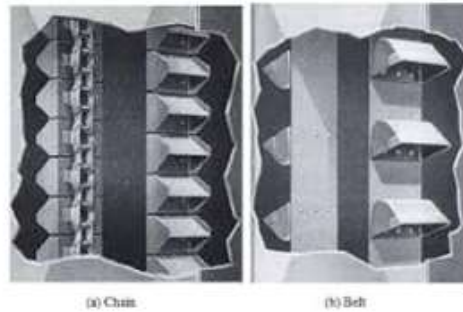


### **Drag Conveyors**

- Used in Feed Mills, Fertilizer Plants, Ag Applications
- Large Capacities



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### Bucket Elevators

- Elevate Product in a gentle way.
- Used in Chemical, Ag, Minerals, etc...

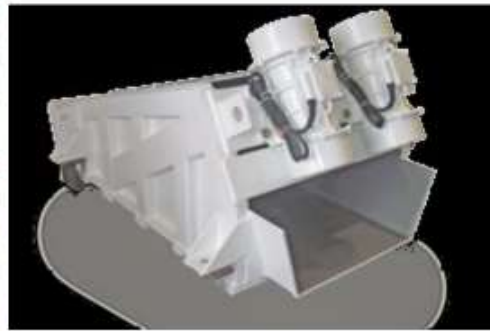


### Screw Conveyors

- Screw Conveyors can be used to convey product.
- Feeder Conveyors can be used to feed product at a rate depending on rpm, bulk density and flight sizing.



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### Vibratory Conveyors

- Gentle Convey of Friable Products
- Great way to Ramp up or Slow Down Feedrate using VFD's
- Can be used to Convey, Heat, Cool or Screen Products.

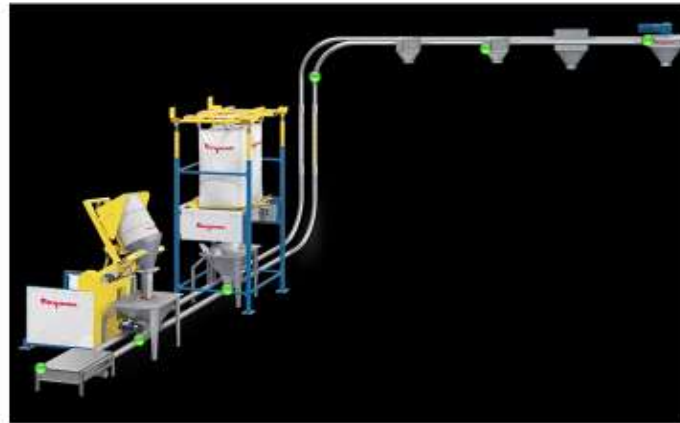


### Tube Conveyors

- Great way to Convey Friable Products
- Easy Cleanout if Designed Correctly
- Very Few Moving Parts, Low Maintenance



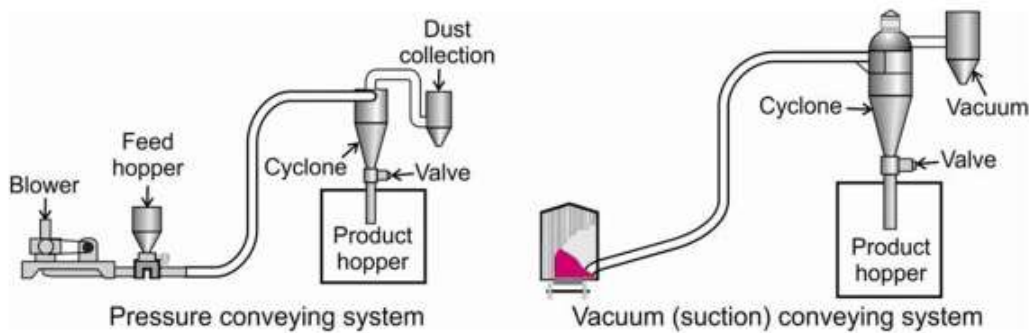
## *Centro Bulk Solids Industry Capabilities*



