

PNEUMATIC CONVEYING

Dense Phase



DEFINITION AND WORKING PRINCIPLE

The positive pressure and dense phase pneumatic conveying system provides for transferring powdery and granular products in remote control mode using high pressure and a slow velocity.

This way of conveying is mainly used for abrasive, fragile, and/or explosive products.

Product transfer takes place in successive batches and plugs.

Each conveying cycle includes the following stages:

- Filling stage during which the filling valve is open as well as the vent valve. The product fills the vessel (tank) and displaces the air which is inside the tank.
- The high level control device issues a closing signal to the feed valve and the vent valve.
- The outlet pinch valve (if fitted) remains closed.
- The compressed air inlet valve opens and the compressed air enters the vessel from the top.
- The product mixes with the air and starts to fluidize.
- When the pressure in the vessel reaches the level required for conveying, the outlet valve opens and the product is pushed forward into the conveying pipeline. The product moves in successive plugs until the vessel and the pipeline are empty.
- A single pressure switch controls the pressure in the vessel and as soon as the pre-set limit of the cycle end has been reached, it stops the air compressed supply. The residual air allows purging the circuit until the pressure differential has been dispersed.

COMPOSITION AND MAIN CHARACTERISTICS

In dense phase, the shipping vessel is made of six main parts:

- One robust carbon steel or stainless steel Blo-Bin vessel with capacity selected for the flow rate,
- One high level probe
- Outlet booster type pipe with pinch valve if necessary
- Inlet Chute with vent valve or vent valve directly mounted to the Blo-Bin vessel.
- Filling and isolating pneumatic valves
- Control command cubicle with PLC Control panel

Typical Principle Sketch



ADVANTAGES

- Dedicated solutions tailored to our customers needs.
- Robust equipment complying with pressure vessel standards in force and having large implementation flexibility.
- The system limits abrasion and segregation and does not require large filter on the collecting hopper.
- We can also supply package systems including discharge equipment under the silo, pneumatic conveying, weighing & feeding, mixing and bagging with all required measurements and automations.
- Operators training and field support service.

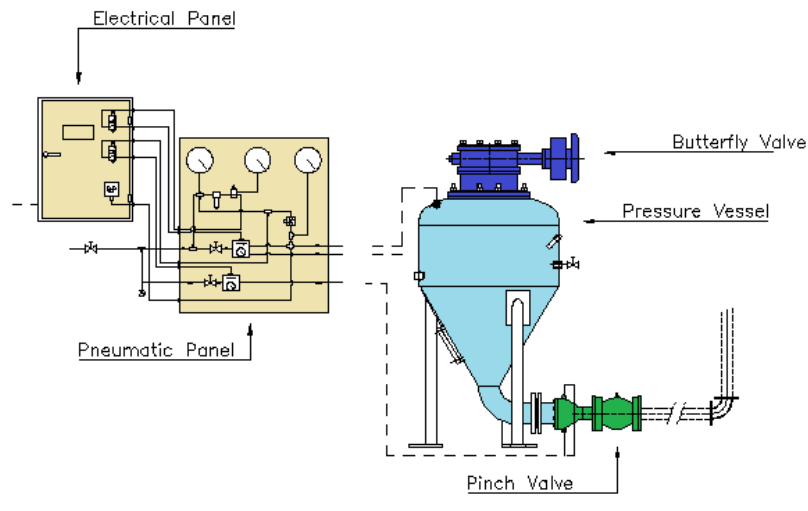


At the center of your systems

RANGE OF APPLICATIONS

The **dense phase** pneumatic conveying system is chiefly used for abrasive, fragile and/or explosive products.

Food industry	Cereals, sugar, powdered milk, flour, dehydrated vegetable, pasta, pet-food, chips, pellets, salt)
Chemicals:	Detergents, pesticides, cleaning products, phosphates, fertilizers
Building materials	Bricks and tiles (manganese and baryte), Cement industry (powdered coal, pet coke, fly ash, kiln dust) Panels (wood shavings, loads...) Aluminium (alumina, pet coke, coal) Glass (borax, crushed glass), feldspar, sand
Plastic industry:	Plastics, compound, fibres
Cosmetics and Pharma :	Any powder and granules transfer application
Nuclear energy	Uranium ore



CONTROL COMMAND CUBICLE / PLC CONTROL PANEL

The standard arrangement is provided with pneumatic control valves etc. mounted directly onto a back-plate attached to the Dense Phase Vessel.

A separate PLC control panel rated to IP65 is supplied for Site fitting local to the Vessel, to house the PLC, solenoid valves, pressure switch and terminals etc. The panel contains:

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|---|---|
| <ul style="list-style-type: none"> - Fuse/Link - MCB - Power Transformer - PLC - Emergency Stop Relay - Emergency Stop push-button - Emergency Stop Reset push-button - 'Control On' lamp - 'Filling' lamp - 'Conveying' Lamp | <ul style="list-style-type: none"> - 'Auto Call' lamp - 'Long Filling Time' alarm lamp - 'Long Convey Time' alarm lamp - Auto/Manual selector - Stop push-button - Main Air solenoid valve - Jet Air solenoid valve - Pressure Switch - Electrical terminals - Pneumatic bulkhead connections |
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PLC Inputs :

- Auto manual
- Manual start / stop
- Remote start
- Pressure switch
- Dense phase vessel level probe
- Separating filter hopper level probe
- Emergency stop
- Separating filter running

PLC Outputs :

- Alarm relay
- Running relay
- Filling lamp
- Conveying lamp
- Long fill time
- Long convey time
- Energise slide valve
- Energise main air valve
- Energise jet air valve



Control command cubicle



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