

ZEPPELIN[®]
WE CREATE SOLUTIONS

ENSURING TECHNOLOGY LEADERSHIP
Research and development at Zeppelin



The Technology Center in Friedrichshafen

www.zeppelin.com



ENGINEERING YOUR SUCCESS



Zeppelin Systems, the world leading plant manufacturer for high quality bulk material 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 after sales 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, extruders and compounders

Liquids Processing

Plants for the beverages industry

Silos & Filters

Silo technology and filters

Components

Diverter valves, rotary feeders, separators

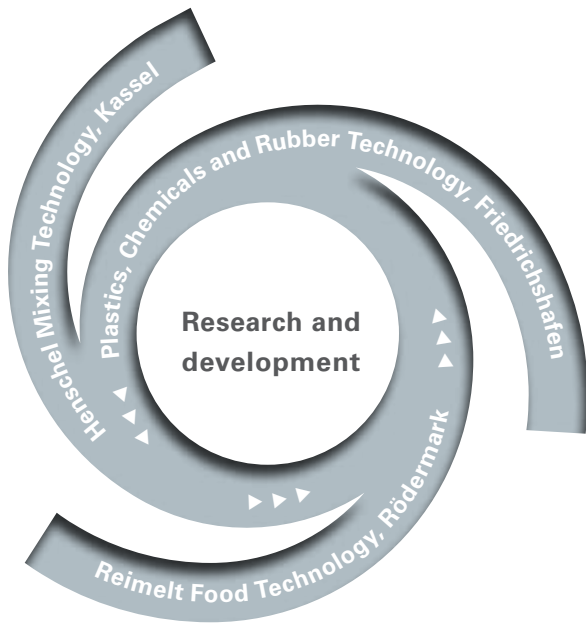
After Sales Service

Assembly, maintenance and spare parts

Quality Service

Services in quality management

A COMPETITIVE EDGE REQUIRES HARD WORK



Technological leadership is based on extensive research and development. Our activities in the world's largest network for bulk material handling ensure your success.

Zeppelin's network of technology centers

- Trials on an industrial scale
- Verification of plant design
- Development of new products and processes
- Bulk material analysis

Friedrichshafen, Germany
Plastics, chemical, rubber and carbon black industry



Rödermark, Germany
Food industry

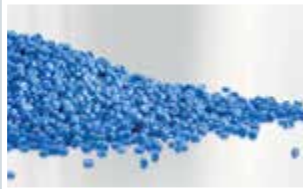


Kassel, Germany
Mixing and compounding



São Paulo
Plastics, mineral and cement industry





Premium bulk material whether plastic pellets, powders or bulk material for the food industry are in safe hands with Zeppelin.

In addition to outstanding staff, you will find the world's largest Technology Center for handling bulk material for the plastics, chemicals and rubber industry at our location in Friedrichshafen, Germany. Together with our test facilities in Rödermark and Kassel, we cover the needs of the food industry as well as the mixing and compounding sectors. We're ready to take on nearly any challenge.

The core of our Friedrichshafen Technology Center are the two test plants specially designed for processing pellets, powders and additives.

Conveying of pellets by a rotary feeder installed below a blending silo.