### Tubular Drag Conveyor

- Flexible Routing
- Multiple Inlets/Discharges
- Gentle Convey for Friable Products

## Bulk Solid Conveyance-Pneumatic

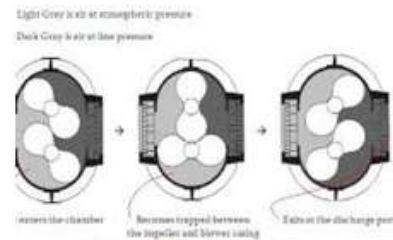




## Centro Bulk Solids Industry Capabilities

### Positive Displacement Blowers

- PD Blowers can be used for Positive Conveyance or Vacuum Conveyance.
- 15" Hg to 15 psig pressure ranges



### Dilute vs. Dense Phase Conveying

#### Dense Phase Conveying

##### Dense Phase - Full Pipeline

The difference in pressure is higher  
Material velocities are at their lowest  
Material fills the pipeline

##### Dense Phase - Slug Flow

dense phase dune flow  
The difference in pressure is medium-high  
Material velocities are low  
Material forms dunes while being conveyed

##### Dense Phase - Bed Flow

The difference in pressure is medium  
Material velocities are medium to high  
The saltation velocity is achieved for some particles in the material which partially fluidises to convey above a bed of material moving slower

##### Lean Phase (Dilute Phase)

The difference in pressure is lower  
Material velocity is highest  
The saltation velocity for all the particles is achieved which causes the material as a whole to be conveyed within the gas stream





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### Regeneration Blowers

- Regeneration Blowers can be used in Pressure or Vacuum Conveyance.
- They can be used for Air Knife Applications. Great Energy Savings over Knives using Compressed Air.

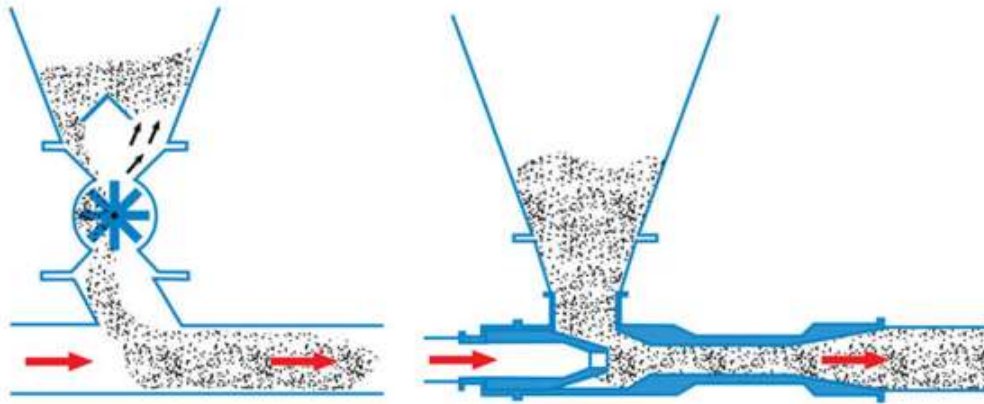
### Industrial Fans and Blowers

- Centrifugal Fans and Blowers can be used for Blow Off, Pressure, Vacuum etc...
- They can be used for Fume or Dust Removal.
- Clean Air Handling or Material Handling Fans.





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### Airlock vs. Eductor

- Airlocks Wear when Conveying Abrasive Products
- Airlocks Leak Pressure allowing fluidization of product, not allowing product to fill pockets, reducing throughput
- Eductors have no moving parts



### Vacuum Loaders

- Vacuum Loaders are great for short up and in's.
- Allow Personnel to stay at ground level to load product up and into vessels.
- Prevent Personnel injuries due to lifting and dumping 50lb bags, etc...

