

PRECISE PROCESSES FOR MAXIMUM QUALITY AND EFFICIENCY

# SUGAR HANDLING IN THE FOOD INDUSTRY

[zeppelin-systems.com](http://zeppelin-systems.com)

 **ZEPPELIN**<sup>®</sup>  
WE CREATE SOLUTIONS



# SUGAR IS MORE THAN JUST SWEET

SUGAR AS A RAW MATERIAL CAN DO QUITE A LOT.

Sugar is one of the most important and versatile ingredients in the food industry. Hardly any other raw material fulfills so many functions at the same time: It sweetens, adds structure, has a preserving effect and conveys flavors.

## SUGAR HANDLING NEEDS PROCESS EXPERTISE

Zeppelin Systems reliably covers the entire sugar handling process: from delivery and filling to storage in silos, big bags or sacks to screening and transport. You also benefit from well-conceived solutions for further processing – the mixing with other ingredients and processing into the doughs of your finished products. In many cases, sugar is ground into pow-

dered sugar before it is processed further. This gives some end products a different structure.

## STEP BY STEP TO QUALITY

So-called sugar handling involves much more than simple storage or grinding processes. It is a highly specialized overall process in which sugar is precisely processed, transported, stored and further refined. From receiving the raw sugar to crushing, recrystallization and producing sugar solutions and syrups to strict hygiene and product safety concepts in automated plants: Every single step has a decisive impact on the quality of the end product. It's good to know that you can rely on the experience of Zeppelin Systems experts throughout the entire handling process!



# SUGAR IS VERY SENSITIVE

SUGAR REQUIRES SPECIAL CARE IN HANDLING.

Sugar is a sensitive raw material. Sugar crystals have an amorphous surface that is particularly hygroscopic and without a fixed structure. This means that sugar requires dry, hygienic storage to prevent clumping and loss of quality.

## ACCEPTANCE: STATIONARY OR MOBILE

Delivery takes place in loose form, in tank trucks, big bags or sacks. Whether stationary or mobile, our acceptance systems adapt flexibly to your production environment and to different container types and sizes. Our sophisticated technology also ensures virtually dust-free emptying.

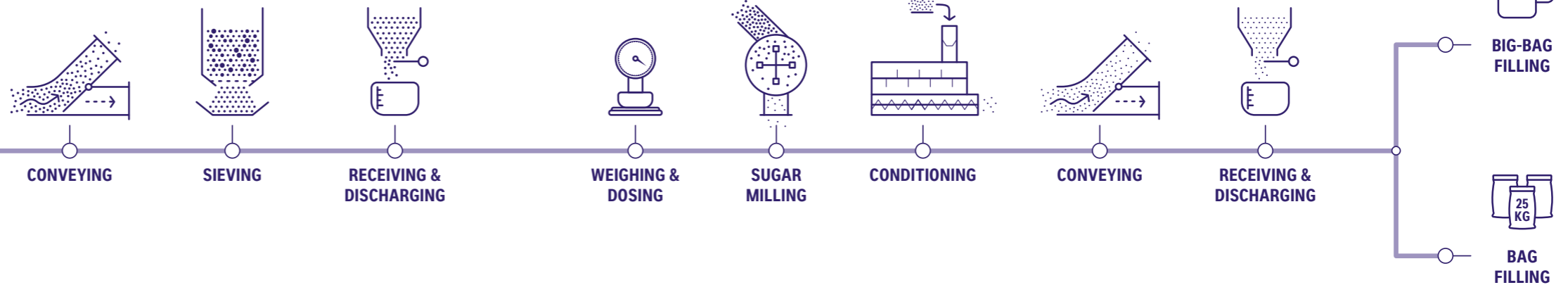
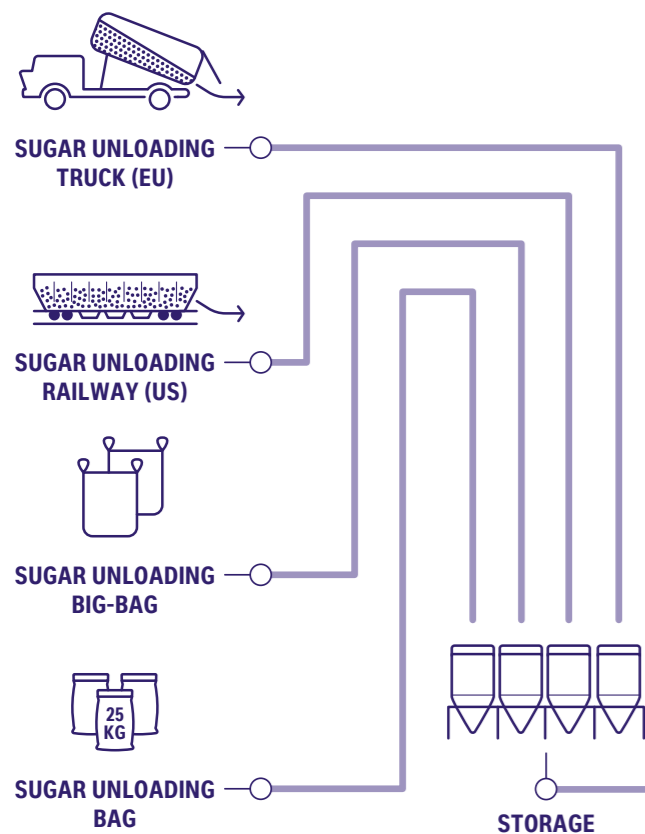
## STORAGE: HYGIENIC AND DRY

