

ZEPPELIN[®]
WE CREATE SOLUTIONS

THE WAY IS OUR GOAL
Innovative conveying systems



Conveying technology

www.zeppelin.com

ENGINEERING YOUR SUCCESS



Zeppelin Systems, the world leading plant manufacturer for high quality bulk material and liquids handling, has remarkably grown over the past 60 years. We cover the demands of a wide range of industries and supply all plant manufacturing services from one single source, whether basic engineering, in-house production of components, final assembly or comprehensive customer service. Thanks to our financial strength and our global network we have long been a reliable partner for our customers.

Every Zeppelin plant is developed according to the clients' specific requirements and realized thanks to our customized innovative processes and technologies.

The knowledge we have acquired over more than 60 years of plant manufacturing and the world's largest network for bulk material handling are the key to providing ideal solutions whatever the challenge. After all, your success is our goal.

Zeppelin plant engineering – business fields

Polymer Plants

Plants for plastics producers and forwarders

Plastics Processing & Rubber Plants

Plants for the plastics processing and rubber industry

Reimelt Food Technology

Plants for the food, confectionery and bakery industry

Henschel Mixing Technology

Mixers, mixing systems

Silos & Filters

Silo technology and filters

Components

Diverter valves, rotary feeders, separators, sifters ...

Customer Service

Assembly, maintenance, spare parts

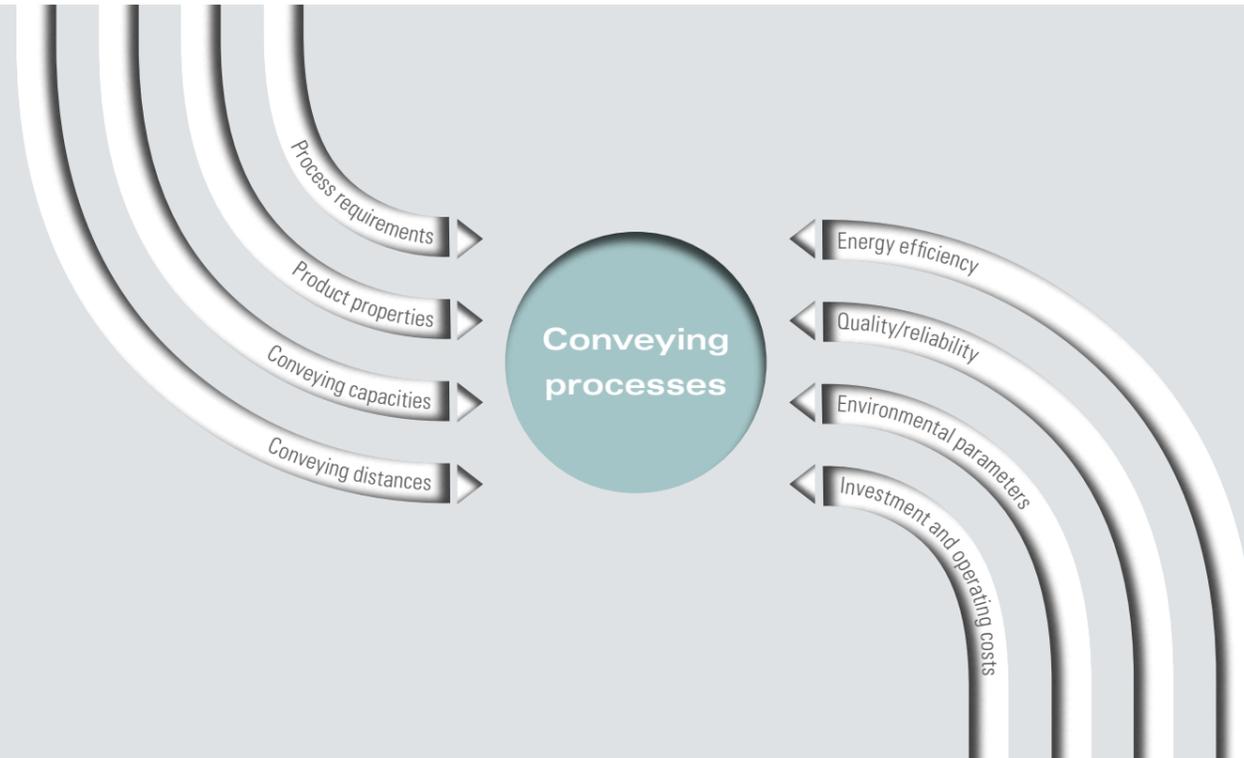
Quality Service

Services in quality management

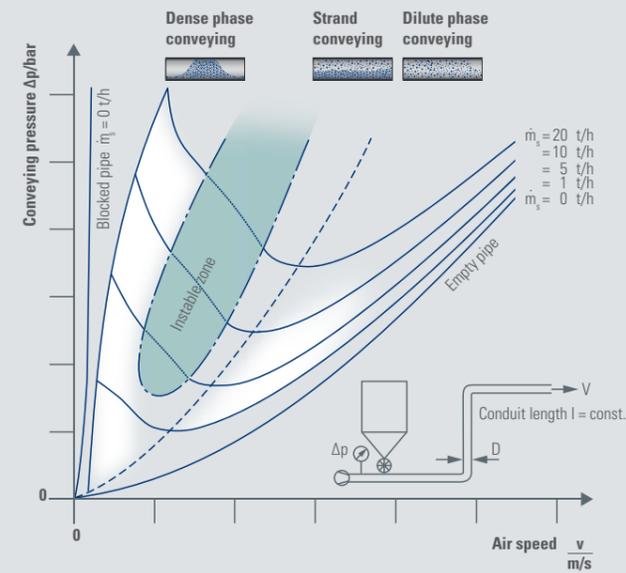
CONVEYING TECHNOLOGY

The right conveying technology for your individual requirements