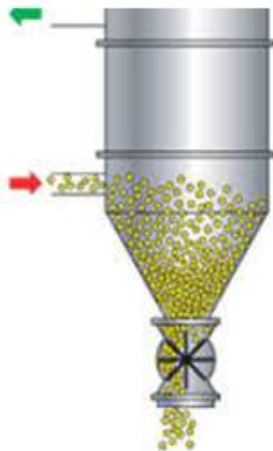


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### Cyclones

- Cyclones allow the drop out of product through cyclonic action of airstream.



### Pneumatic Filter Receivers

- Pneumatic Filter Receivers can be used for Pressure or Vacuum Conveyance.
- A drop-out point for materials being conveyed.



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### Dust Collection- Dust Hog

- Modular Heavy-Duty Design
- Easy Filter Change Out
- Can Utilize an Integral fan or Remote Fan Application



### Bin Vents – Style II Dust Filters

- Bin Vents Allow Venting of Conveyance Air from Silos and Bins.
- Can be Top or Bottom Load Style.
- Can have Bags or Cartridges.



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### Bag In – Bag Out Option – Dust Hog



### Dust Arm/ Fume Arm

- Allows for Precise Fume/Dust Extraction.
- Flexibility for different applications.





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### Welding Portable Dust Hog unit



### Dust Hog Down- Draft Tables

- Reduce dusting in the Environment.
- Pulls dust away from Operator.
- Easy Filter Change and Dust Pan Removal.





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### Airlocks & Double Dump Valves

- Isolation of Filter Pressure or Vacuum from Atmospheric Pressure to allow Product Removal.
- Allows for a steady Feed Rate.



### Roto Disc – Spherical Valve

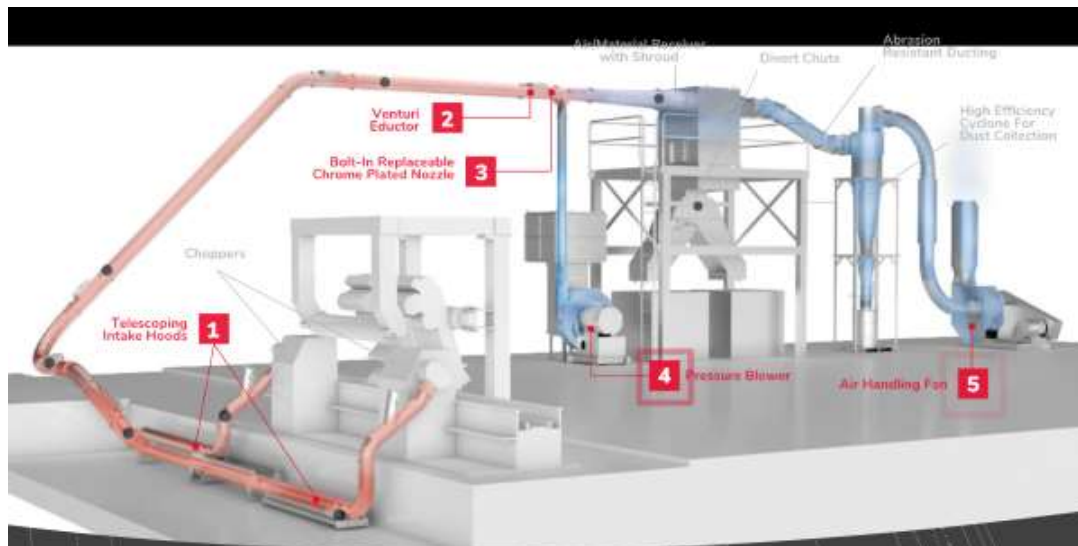
- Can be used for Double Dump Valves on Left Pic
- Full Open Bore Valve
- Inflatable Seal for Positive Sealing



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### Smog Hog – ESP or PEACH Filtration

- Electrostatic Static Precipitator uses an Ionizing Charge to remove the fine fumes or smoke particles.
- The Peach Filtration uses 4 paths to help remove the fumes,