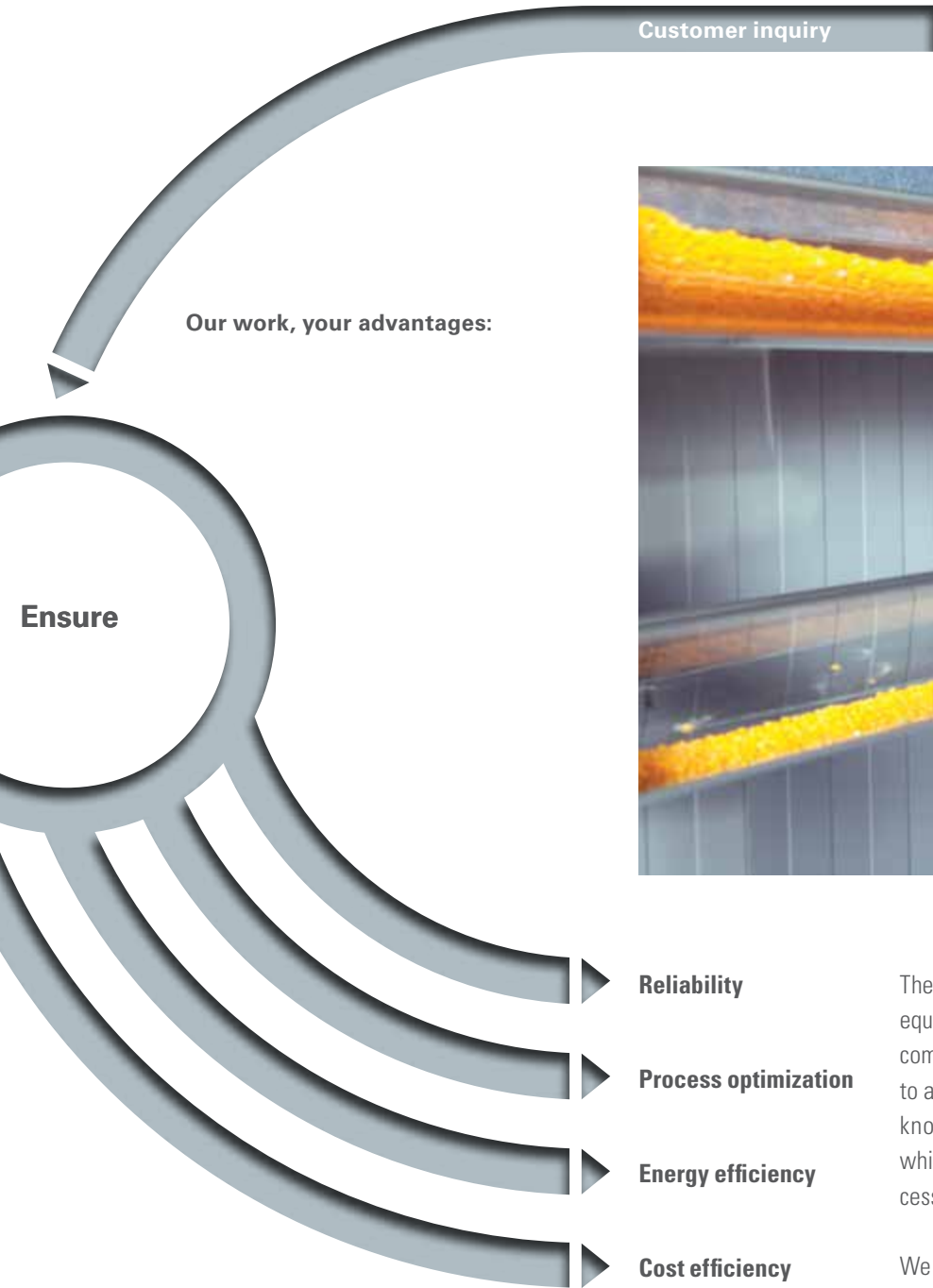


Discharge of powder from a pressure vessel.





WE FACILITATE YOUR CHOICE



The Zeppelin Technology Center in Friedrichshafen is equipped with all the necessary process technology components and systems. Our customers expect us to analyze their products in detail as only those who know their bulk material well can design plants which are characterized by reliability, optimized processes, energy efficiency and cost efficient solutions.

We conduct full scale tests to avoid the uncertainties of scale-up calculations. Special configurations can be quickly installed. Our experts provide you with a precise performance analysis as a solid basis for your investment decision.



Numerous modern test facilities guarantee optimum results. Data is continuously recorded by state-of-the-art measuring technology. We determine the relevant design parameters and issue detailed test reports as basis for designing your plant. We advise you in detail on all possibilities. New developments and advanced technologies are tested intensively.

Zeppelin customers have direct access to our Technology Centers to ensure the technological leadership essential for their operational success – wherever the location of the plant.

Our services

Conveying technology

- Dense phase and dilute phase conveying of pellets and powders
 - Nominal width: DN 65 – 225
 - Conveying distance: 10 – 460 m
 - Throughput: up to 200 t/h
- Hydraulic conveying of pellets
- Dense phase conveying of sensitive bulk material (bypass system)
- Combined vacuum 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

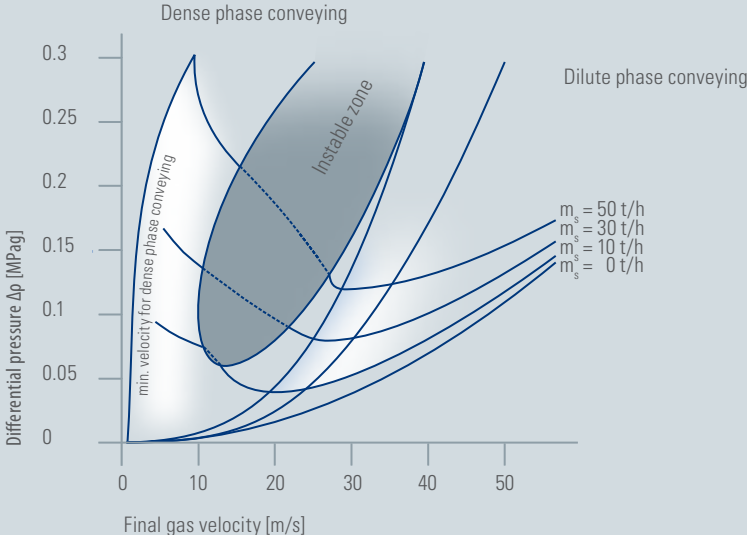
- Storage silos and vessels with various discharge systems
- Different blender types for powders and pellets
- Small component weighing unit for additives
- Heating and cooling of bulk material
- Degassing of bulk material

