

Competence in Bulk Solids Handling

Benefit from Research, Development and Process Technology





A century of experience gained through your tasks

The industry sector of the Zeppelin Group is among the leading manufacturers of plants for storing, conveying, blending, and dosing of premium bulk solids. Thanks to our world-wide activities and locations in all important industrial centers we can always provide our clients with the latest, most innovative and reliable technology to ensure maximum economic success.

As the direct successor of Count Ferdinand von Zeppelin who turned the human dream of flying into reality by building his legendary airships over a century ago, we are used to looking ahead. Constantly innovating, striving for perfection and maximum functionality in our products has turned us into the company that Zeppelin is known as today: the technology leader for handling premium bulk solids.



On site world-wide - always near our customers. Production plants in Germany, Belgium and Brazil, production partners in Saudi Arabia, Thailand and China as well as subsidiaries and representations all over the world enable Zeppelin to serve its customers with speed, flexibility and the utmost closeness to them. More than 200 engineers – including specialists in chemical engineering – guarantee innovative and economic construction of plants.





Zeppelin has been the leader in the international market of silo construction for decades. Thanks to our own modern manufacturing and the international experience of our assembly staff and service engineers we guarantee quality of the highest level.

Competence in bulk solids handling – you can rely on Zeppelin

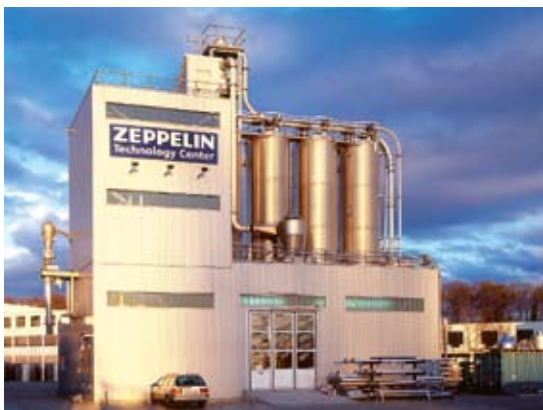
The industrial Zeppelin Group and its various divisions are focused on the requirements of their customer groups. All activities have, however, one thing in common: the economic handling of premium bulk solids.

Silo plants for the plastic, food, and chemical industries integrated in one logistics concept: from consultation and design to manufacture, assembly and after-sales service.

Turn-key plants for the plastics processing and chemical industry as well as for rubber producers and tiremakers.

Conveying components for any application: for powders or pellets, for high or low pressures, for products with good or poor flowability, for standard or special applications.

Silogistic: turn-key plants for plastics producers, engineering companies and forwarders. Zeppelin is the world-wide leader in the planning and construction of logistic centers and manufacturing plants.



Pulling all the strings: the central office for the industry sector is located in Friedrichshafen, Germany. Here, in the world's largest Technology Center for pellets and powders, tests are carried out on an industrial scale. The test results are available to all subsidiaries, therefore allowing our clients to always be on the safe side – no matter where their plant is located.





Leading edge technology is no luck, it's an achievement

Your investments in individual components or complete systems must be profitable. Using the right product for a specific application, readily available and at a fair price. To achieve such results, Zeppelin, as the technology leader, runs a powerful Development and Technology Center that provides the different technologies used for handling bulk solids.

To further contribute to your success, we offer the services of our Technology Center whose capabilities span the entire Zeppelin product range. Acquiring comprehensive information on your product helps you to select the best possible component or plant design.

Our Technology Center is built on an industrial scale to meet our customers' wide range of demands. This enables us to provide tailored solutions to your individual tasks, from trials on an industrial scale to special configurations that can be quickly installed.



Powders or pellets – we have all the answers

The heart of our research and development activities are the two Technology Centers – one specially designed for pellets and the requirements of the large scale chemical industry, and the other for powders and additives (for the rubber and plastics processing industries).

Whether commercial-size installation or processing plant, we conduct full scale tests to avoid the uncertainties of scale-up calculations with the help of the Technology Center's impressive range of options. Because our customers naturally expect maximum process reliability, Zeppelin provides them with unquestionable results as a solid basis for their investment decisions.

