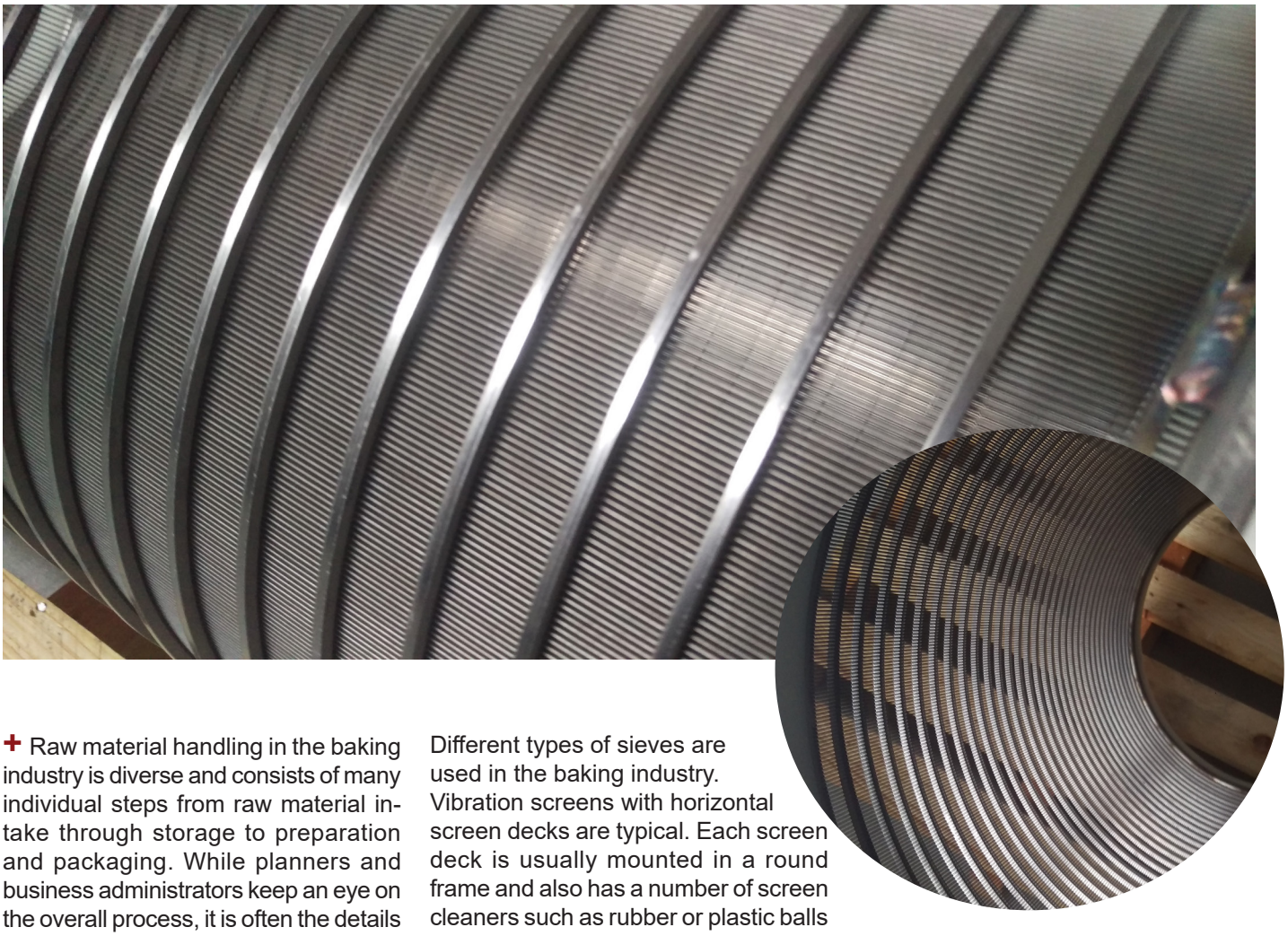
It is worth looking at the detail

Consumers attach great importance to perfect products. Flours, as an important raw material, have to meet the specifications exactly. Rotary screening machines with sieves made of stainless steel ensure safety in the production process, as several tests have confirmed.



