

AZO[®]VacuumPlus dense phase conveying gentle, segregation-free and extremely energy efficient

Segregation and destruction free

Low air and energy consumption

Conveying of critical bulk materials

Optimized controls

Efficient usage of conditioned air

Preferred applications

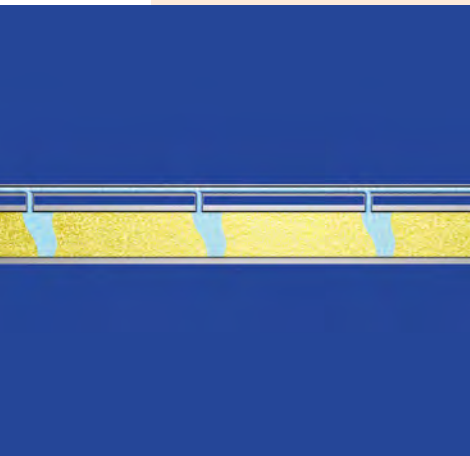
The AZO[®]VacuumPlus dense phase conveying system is a new conveying system, intelligently combining the advantages of pressure and vacuum systems. Whenever fragile and/or temperature sensitive bulk materials need to be gently conveyed without segregation, this new materials handling technology is the solution – especially for applications with medium throughputs and conveying distances of up to 100 m.

Special advantages

The low product speed achieves a dense phase conveying with very little product segregation. This also means the conveyed product is handled very gently, with very little attrition, and therefore extremely low wear rates within the conveying pipes. It is easy to engineer such a system with many different product feeding points. Due to the low air and energy consumptions this system is very

efficient, especially advantageous if conditioned air is required for conveying the product.

SYSTEMS

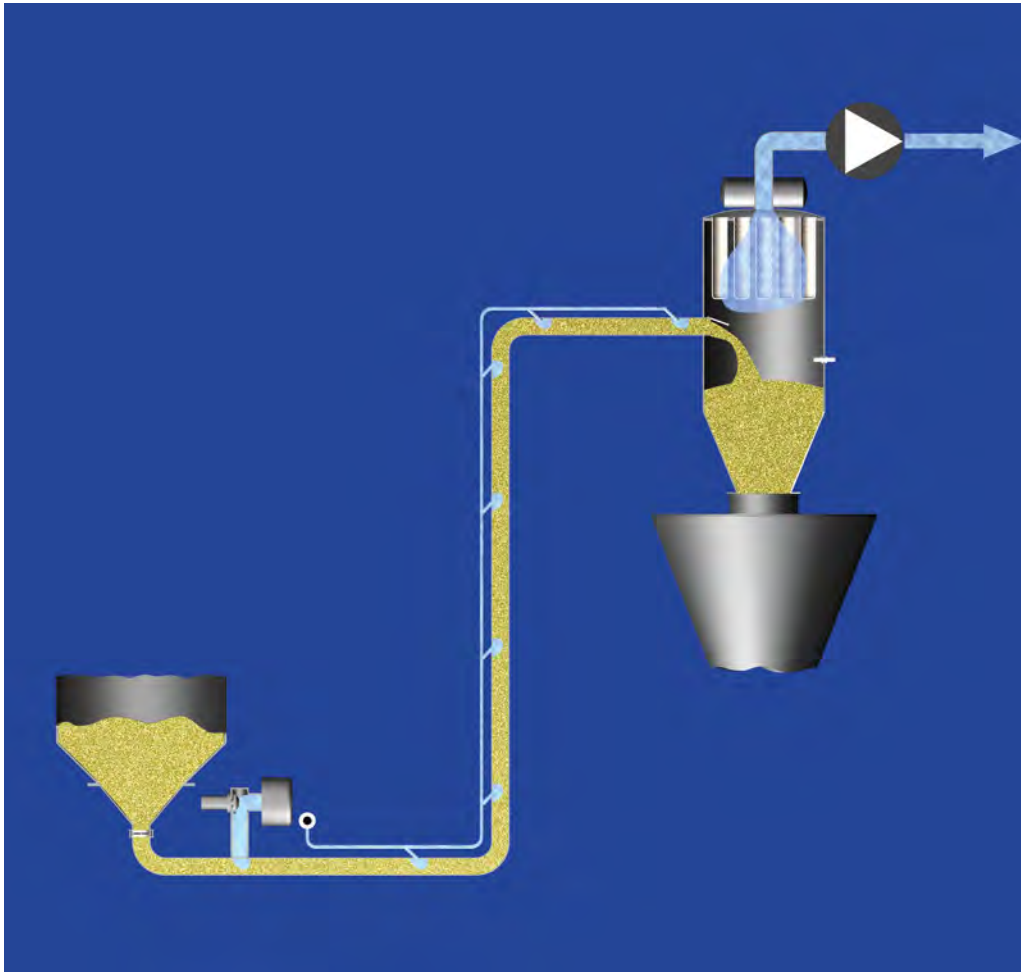


System description

This conveying technology is basically separated into two different versions: discontinuous operation and continuous operation. The decision of which version should be used is dependant upon the nature of the manufacturing process (either before or after the conveying stage).

