



Multi-Phase Dense Phase Pneumatic Conveyors

Control Your Product Quality by Controlling Your Product's Conveying Velocity

The Young Industries, Inc. Multi-Phase dense phase pneumatic systems are designed to convey material in either the low velocity dense phase conveying regime or in the true dense phase conveying regime. In the low velocity dense phase regime, the material nearly fills the convey line, and is extruded through the convey pipe. In longer distance systems, the material in the convey line forms dunes as it moves down the line. These systems have very low average conveying velocities. Material velocity can be set as low as 25 feet per minute or up to 1,000 feet per minute. In the true dense phase conveying regime, the air velocity is set just below the material's saltation velocity. Material is conveyed as a bed of product that runs along the bottom of the convey line. The true dense phase velocity range can be set from 1,400 to 4,500 feet per minute. The velocity selected is based on the physical characteristics of the material, capacity, conveying distances and line size.

The most valuable feature of Multi-Phase Dense Phase systems is the M/P Valve. The M/P Valve controls the volume of air in the system. This valve meters the air at a constant volume irrespective of the system operating pressure. The valve is adjustable.



Transporter vessel for batch transferring of materials in true dense phase and low velocity conveying regimes

It is manually adjusted when used on batch transporter systems and automatically when used on rotary valve type continuous dense phase systems.

When customers need a batch operation using a transport vessel, the M/P valve is set to meter the minimum requirement of air to meet the transfer rate. The valve also controls shutdown and purge air volumes, thus eliminating uncontrolled air surges that cause line vibrations and over loading of the system filter.

When a low velocity rotary valve type continuous dense phase system is used, the M/P Valve controls the air during the initial start-up, during normal conveying and during system shut down modes of operation. This ensures slow gentle conveying and eliminates uncontrolled material surging in the line. The minimum conveying velocity of the product is established based on the material handling characteristics and the conveying distances.

When conveying with the low velocity rotary valve type continuous dense phase system, high and low level indicators control the M/P valve setting. The high level switch increases the amount of conveying gas that is metered to the system. The low level switch decreases the amount of conveying gas that is metered to the system. We have designed the controls to change the M/P air valve setting in restricted steps based on the level switch information. This ensures minimum gas usage and a stable extrusion of product in the convey line. The controls also manage the start-up gas volume and shutdown or purge gas volume setting of the valve. The material is always conveyed at the lowest possible velocity, at the required rate.

The low velocity rotary valve type continuous dense phase systems uses side-entry



Rotary Valve Type Continuous Dense Phase for transferring material in true dense phase and low velocity conveying regimes

rotary valves to meter the product into the pressure vessel. Because the material enters the rotary valve rotor from the side, jamming and clipping of the pellets is eliminated. Besides controlling to the M/P valve setting, the high level indicator prevents material from over filling the vessel and causing material clipping at the bottom of the rotary valve. The low level indicator makes certain that a solid plug of material is extruded into the convey line. Material is conveyed at the minimum possible velocity.

Contact us for additional information on dense phase conveying or for testing of your material.