+ Raw material handling in the baking industry is diverse and consists of many individual steps from raw material intake through storage to preparation and packaging. While planners and business administrators keep an eye on the overall process, it is often the details that determine success. If only one component does not work optimally, e.g. if everything is too slow, too imprecise, or everything is not hygienically perfect, the entire concept begins to falter.

Sifting/screening machines, for example, are under observation in several ways. They not only ensure that the product is flawless from a hygienic point of view, e.g. stones or insects are removed, but are also responsible for the correct particle size distribution in flours. This in turn plays a decisive role in later processing and for the quality of the end product.

Different types of sieves are used in the baking industry. Vibration screens with horizontal screen decks are typical. Each screen deck is usually mounted in a round frame and also has a number of screen cleaners such as rubber or plastic balls or cubes. These cleaners impact the underside of the deck during screening operation to prevent the deck from blinding. A drive mechanism provides a short, reciprocating linear movement while exerting vertical movement on each screen.

Another method is the rotary screen, which consists of a stack of several square screen decks. A drive mechanism transmits a circular motion in a horizontal plane to the screen decks. The horizontal sieves and the lack of vertical movement create smooth sieve movement. This maintains the natural stratification of the material with fine particles next to the screen and coarse particles on top of the material bed.

Rotary sifters have an integrated screw conveyor that feeds the product through an inlet housing into the screen. For this purpose, the motor mounted on the flange drives the intake screw and the perforated screen drum and the rotating paddles.

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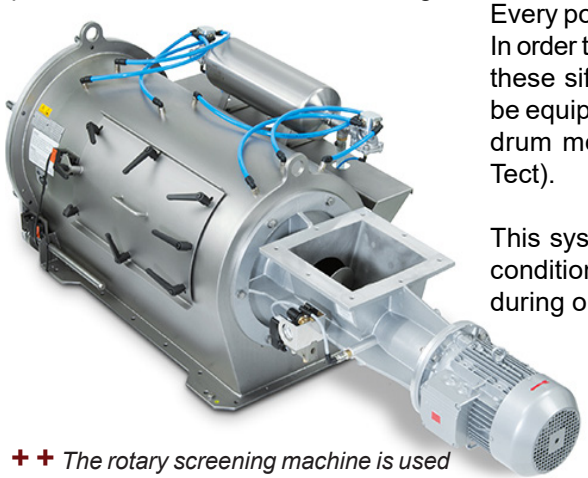
The product is then transported by the screw to the pre-screening drum and to the final screen. There, rotating paddles in the chamber accelerate its movement and swirl the product through the sieve. This high speed moves the particles several times onto the deck surface. This increases the chances that all of the particles will actually pass the sieve

High performance and long service life

Rotary sifting machines (e.g. RS 3 or RS 7) from Zeppelin Systems have proven themselves for many years for the processing of powdery bulk materials in the food industry. These machines are used as secondary sieves behind silos, below bag emptying stations and bins, as well as inline sieving machines for pressure-tight operation from -0.4 bar (g) to +0.8 bar (g) in pneumatic conveying lines as well as unpressurized directly below the bins. There is a large selection of sifter drum variants, in different materials, with different mesh and gap widths as well as hole diameters. In general, the rotary sifting machine has a compact, stable and low-vibration construction, which was designed in particular for high performance and a long service life.

For example, the intake screw and rotating paddle mechanisms have double bearings. Automatic cleaning of the sifter drum is also provided as an option.

In the RS 7 rotary sifting machine, large pieces of product that could damage the screen are first separated from the product flow in a pre-screening drum with a mesh size of 10 mm and transported to the coarse material discharge.



++ *The rotary screening machine is used in various industries as pre-screen and after-screen, under silos and in front of containers, or in feeding station*

The coarse material outlet is closed by a tight coarse material bag or alternatively by a pneumatic shut-off valve. In the case of pressure-sealed machines, the coarse material cylinder can be emptied during conveying. The sifted bulk material is conveyed through the fine material collecting hopper for further use. To replace the sieve or to carry out a general visual inspection of the sieve drum, the rear cover, on which the seal and the shaft bearings are mounted, can be removed.

A safety limit switch ensures that the machine is not switched on while the rear cover is removed. With the larger RS7 sifting machine, the sifter drum can also be checked securely through the inspection opening on the side of the machine.