To ensure the completeness and accuracy of the results, Zeppelin provides:

- competent result analysis by its specialists
- conclusive test reports and documentation
- determination of relevant design parameters



A multitude of possibilities thanks to complete equipment

In times of continuously increasing requirements to product quality under the pressure of international competition and consequently permanent modification of bulk solids' characteristics, positive operating results can only be reached through first-class information. For this reason, the Zeppelin Technology Center has been equipped with all the necessary components and systems for process technology.

Conveying technology

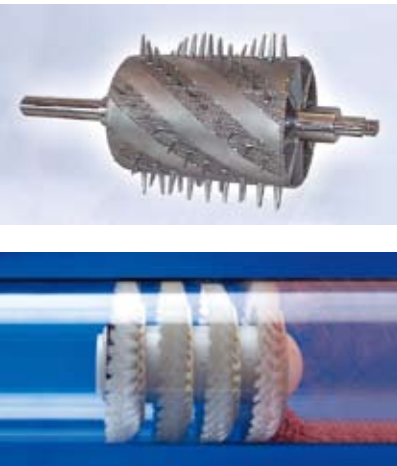
- dense phase and dilute phase conveying of pellets and powders
- hydraulic conveying of pellets
- dense phase conveying of sensitive bulk solids (bypass system)
- combined suction and pressure conveying of pellets and powders
- rotary feeders available in various sizes and types (high pressure, medium pressure and blow-through types)
- pressure vessels
- feeding systems: Pump-Flow or Screw-Flow

Storage, discharge, blending and dosing technology

- storage silos and vessels with various discharge systems
- several different blender types for powders and pellets
- small component weighing unit (e.g. for additives)
- components for conditioning, heating and cooling of bulk solids

Sorting, separating, cleaning

- cleaning of pellets and removal of streamers by separators or drum screener
- various filter systems and cyclones



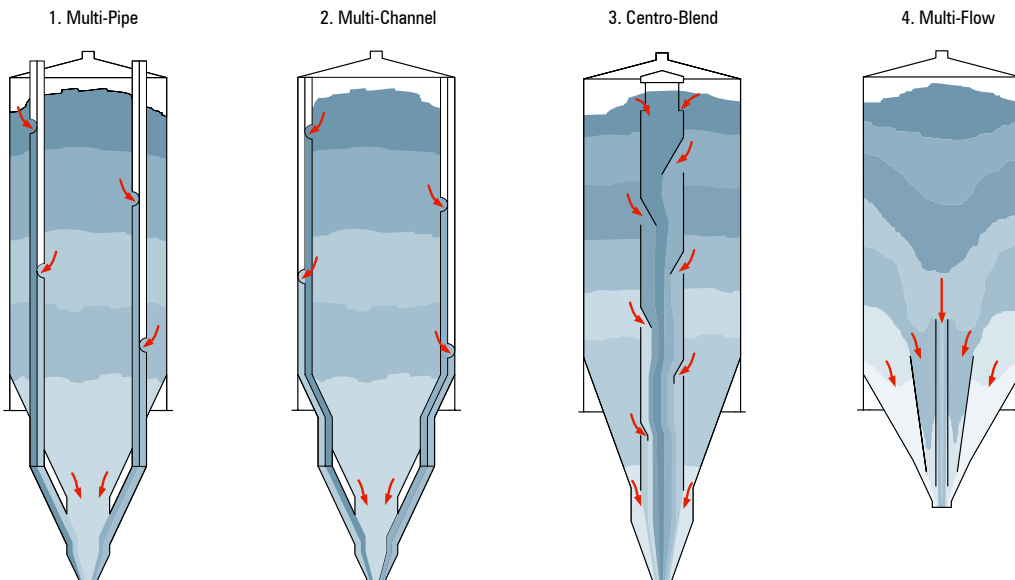
Services

A technology center must be versatile and equipped to meet the wide range of customers' demands and those of the industry. This means conveying pipelines made from different materials, and conveying distances, capacities and air supply should be adjustable over large pressure ranges.