Zeppelin Systems supplies customized sugar storage silos made of aluminum or stainless steel that are precisely tailored to your processes. The integration of screening machines is also easy to implement. For maximum safety, all sugar silos from Zeppelin Systems are designed in accordance with the applicable explosion guidelines (ATEX).

## DISCHARGE: SAFE EMPTYING

Zeppelin Systems discharge floors gently convey and reliably prevent material jams or bridge formation in silos and containers. This ensures complete emptying.

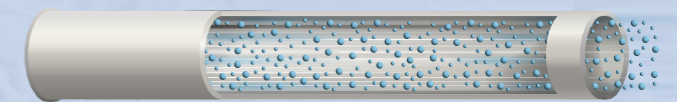
The BigBag or bag emptying stations are customized to the BigBags or bags used in your company. Critical are size and design - e.g., with an inliner pull-out and/or winding device as well as the specific flow properties of the sugar. If sugar is predominantly processed in bags, a combined BigBag and bag emptying station is a cost-efficient alternative.



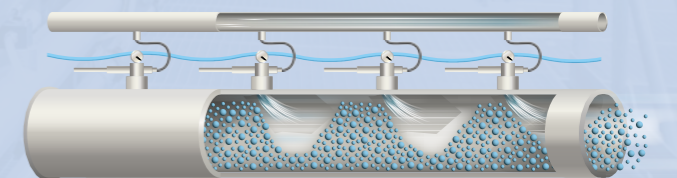
## CONVEYANCE: TWO CONCEPTS

Pneumatic conveying systems transport the sugar gently and without loss to the next processing steps. The following conveying concepts are available for pneumatic raw material conveyance:

- Economical dilute phase conveyance, i.e., via pressure or suction pneumatics



- The gentler dense phase or secondary air conveyance





# WHEN SUGAR BECOMES POWDERED SUGAR

GRINDING CRYSTAL SUGAR PRODUCES POWDERED SUGAR – BUT HOW DOES IT WORK EXACTLY?

Sugar and powdered sugar differ in their particle size. A distinction is generally made between four levels of fineness:

	Particle size range for 90% by weight	Bulk density (kg/m <sup>3</sup> )	True/particle density (kg/m <sup>3</sup> )	Number of particles (in 100 g)
<b>COARSE</b>	1.0 - 1.60	822	987	35 x 10 <sup>3</sup>
<b>MEDIUM</b>	0.5 - 1.25	864	987	293 x 10 <sup>3</sup>
<b>FINE</b>	0.2 - 0.75	887	987	8 x 10 <sup>6</sup>
<b>POWDER</b>	80% < 0.1mm	565	830	19 x 10 <sup>9</sup>

## A VARIETY OF USES

Powdered sugar is used in the food industry for further processing and forms the basis for numerous confectionery products and glazes. Approximately 85 to 92% of particles are smaller than 100 µm, which greatly increases the specific surface. The selection of the mill is based on the desired end product, among other things. Freshly ground powdered sugar has a bulk density of approx. 570 kg/m<sup>3</sup>.