All parts that come into contact with the product are of food grade and are designed on the basis of the (German) employer‘s liability insurance association regulations and on the basis of the EHEDG guidelines and are accordingly easy to clean. The design of the sifter drum also contributes to this. The side inspection openings on the sifting machine are easily used to clean and, if necessary, to replace the sifter drum. Of course, the rotary sifting machine is also available in a version in accordance with ATEX directive 94/9 / EC for use in zone 21 or 22. The sifter drum can be made of polyester or stainless steel 1.4306. The wedge wire drum is recommended as a particularly robust version.

What to do if the screen breaks?

Every polymer sieve breaks over time. In order to detect such a broken screen, these sifting machines can optionally be equipped with an automatic screen drum monitoring system (Screen-D-Tect).

This system continuously checks the condition of the special screen mesh during operation.

For this, the electrical resistance is permanently measured, and this resistance changes immediately if the screen breaks. This minimizes production downtime and the product can be blocked immediately before the raw material is processed. It is also ensured that previously produced goods are still in order. Compare this to the case of a daily visual inspection, when at least one entire day’s production would have to be blocked. This method works very well for a variety of applications.

The disadvantage of a normal polyester textile, on the other hand, is that it cannot be detected using conventional means. Completely different possibilities arise with wedge wire screens made of stainless steel. The big advantage: The stainless steel can be detected. This offers greater security if the sieve should break and the smallest of materials get into the bulk material being sieved. These batches could then be easily identified and removed at an early stage. This wedge wire screen variant is therefore particularly interesting for companies with hygiene-sensitive products. The exchange of a polymer sieve for one made of stainless steel is possible even with older models of the sifter machine.

The investigations were based on test procedures of the American Institute of Baking (AIB). The technology and information transfer centre is made up of experts from the fields of baking production, experimental baking, grain science, nutrition, food safety and hygiene. Many companies in the food industry even rely exclusively on components that have been certified by the AIB. This makes AIB an ideal partner when it comes to testing components for their suitability in terms of safety, quality and hygiene.

The main question in these tests was whether a rotary sifting machine with a wedge wire drum made of stainless steel can be used to sieve flour just as safely as one with fabric sieves made of polyester. The question arises because the mesh shape in polymer sieves is rectangular, while due to manufacturing requirements, the openings in the stainless-steel wedge wire drum are shaped square in longer columns. This could theoretically lead to increased patency with certain orientations of elongated foreign material.

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Detailed investigations

First, a basic test was carried out to determine whether the sifting machine met the requirements of the AIB, and the RS7 successfully passed all of them. Flour with the recommended 30 mesh could even be sieved in different sieve equivalents.

This was followed by various tests in which foreign material was mixed with the screenings (flour). The foreign material differed in type (e.g. glass, paper, plastic, stones or hair), size (e.g. starting at 1 mm thickness) and shape (oblong, round, etc.). In a further series of tests, the applied material included insects (e.g. Tribolium confusum - mealworm beetles). All tests were carried out in the Zeppelin test facility at the Rödermark location on the RS7 rotary sifting machine.

Various foreign materials and sizes were checked. First, the funnel was filled with 50 kg of flour and the foreign materials were added manually. The sifting machine was then started, and another 150 kg was added and sifted. The machine and the sieve were then cleaned. The sifted flour and the flour from the inside of the sifter were sifted by hand. All foreign materials found were collected and analysed. Each test was repeated three times. The result was clear: 99% of the foreign objects added to the bulk material to be sifted were sifted out by the rotary sifting machine.

Particularly regarding the production of kosher and halal products, the question of whether the RS 7 can also achieve a very high degree of protective screening for insects and parts was interesting. Further tests with weighed sifting would have to be carried out for official certification, but the sifting results were convincing here too.

Summary

In the tests based on the AIB process, it was possible to prove that the use of wedge wire screens in the rotary sifting machine also meets high quality requirements. 99% of the added foreign objects were reliably sifted out. For many applications in the food industry, sieves made of polyester are sufficient. However, if higher demands are made, especially regarding detectability, sieves made of stainless steel are recommended.

In practice, it is helpful that the polymer sieve can be replaced with a stainless-steel sieve without much effort, even in older machines.

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