Different blender types are required for testing blending processes. The Zeppelin Technology Center can provide you with answers to all of these tasks and offers optimum testing conditions for any application.

Capacities and operating data

Storage and blending silos (3 - 35 m ³)	:	Multi-Flow, Multi-Pipe, Centro-Blend Multi-Channel, Fluidized Bed Blender
Air compressor and air supply	:	up to 8 bar and 5,000 m ³ /h
Conveying pipes (material)	:	aluminium and stainless steel (smooth and shot-peened), polyethylene, rubber hoses
Bypass	:	Overflow, Airfloat
Conveying pipe diameter (nominal width)	:	DN 65, 80, 100, 200, 250
Conveying distances	:	20, 65, 100, 150, 225, 420 m
Flow rate	:	1 - 80 t/h
Feeding systems	:	rotary feeders, pressure vessels, Pump-Flow, Screw-Flow, injectors
Separator	:	filter, cyclone, drum screener, special separator for streamers



Blending and homogenization silos: Zeppelin offers a large variety of blending and homogenization silos. Suitable for bulk solids with good and poor flowability (e.g. powders, pellets, recycled products, dryblends, compounds). Available as new blender or for retrofitting existing silos.

Knowledge is the basis for your success

The plastics industry is subject to rapid change. New or modified bulk materials which often have completely different characteristics are constantly enhanced by our customers. Only those who know their bulk solid material and its characteristics well can ensure functional design and operation of plants. The Zeppelin Technology Center offers a multitude of possibilities to determine the product characteristics necessary for a reliable design of silos, blenders, components and complete plants.

Shear tests provide the basis for the design of storage and blending silos. The data obtained through these tests are used for the structural silo design as well as for the process design for reliable flow.

Safety is always a top priority at Zeppelin, not only in the Technology Center. Therefore, our customers benefit from components supplied with the ATEX certificate.



Zeppelin uses modern shear testing equipment, e.g. the automatic ring shear tester RST as well as long-term proven equipment such as the translational shear tester TSG which is also manufactured and sold by Zeppelin.

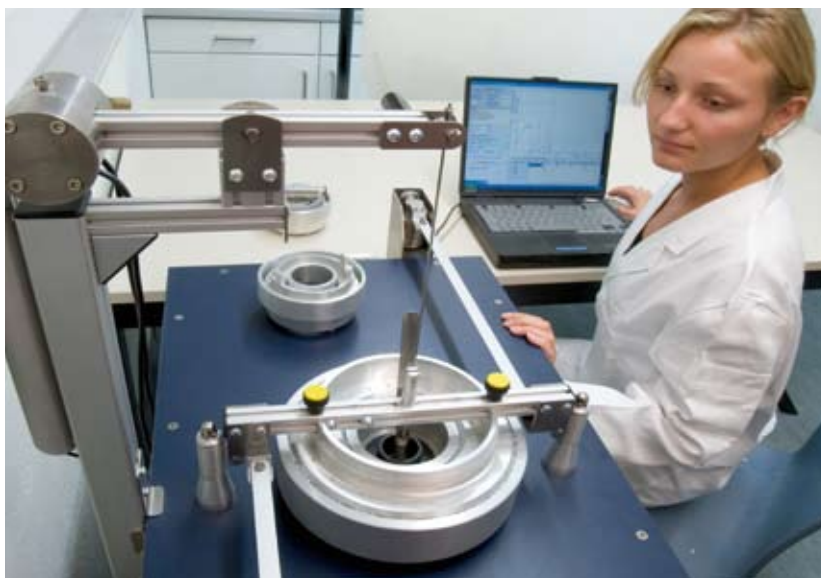
Product purity plays a decisive role in the plastics production area. In order to evaluate the different conveying methods, Zeppelin verifies the residual fines content using acknowledged measuring methods. The results are then handed over to our customers and stored in our central database for future reference.

In order to determine the residual dust content in pellets, the electrostatic forces prevailing between the dust particles and the pellets must be reduced. Rinsing processes with size classification of the fines have proven best-suitable for this task.