Customer requirements



Phase diagrams are used for the design of the particular pneumatic conveying systems.



In order to develop the ideal system tailored to your individual requirements, we analyze the properties of your bulk materials and we consider the plant parameters, the concept of the complete plant as well as the investment and operation costs.

The following are various conveying methods to select from according to the customer's requirements:

- Pneumatic dilute phase conveying
Lean-Tec
- Pneumatic dense phase conveying
Dense-Tec
- Pneumatic dune phase conveying
Twin-Tec
- Hydraulic conveying
Hydro-Tec

Our know-how



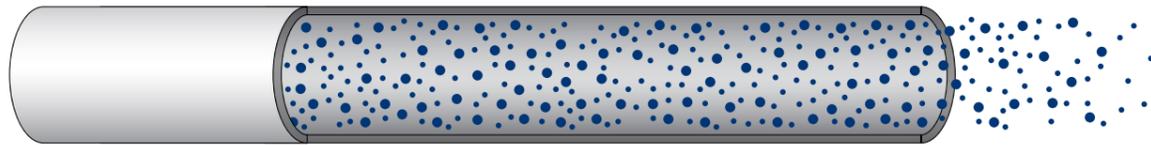
Clever combinations are also possible: e.g. dilute phase conveying systems for long distances combined with a downstream elutriator and gentle dense phase conveying.

Based on the efficient modular design of our conveying systems, we will provide you the most economic solution tailored to your product and your specific requirements.

Our conveying systems stand for process reliability, maximum operating efficiency and gentle transport of material.



Dilute phase conveying

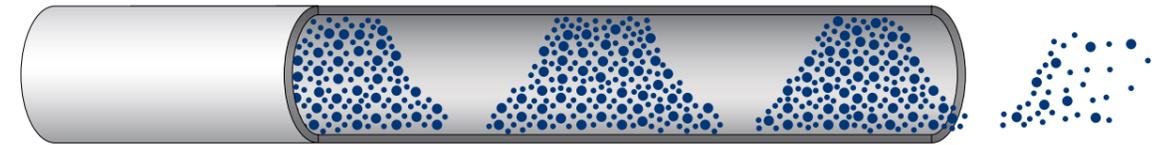


Lean-Tec: the all-rounder

The pneumatic dilute phase conveying process is mainly characterized by the system's high flexibility e.g. in case of varying conveying quantities. This type of conveying system is very simple compared to other conveying processes and can be used for short or long conveying distances. The necessary components are simple and require low maintenance. A further advantage of dilute phase conveying is a reduction in total investment costs: lower pipe forces mean less costly pipe supports.