Sorting, separating, cleaning

- Various separators for cleaning of pellets
- Drum screeners or streamer separators
- Pig system for pipe cleaning
- Various filter systems and cyclones

AS VERSATILE AS YOUR REQUIREMENTS

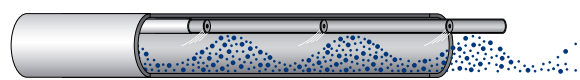
Conveying lines made from aluminium, stainless steel, PE-plastic and rubber, with or without injection of secondary air are available for the test runs. Secondary air is injected at interval points or slots with the help of special bypass systems.



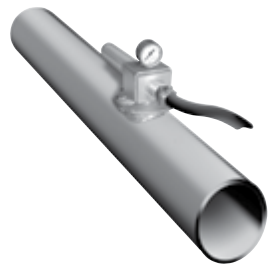
Design of pneumatic conveying systems is based on the corresponding phase diagram.



Twin-Tec systems (bypass) in our Technology Center



Intraflow: internal bypass system in aluminium or stainless steel pipes for conveying mineral bulk material, PTA/CTA, etc.



Overflow: combined with PE or stainless steel pipes; air injected at points every 0.5 to 1.0 m distance. For sensitive powdery products such as carbon black, etc.



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

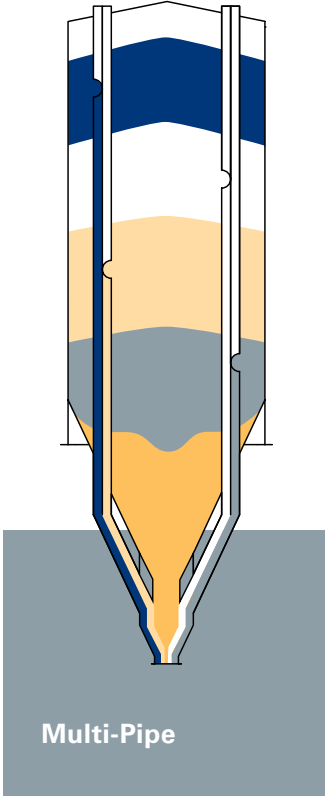


STATE-OF-THE-ART EQUIPMENT IS A MUST

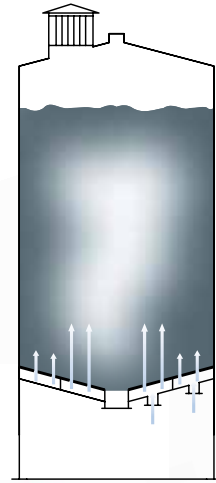
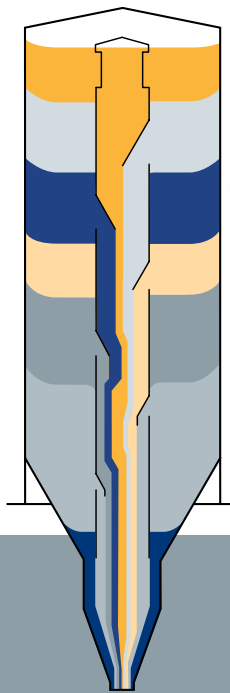
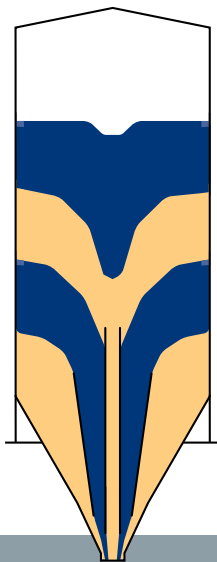
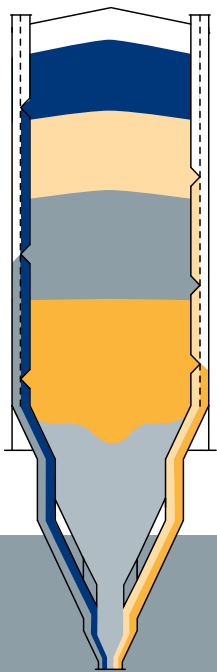
Zeppelin offers a large range of blending and homogenization silos: available as new blender or for retrofitting existing silos.

Selection of the appropriate blender type always depends on the product properties and the required blending quality.