Performing shear tests requires a lot of experience in the handling of bulk solids having very different properties. Wall friction, internal friction and time consolidation are important characteristics for a reliable silo design.

The services of our laboratories

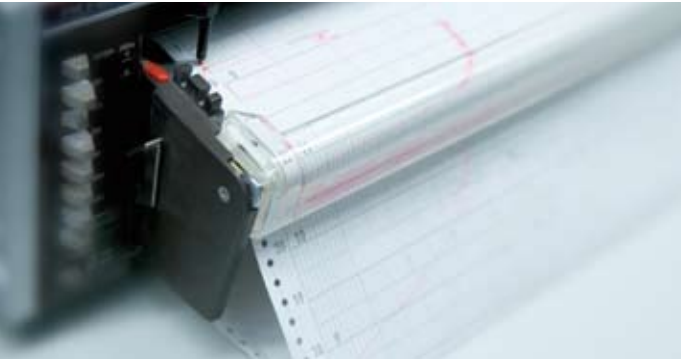
- shear tests with translational and ring shear testers
- determination of the bulk density
- measurement of time consolidation
- particle size analysis (by screening or per Camsizer)
- residual fines content for pellets by washing
- fluidization tests
- determination of friction coefficients
- determination of the separation efficiency
- wear tests



World-wide on site – always near our customers

A successful enterprise gains experience through the tasks of its customers. Therefore, Zeppelin subsidiaries, partners and representations are located all over the world, offering you personal contact at any time.

Pulling all strings of our network in the Zeppelin Technology Center. As our customer you have direct access to the central facilities for Research and Development, located at our headquarters in Friedrichshafen, Germany. No matter where your plant is located, you will assure yourself the technological lead essential for your operational success.



Data is collected and stored using traditional measuring records, and with centralized data acquisition by BUS-System for future analysis on the computer display.



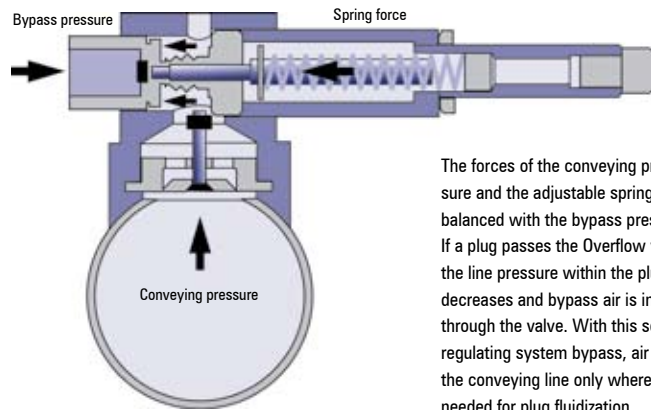
During the test runs, sensors at numerous measuring points continuously record the different parameters.



The Zeppelin Technology Center – as versatile as your requirements

The demands on testing bulk solids are very different. Therefore, numerous testing devices which can be mounted flexibly have been installed in our Technology Center.

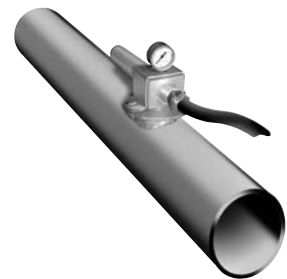
Pneumatic conveying of different bulk solids such as plastic pellets and carbon black requires a Technology Center which has been equipped accordingly. Conveying lines made from aluminium, stainless steel, polyethylene, and rubber with smooth or rough surfaces, with or without injection of secondary air, are available for the test runs. Secondary air is injected through holes or slots with the help of special valves.



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 within the plug decreases and bypass air is injected through the valve. With this self-regulating system bypass, air enters the conveying line only where it is needed for plug fluidization.



Airfloat combined with stainless steel pipes: air is injection through slots to avoid dead spots in the conveying of critical products.



Overflow combined with PE pipes: air injected through holes at every 0.5 – 1 m distance for standard products.



The Zeppelin Group of companies: All specialists under one roof

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