Velocity (typical): 15 – 35 m/s
Air to solids ratio (typical): < 20 kg/kg

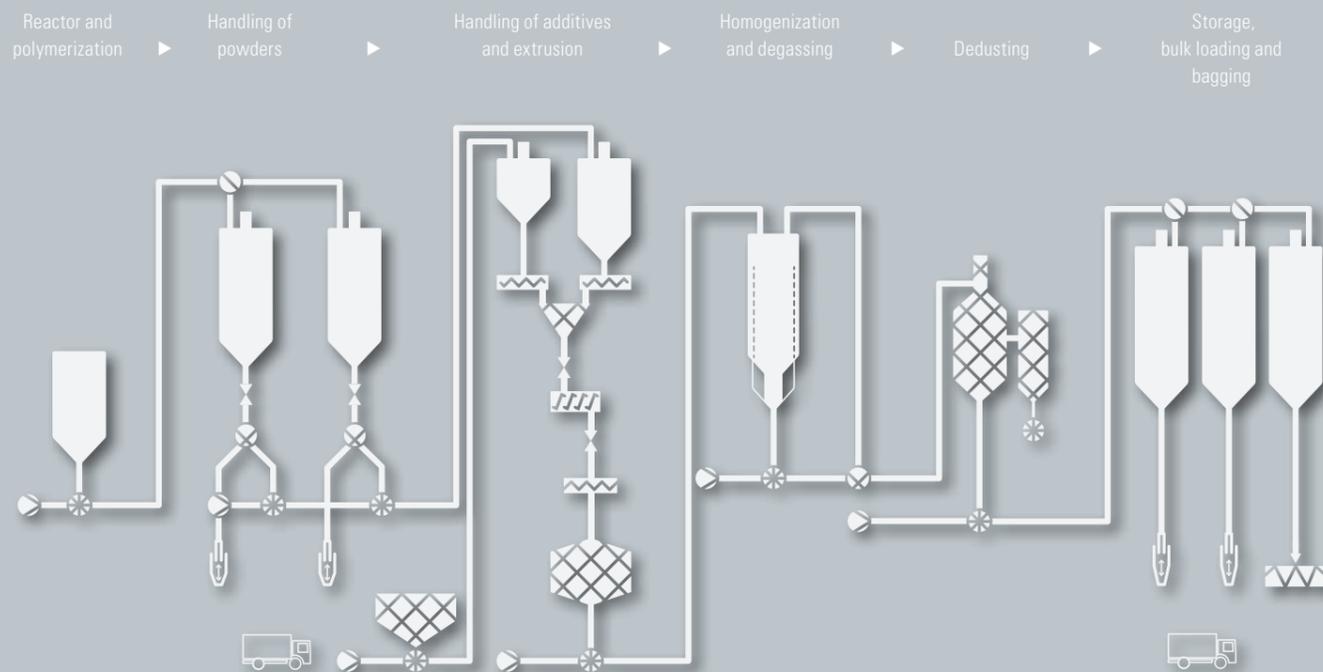
Dense phase conveying



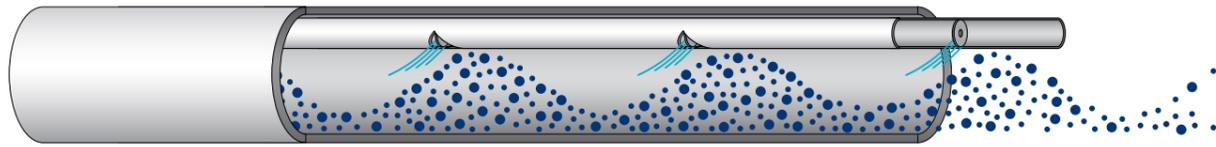
Dense-Tec: totally gentle conveying

Pneumatic dense phase conveying is normally used for pellets with high quality requirements. This system is recommended especially for products susceptible to abrasion. The dense phase conveying is more complex than the dilute phase conveying, is operated with higher pressures (up to typically 3.5 bar) and it requires more complex components regarding design and layout. However, the dense phase conveying is often the more economic solution for short conveying distances.