For instance, if the conveying system is feeding a batching process, a discontinuous system is recommended. If the manufacturing process is continuous, then a continuous AZO[®]VacuumPlus system is probably more appropriate.

AZO® VacuumPlus system, discontinuous



System description

The product pickup point is equipped with a secondary air intake. Several additional air intake ports are also installed along the conveying pipe up to the receiver. The number and position of the air intake points is dictated by several parameters such as the nature of the product itself, the required throughput, pipe routing and other conditions. The reception point or receiver of the discontinuous AZO® VacuumPlus system is equipped with a butterfly outlet valve. The conveyed product discharges completely into the downstream process after each conveying cycle. This system should be used for batching processes.



Product feeding into two conveying lines.

How it works

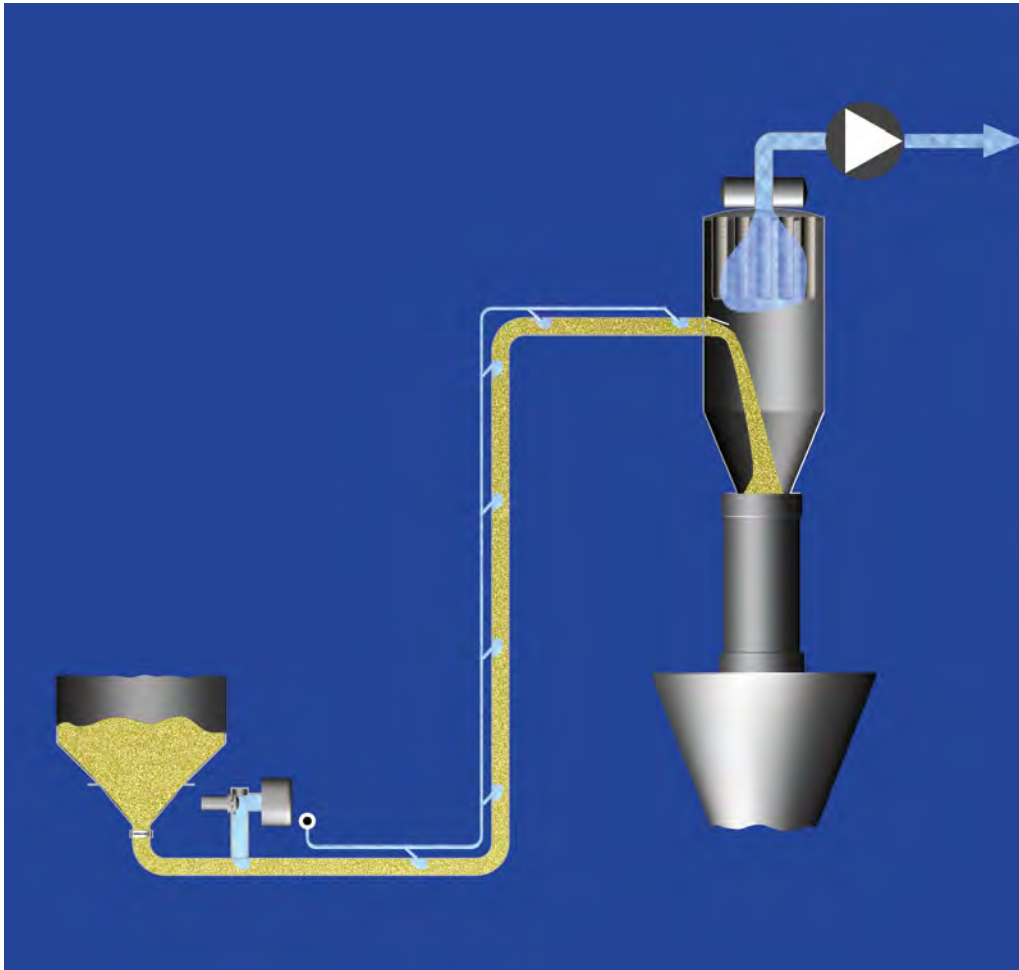
After starting the vacuum pump, a underpressure is generated in the conveying system, drawing the product into the conveying line. The presence of the bulk material in the line increases the conveying vacuum. As soon as the conveying pressure is exceeding a certain set point, bypass valves are used to introduce secondary air into the vacuum system, which keeps the bulk material moving. In a simple solution the bypass valves activate one after another, introducing secondary air successively into the conveying line. Differential pressure measuring offers a more demanding solution, as required for products that have traditionally been difficult to handle by pneumatic conveying. Before and after each air intake connection, the differential pressure is

