

Dilute phase pneumatic conveyors

Safe and efficient transport of granules and powders

Dilute-phase pneumatic conveying is suitable for handling powders and granules and can be performed either through suction or by pressurizing the pipes; in some cases, both technologies are used.

This type of pneumatic conveying is generally used to transfer **non-abrasive and poorly degradable powders or granules**, in any case with a low specific weight, loose and lightweight.



Dilute-phase pneumatic conveying is also called "flying" because the transported material is effectively suspended along the pipe due to the speed of the air.

We typically provide this technology in the pharmaceutical, chemical, cosmetic, and food industries to transfer raw materials from big bags or containers to dozers, mixers, and processing machines.

Operating principle of dilute phase pneumatic transport

In dilute-phase pneumatic conveying, vacuum or air pressure is used to move materials within pipes.

The air is low-pressure and high-volume, so it moves through the pipes at very high speed. High speed, typically between 20 and 40 meters per second, transports approximately 30 tons of material per hour. It is ideal for conveying light, dry materials and allows for continuous dosing, but is not suitable for mixed products.



Dilute-phase pneumatic conveying, as its name suggests, is characterized by a low ratio between the transported product and the amount of air used. The advantages of dilute-phase pneumatic conveying include ease of management and system maintenance, and particularly low construction costs and energy consumption.

Dilute phase characteristics and performance

- Solids concentrations less than 1% by volume
- High air speeds (20 - 40 m/s)
- Low pressure losses per unit length (< 5 m/m)
- Aerodynamic forces dominate; solid particles behave like individual particles suspended and carried by the air
- System limited to short distance
- For continuous transport of solids
- For flow rates of approximately 10 tons/h



Types of dilute phase transport

Dilute phase transport in suction

This suction conveying method is used to **extract powders and mixtures from multiple sources** and transport them to a single destination.

This method is used for short-distance transport, particularly for **powders that tend to compact** and, above all, for **harmful substances** that must not be released into the environment.



Dilute phase transport under pressure

This pressurized conveying method is used with **powders that have a low specific weight** and are not mixtures.

The blower motor, at the beginning of the system, introduces a large amount of air into the pipe where the material to be conveyed or "pushed" toward one or more destination points is introduced.



Sectors of use of dilute phase conveyors

Pharmaceutical, Food, Cosmetic & Chemical

Pharmaceutical industry

Hygiene in total safety

FR Sistemi designs and customizes pneumatic conveying systems for pharmaceutical powders and mixtures for modern industrial processes.

FR Sistemi is a pharmaceutical process specialist, and its products have been refined over time thanks to close collaboration with international groups: pharmaceutical packaging machine manufacturers or pharmaceutical companies that use the same machines in their own production cycles.

FR Sistemi specializes primarily in operations that require machines to be fed with tablets or capsules: precision, speed, and control during this phase are critical and essential to meeting the needs of the process itself.

In addition to pneumatic conveying,

FR Sistemi produces the entire ecosystem of machinery for pharmaceutical production : dosing, mixing, and weighing systems that share several common characteristics: they are generally safer, more hygienic, simpler, and more precise when handling "hazardous" powders or mixtures than products designed for cleaning and non-processing.



Simply put, FR Sistemi transports, weighs, mixes, separates, and releases all types of pharmaceutical powders at the required times and in the required manner, in complete safety.

Food industry

One partner, an entire ecosystem of solutions

The food industry is a key sector for FR Sistemi. From the very beginning, we have collaborated with food companies to develop and provide pneumatic conveying and industrial suction solutions specifically tailored to meet the needs of this sector.

The products and technologies we provide to small and large food production companies meet every stage of the food industry's production process:

- transportation of raw materials,
- mixing
- weighing
- suction and recovery of waste in the packaging phase