Velocity (typical): < 3 – 10 m/s
Air to solids ratio (typical): < 80 kg/kg



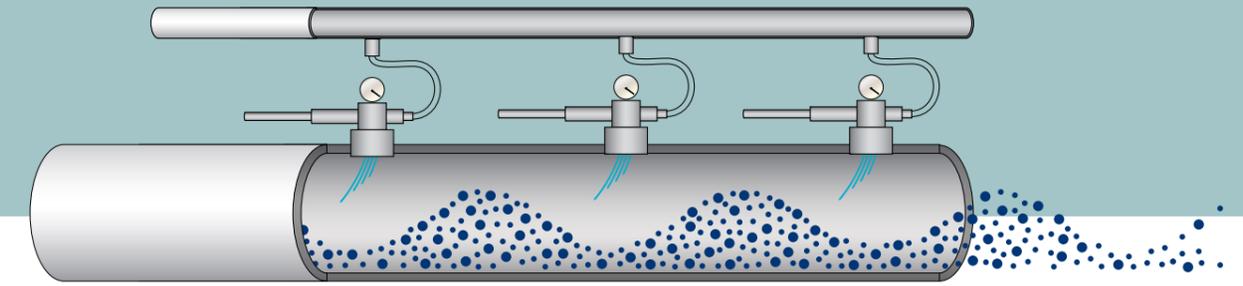
Bypass systems



Twin-Tec Intraflow: reliable – gentle – clean

The innovative Intraflow system is a bypass system which prevents the clogging of pipes by dissolving the plugs as they form. Air is injected through a small pipe installed in the conveying piping to ensure continuous, gentle transport of the product and operational reliability. This bypass system is mainly used for bulk materials with good fluidization characteristics, especially PTA/CTA.

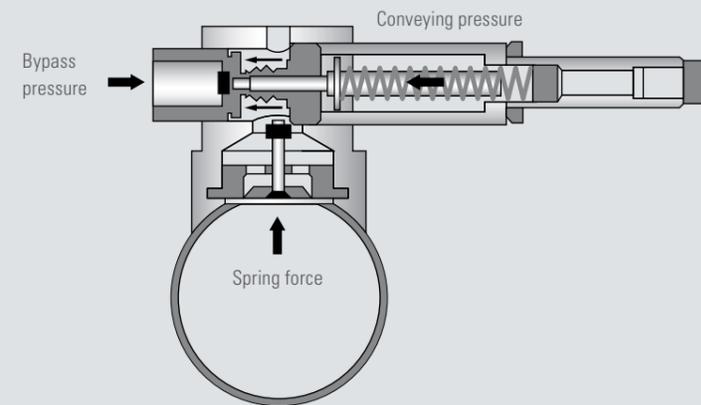
Velocity (typical): depending on the selected conveying system
 Air to solids ratio (typical): < 50 kg/kg



Twin-Tec Overflow und Airfloat: specially designed for powders

Two special bypass systems (Overflow and Airfloat) allow the use of the gentle dense phase conveying even for powders. Secondary air is injected through valves into the conveying pipes at exactly defined intervals. This process ensures trouble-free dense phase conveying, a method which is preferably used for granulated carbon black or silica due to the low rate of particle destruction.

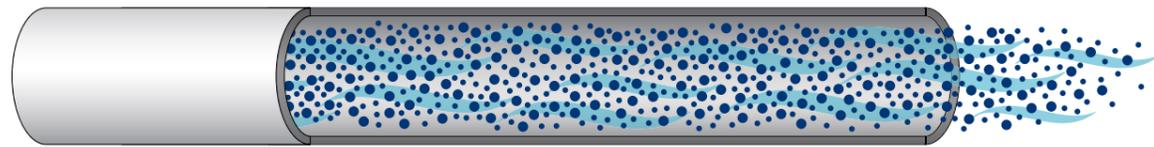
Velocity (typical): 3 – 10 m/s
 Air to solids ratio (typical): < 80 kg/kg



The forces of the conveying pressure and the adjustable spring are balanced with the bypass pressure. If a plug passes the overflow valve, the line pressure drops and bypass air is injected through the valve. With this self-regulating bypass system, air enters the conveying line only where it is needed for plug fluidization.



Hydraulic conveying



Hydro-Tec: The best way to manage long distances

For hydraulic conveying, water is used as conveying medium instead of gas. This conveying method is especially advantageous in case of long conveying distances or extremely high purity demands and the complex system has a lower energy consumption for conveying. Furthermore, smaller pipe diameters can be used even for high conveying capacities resulting in minimal pipe forces and noise emissions.

