



Product News

Entirely Dust-free: Hybridising Pneumatic and Mechanical Conveying for Bulk Material Handling

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For the enclosed conveying of powdery or granular products may happen in pneumatic as well as in mechanical systems. An interesting alternative are aero-mechanical systems, which allow very gentle conveying even of friable products.

Moving powders, pelletized materials, or granular bulk materials to processes from bulk bags, bag dump stations, silos, feed bins, hoppers, totes, supersacks or other sources is done very efficiently and economically with aero-mechanical conveying systems. Depending on the application and bulk materials conveyed, this conveying method provides solutions by crossing the traditional boundaries in providing the best of both worlds in dense or dilute conveying for total dust-free bulk material transfer.

Overview



Aero-mechanical conveying systems are space-saving and allow for gentle conveying even for friable products.

Aero-conveying is best defined as the movement of material using both pneumatic and mechanical conveying, with the process eliminating most disadvantages of each, resulting in high volume controlled transfer of dry materials including friable and degradable bulk materials. An aero-conveying system transports bulk materials in pockets between fixed discs on a cable assembly, moving at rates of 750 fpm (approx. 3,8 m/s). The bulk materials are suspended in the stream and fluidized, allowing minimal product damage with no segregation during the transfer process. Applications vary from simple up-and-in systems to complicated multiple inlet or outlet designs. Additionally, the system can be easily reconfigured to suit new applications, should the need arise.

“Densilute” Conveying Technology

As a standard, an aero-mechanical conveying system consists of two parallel tubular housings, typically 3" or 4" (approx. 76,2 or 101,6 mm) tubes, containing a continuous loop of steel cable. Polymer discs smaller than the inside diameter of the tubes are mounted at equal intervals along the steel cable. One side of the housing is for conveying and the other is for the return. Material inlet and outlets are suitably located for the application. Two sprocket assemblies, one providing drive and linked to a small 2 or 3 hp (1,5 or 2,24 kW) motor, and the other guiding the return, complete a basic aero-conveying System.

The versatility of an aero-conveying system allows for additional tubing, sprockets, inlets and outlets, angles, bends, and horizontal and vertical configurations, to form a continuous system ranging from 10 to about 120 ft (approx. 3 to 36 m). Several combined systems can cascade to cover greater distances. Bulk materials entering the inlet are moved in a fluidized form by pockets of air between the discs, further aided mechanically by movement of the discs. Controlling the velocity of the cable assembly determines the nature of conveying and movement of the bulk material.

The bulk material can be moved at critical speeds, comparable to dense or dilute phase conveying. This “Densilute” conveying phase offers high speed, lean or dilute phase conveying, fluidizing the bulk material, gently handling the material. Fluidization of the bulk material within the cable-disc and around corners causes minimal impact between particles and against the housing. The result is less particle attrition, and less conveyor wear than with other types of conveyors.

Flexibility, Versatility and Cleanliness



Material is fed to the aero-mechanical system at the conveyors sprocket-end.

Space above process vessels is always a premium, particularly when considering a filter receiver or cyclone. Aero-conveying allows the ability to fit the bulk material handling system within the constraints of the factory or process area. Systems can be adapted to fit most spaces easily and conveniently.

With the ability to convey through multiple-planes, around corners, at any angle from 0 to 180°, and at a variety of conveying speeds, Aero-Conveying is very versatile. In addition to physical versatility, Aero-conveying provides versatility in the bulk material being conveyed. The system allows for a range of bulk densities from as low as 5 to 200 lb/ft³ (approx. 80 to 3200 kg/m³), with a range of particle sizes from 5 μ to 1/2" (approx. 0,005 to 12,7 mm), and a range of powder properties from free-flowing to cohesive - all handled by the same aero-conveying system.

Basic “up-and-in” systems feed bulk materials into the sprocket end of the system, from a controlled feed and transfer it in a straight line to a discharge point where it leaves the conveyor under centrifugal force. High volume, high linear velocity, lean phase is suitable for non-friable bulk materials. Aero-conveying also allows for multi-plane bulk material handling, for applications requiring both vertical and horizontal conveying combinations, with system also allowing for multiple inlets and/or outlets. This configuration can accommodate bag frames, bag dump stations, discharge from mixers or any combination thereof. Additionally, system can be used to feed multiple packaging machines, hoppers, reactors or similar process equipment. Aero-conveying offers a dynamic

solution for bulk material handling with the highest throughputs and the lowest level of product degradation of materials like tea, coffee, and plastic compounds.

Industries have become more stringent with regards to managing combustible dusts, with dry powder leaks a major concern both to processing plants and exposure to employees. Aero-conveying systems are dust-tight and fully enclosed, non-pressurized and vented. Cleaning-in-Place features further enhance the suitability of aero-conveying for the food industry.