### Quick Draft Conveying/Exhaust Systems

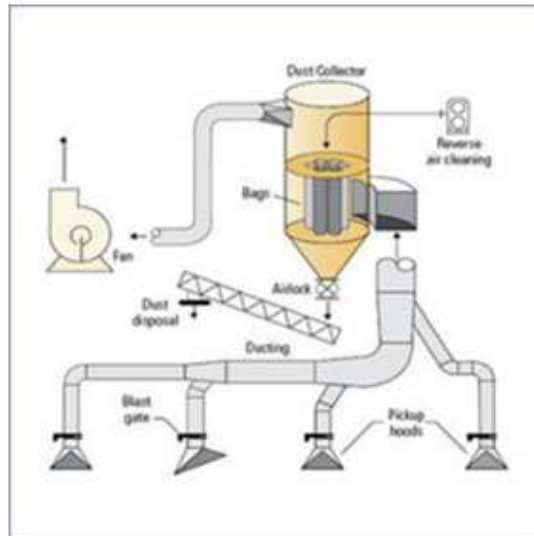
- Fume/Heat Exhaust.
- Paper Trim or Metal Stamping Trim Removal.
- No Moving Parts (Eductor Style)



## *Centro Bulk Solids Industry Capabilities*

### Dust Collection System

- A Well Designed System Can Capture Combustible Dust
- It Will Also Clean Up the Environment Improving Your Personnel Health and Safety.



### Ductwork Layout

- Ductwork Layout and Sizing is very important to prevent your product from salting out in the bottom of your ductwork.
- Conveyance Velocity is very important!



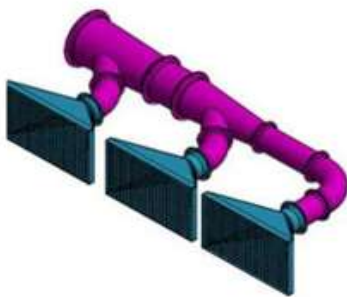
## Centro Bulk Solids Industry Capabilities



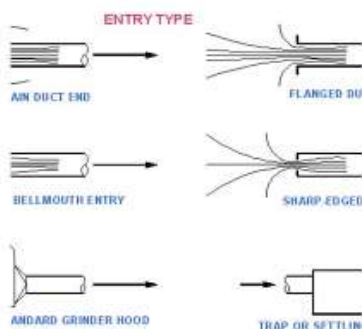
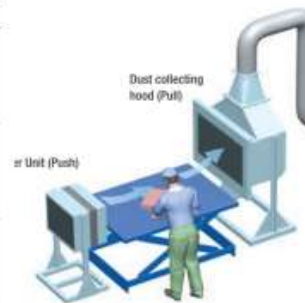
Nordfab In-line Spark Trap  
(shown with viewing spools  
on either side)

### Quick Fit Ducting Accessories

- Easy Installation/Cheaper Installations.
- Flexible Installations/Easy Changes.