Velocity (typical): 1.5 – 3 m/s
 Solid concentration: < 40%

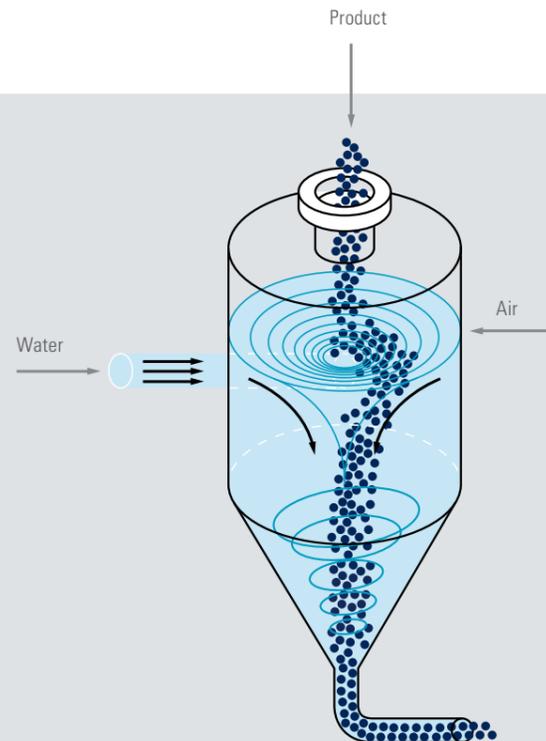
Advantages of the different conveying technologies at a glance

Applications

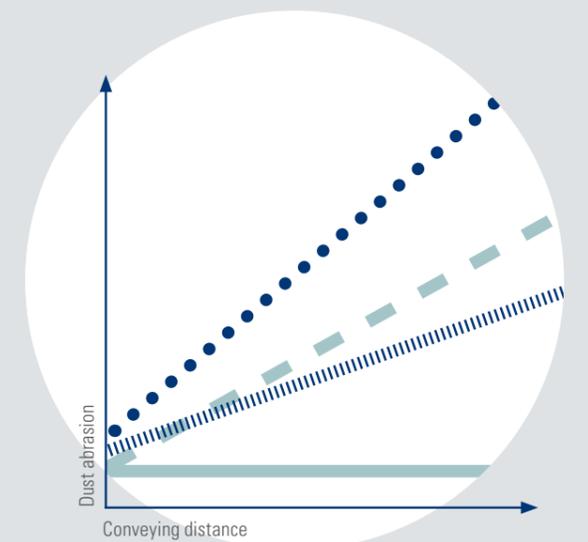
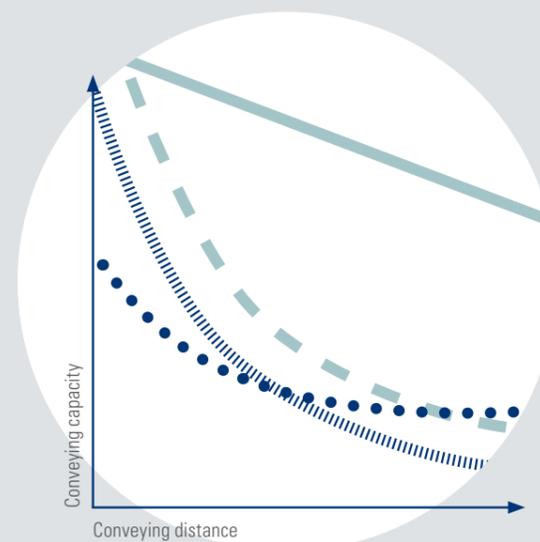
Conveying process	Type of product			Conveying data				
	Fine powder	Grit, coarse powders	Pellets	Conveying distance**** [m]	Conveying capacity**** [t/h]	Conveying velocity [m/s]	Air to solids ratio	Conv. pressures (recommended) [bar (g)]
Dilute phase conveying	✓✓	✓✓	✓✓	< 1500	< 200	15 – 35	< 20 kg/kg	< 3.5
Dense phase conveying	–	✓**	✓✓	< 1000	< 100	3 – 10	< 80 kg/kg	< 8.0
Dune phase conveying with bypass system	✓✓*	✓✓	✓	< 1000	< 200	8 – 20	< 50 kg/kg	< 8.0
Dense phase conveying with bypass system	–	✓✓	✓	< 300	< 30	3 – 10	< 80 kg/kg	< 4.0
Hydraulic conveying	✓	✓	✓✓	< 5000	< 100	1.5 – 3.0	< 40%***	< 8.0

- ✓✓ Preferred process
- ✓ Appropriate process
- Process not appropriate

* Process not appropriate for adhesive products such as chalk, zinc oxide, titanium oxide
 ** Suitability of process depends on the grain size distribution
 *** Data indicated in solid concentration
 **** Depending on the conveying capacities or conveying distance



Cyclo feeder: With a swirl flow, even lightweight pellets are gently fed into the conveying pipe.



●●●● Dilute phase conveying
 — — — — Conveying with bypass system
 ●●●● Dense phase conveying
 — — — — Hydraulic conveying



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