We use different blender types for testing blending processes. Our blenders are suitable for bulk material with good and poor flowability e.g. powders, pellets, recycled products, dryblends and compounds.



Free-flowing products	✓
Free-flowing pellets	✓
Bulk material with poor flowability	
Blender capacity [m³]	2.5 / 30



Multi-Channel

Multi-Flow

Centro-Blend

Fluidized Bed Blender

(✓)

✓

✓

✓

✓

✓

✓

○

✓

✓

2.5

4.5 / 30

4.5 / 30

4.5

✓ suitable

(✓) of limited suitability

○ not economic

KNOWLEDGE IS THE BASIS FOR SUCCESS

Zeppelin has been dealing with bulk material for many years. The knowledge of bulk material properties and the experience we have gained since our foundation is stored in our central database: one of the world's largest bulk material libraries. Regular maintenance and continuous growth of our database is ensured as our customers regularly develop new products with yet unknown properties.

Shear tests provide the basis for the optimum design of storage and blending silos.

Zeppelin verifies the residual fines content using acknowledged measuring methods and evaluates the effect of different conveying methods.

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 with Camsizer)
- Residual fines content by washing
- Fluidization tests
- Humidity measurement
- Oedometer





Shear tests require much experience in the handling of bulk material having very different properties. Wall friction, internal friction and time consolidation are important characteristics for the reliable design of storage and blending silos.



Trials with different temperatures and humidity levels are carried out in our climatic test chamber.



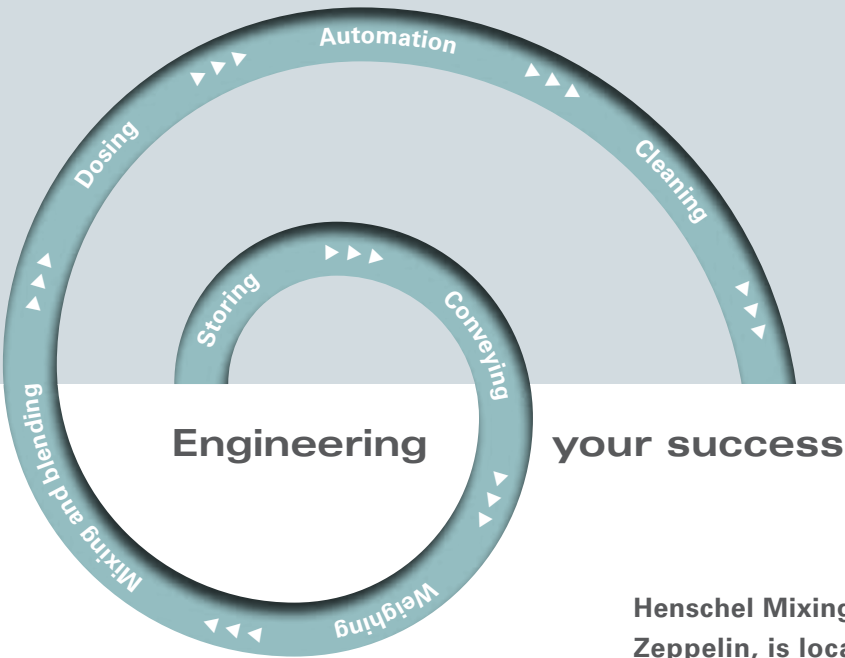
Classic screening processes and state-of-the-art measuring equipment are available to quantify the grain size distribution.

In order to determine the residual dust content of pellets, the electrostatic forces between the dust particles and the pellets must be reduced. The washing out method (e.g. FEM, ASTM) together with the classification of the fines have proven reliable.



Determination of humidity by titration.

MIXING AND COMPOUNDING WITH ZEPPELIN



Henschel Mixing Technology, a business field of Zeppelin, is located in Kassel, Germany, where mixing and compounding systems up to complete plants are designed and manufactured. The key technologies are developed and manufactured there as well.





The Kassel Technology Center offers facilities to the plastics processing and chemical industries for testing the most important operations of mechanical process engineering, particularly the mixing technology. Adapting machinery and equipment to production parameters does not always suffice to improve our customers' products. We develop completely new methods for producing and processing sensitive raw materials in cooperation with and for the benefit of our customers. Results can be verified directly in our state-of-the-art laboratories.

Many innovations could not have been realized without our Technology Center: several processes which have become standard for mixing and processing were developed here. Today's quality processing of hard and soft PVC could hardly be reached without the Kassel Technology Center.

Our continuous research provides our customers with a leading edge in fields such as metallic powder coatings, master batches, materials used for battery production or ceramic powders.





Global presence

- Australia
- Belgium
- Brazil
- China
- France
- Germany
- India
- Italy
- Korea
- Russia
- Saudi Arabia
- Singapore
- United Kingdom
- USA

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