Our flexible plant concept for sugar grinding enables different fine powdered sugar qualities.

Depending on the requirements, impact, hammer or jet mills are used for sugar grinding. Our expertise enables us to react flexibly to changing market requirements and sustainably optimize production processes – e.g., by finely grinding powdered sugar to achieve a consistent sweetness with less sugar use.



## SUGAR MILLING: THREE METHODS

### 1 | SIMPLE GRINDING PROCESS

Sugar is dispensed from a storage tank or pneumatically into a sugar mill. The powdered sugar is stored in a conditioning container and kept in motion by stirring. From there, it is conveyed pneumatically for further processing.

### 2 | WITH DIRECT COOLING OF THE SUGAR

Cooled air circulates to bring sugar to a defined temperature. If required, two coolers work in tandem for air below 0°C. Suitable up to approx. 10°C final temperature for powdered sugar – without CO<sub>2</sub> or nitrogen, precisely adjustable via air temperature. Ideal for sensitive creamy and cookie products.

### 3 | RECRYSTALLIZATION

Recrystallization starts after grinding with air at a defined humidity and temperature. In an agitator-driven conditioning vessel, excess water is removed by controlled cooling. The stabilized powdered sugar can be stored in silos (up to 30 m<sup>3</sup>) or sacks without separating agents. Retrofitting of existing systems possible.



# REPRODUCIBLE QUALITY IS THE KEY TO TASTE

CUSTOMIZED SOFTWARE SOLUTIONS FOR YOUR PRODUCTION.

In terms of a consistent, reproducible quality, we develop customized software applications according to your requirements. We automate your processes in storage, conveying, weighing, dosing and mixing. For example, in batch or continuous processes, where gravimetric or volumetric metering systems are precisely controlled and linked to the formulation controls of mixing plants.



## EVERYTHING UNDER CONTROL

CONTROL TECHNOLOGY FROM ZEPPELIN SYSTEMS KEEPS YOU WELL INFORMED.

Experience automation solutions that both support as well as actively drive your digital challenges and transformations.

Thanks to the latest technologies and an open, flexibly expandable architecture, the system can be easily deployed for new challenges and solutions and integrated into existing infrastructures. The connection to common IoT platforms enables continuous data availability.

### SEAMLESS INTEGRATION - MAXIMUM DATA SECURITY

With standardized interfaces and a scalable, modular structure, the platform grows with your needs. Production processes are optimized through fully automated processes that increase efficiency, quality and transparency over the long term. An intuitive UI/UX design ensures that users can work quickly, securely and comfortably at all times.



## PRODUCT KNOWLEDGE IS KEY

THE ZEPPELIN SYSTEMS TECHNOLOGY CENTER - RELIABLE DECISION-MAKING SUPPORT.

Detailed knowledge of our customers' products is crucial for efficient processes. This is the only basis for developing systems that are reliable, process-optimized, energy-efficient and economical.

The Zeppelin Systems Technical Center in Rödermark is therefore equipped with all components and systems relevant to process engineering. This is where we carry out full-scale industrial trials, which minimizes uncertainties in the scale-up. Special

structures are also easily achievable. Our experts perform a precise results analysis so that you have a solid basis for your investment decision.

### STATE-OF-THE-ART MEASUREMENT TECHNOLOGY

Numerous test facilities guarantee optimal results. Data is recorded seamlessly using state-of-the-art measurement technology. We calculate the relevant design param-

eters and create detailed test reports that serve as a basis for your plant design. In addition, we will provide you with comprehensive advice on other options. New and ongoing developments are thoroughly reviewed.

No matter where you build your plant: As a customer of Zeppelin Systems, you always have direct access to our Technical Center, thus securing a decisive advantage for your operational success. Take advantage of this opportunity!





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