measured and if required secondary air is introduced before a blockage occurs. With such highly optimized control a fully filled product conveying line is possible, which allows for conveying speeds below 2 m/s. Such slow conveying speeds only generate very tiny amounts of friction, thus protecting both the product and the conveying line from wear and damage. As soon as the product level in the receiver reaches the high level indicator, the conveying cycle is finished. The vacuum source is cut off, the receiver is vented and the outlet valve is opened. The material within the receiver is discharged into the subsequent process. Once empty, the receiver's outlet valve is closed and a new conveying cycle can start.



Two asymmetric receiver with butterfly valves for discontinuous conveying

AZO® VacuumPlus system, continuous



System description

This conveying system consists of a product pickup device, a conveying line with air intake ports and a receiver equipped with a rotary valve. Vacuum pumps, suitable for high underpressure, are used for generating the required vacuum. Convenient controls enable trouble-free operation of the conveying cycle.



Air intake ports for secondary air

How it works

After starting the vacuum pump, underpressure is generated in the conveying system up to the product intake point, drawing the product into the conveying line. To prevent blockages in the conveying line, secondary air is injected via bypass valves to keep the product moving. For easy to handle bulk products the secondary air injection can be applied at a number of air intake points without any differential pressure measuring. Difficult to handle and complicated bulk products require differential pressure measuring. Secondary air is only injected at certain bypass valves when stabilization of the conveying is needed. The process allows a very slow conveying resulting in very little friction between the product and the conveying line, which preserves the integrity of the product and eliminates wear of the

pipework. A further advantage is that due to the small air volumes used, relatively small filter surface areas are required. The rotary valve at the receiver's outlet is continuously feeding the bulk material into the downstream process. During system commissioning, the intelligent control system allows product-specific parameter settings for achieving optimum energy efficiency, and also gentle, destruction and segregation-free conveying systems.

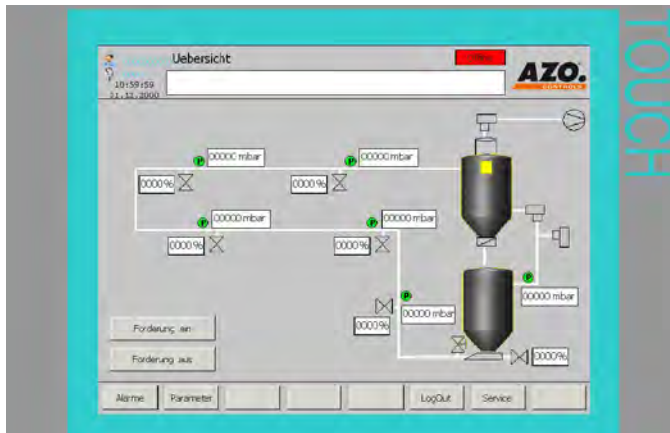


Receiver with rotary valves for continuous product conveying

Intelligent, easy to operate control system

The AZO®VacuumPlus conveying system is a stand-alone-system with a convenient touch screen operated control system for operating, controlling and monitoring. The controls are programmed according to the system requests for continuous or discontinuous operation. Best possible safety standards are given by controlling overall pressure limit values, local pressure limit values and local differential pressure values. Process visualisation allows (especially during the startup phase) optimal parameter setting according to the corresponding conveying product. If different conveying products are conveyed

with the same system, product specific parameter settings are possible for each of the corresponding conveying cycles. The touch screen of the process visualization allows the operator to monitor the actual system situation and if needed to activate the bypass valves for secondary air. This offers a very stable, gentle, energy saving and also segregation-free conveying. The control system of the AZO®VacuumPlus conveying can also be controlled by a centralized process control and visualization system. The efficient combination of a vacuum system and secondary air injection, in conjunction with an intelligent



Convenient control system with touch screen

control system sets new standards in pneumatic conveying technology. Economical solutions can be realized even for difficult

and very sensitive bulk materials which in the past were considered to be unconveyable with a vacuum system.

Interesting case of operation in practice



Discontinuous AZO®VacuumPlus system for different kinds of tea



Continuous AZO®VacuumPlus system



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The design is subject to change due to our continuous improvement program.