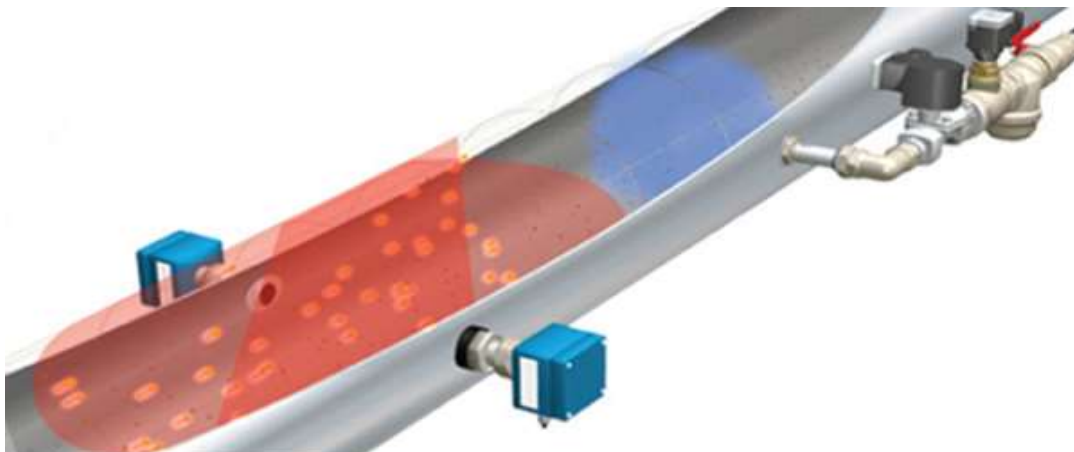
Hood type	Description	Hood entry loss coefficient (K)
	Plain opening	0.93
	Flanged opening	0.49
	Bell mouth inlet	0.04



## Hood Design

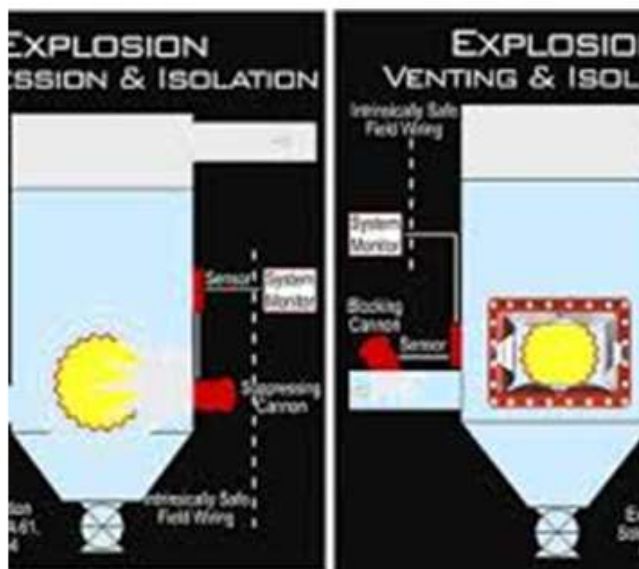


## *Centro Bulk Solids Industry Capabilities*



### Deluge Systems

- Detect/Extinguish System



Explosion  
Suppression,  
Isolation and  
Venting



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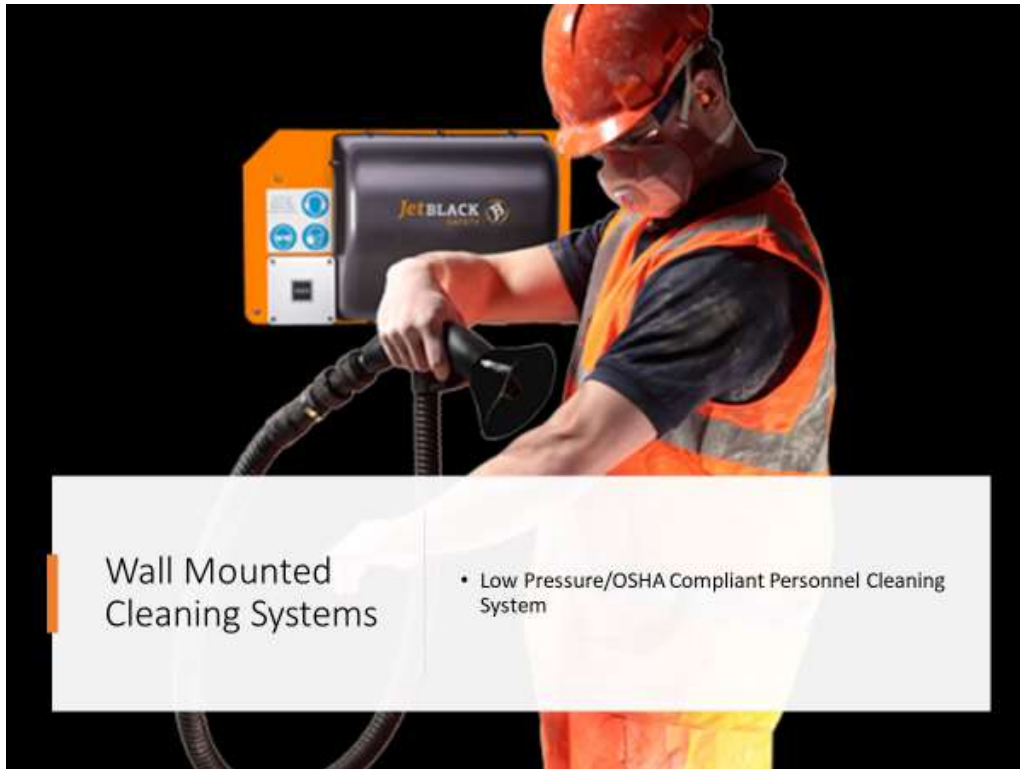
Abort Gate, Back Draft Damper,  
Flameless Vent and Bucket  
Elevator Protections



Air Knife Systems

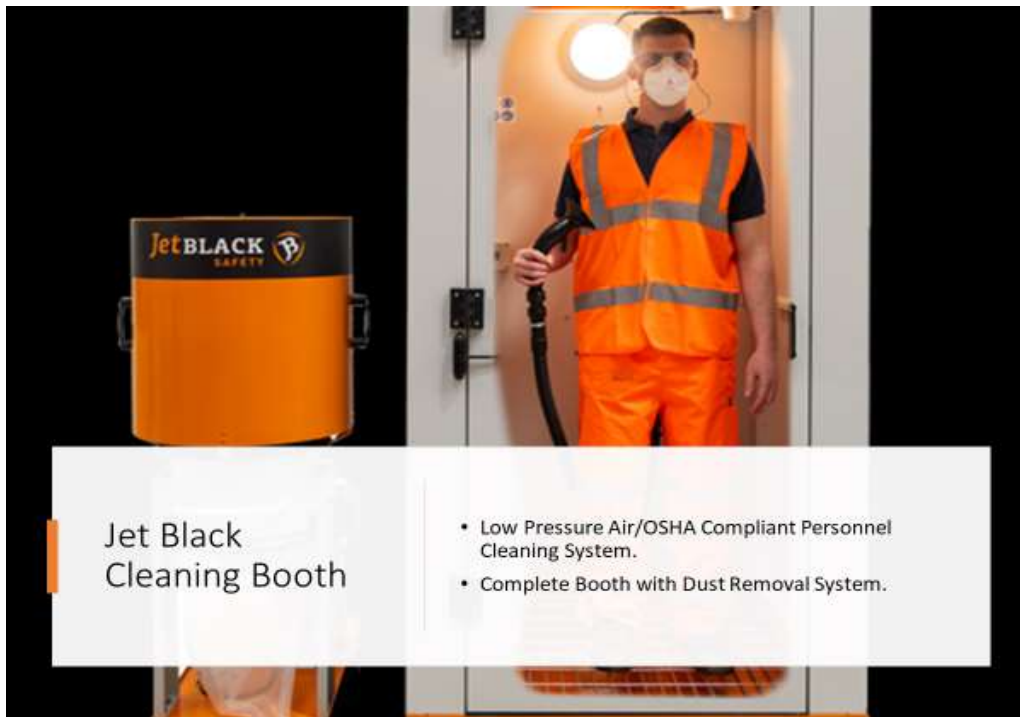


## *Centro Bulk Solids Industry Capabilities*



### Wall Mounted Cleaning Systems

- Low Pressure/OSHA Compliant Personnel Cleaning System



### Jet Black Cleaning Booth

- Low Pressure Air/OSHA Compliant Personnel Cleaning System.
- Complete Booth with Dust Removal System.