



## Grain cleaning. An essential process step.

### Different trends in food safety and climate all point in one direction.

Adequate grain cleaning is paramount to profitable grain processing and to fighting post-harvest food wastage.

On the one hand crop failures, fungus contamination or moist crops may jeopardize food security: either the yield is too low, or the grain is contaminated with dangerous toxins, or moist crop is prone to mold and rots during storage, thus leading to food wastage. On the other hand, the demand for safe and nutritious food is on the rise, due to stricter hygiene guidelines claiming higher quality, and the growing world population requiring larger quantity. The solution to both challenges lies in careful and appropriate grain cleaning – it increases storage life of the grain, improves product quality and enhances production reliability as well as profitability.

#### Step-by-step cleaning

Depending on the requirements, grain cleaning consists of different steps. The basic step at the collection point always consists of sifting and aspirating. This is how foreign particles such as straw, bigger stones, paper, pieces of wood or corn-cobs – but also lighter grains, which might be contaminated, or in length broken grains, can be eliminated. Moreover, compromised surface quality of the grain can also be dealt with through surface abrasion while sifting, as well as through specialized hulling machines. Basic cleaning accounts for approximately 90 percent of grain cleaning. In subsequent

steps, the grain can be sorted according to highly specific parameters, which include practically every physical property ranging from size to discoloring thanks to trieur graders and Sortex machines.

#### Striking a fine balance

All these steps can be adjusted and combined depending on which kind of grain quality is intended. If grain is being processed to become animal feed, naturally different guidelines apply than if it is destined for human consumption. Then, depending on the application – whether milling, seed processing or malting – companies may also diversify their product for basic or premium ranges. Depending on the region where the finished product is to be sold, also different guidelines or preferences might apply. The art of adequate grain cleaning consists in the fine balance between sorting waste product without including too many good grains. Perfectly adjusted grain cleaning will guarantee optimized product quality with good profitability.

#### Basic cleaning with sieve and aspiration

The core machine for basic grain cleaning, grading and aspirating is the universal cleaning machine TAS. The machines from this series are optimally suited for applications in plants for the reception and storage of grain and other bulk materials, port facilities, mills, silo and storage plants, seed processing plants as well as malting plants. Thanks to the large number of

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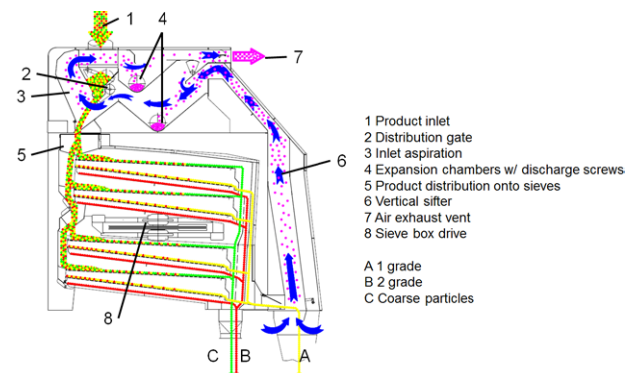
screens in limited space and the tried and tested plansifter technology, high throughput rates can be attained while only small space is required.

### Function of a universal cleaning machine

The product which has to be cleaned is distributed via a weighted vibration flap or an optional automatic inlet regulator over the whole working width of the machine. This enables an undisturbed feeding of the sieve box, even with very moist grain. The inlet aspiration system serves to remove light particles (dust, husks) which are discharged with the help of a screw conveyor and prevent the sieves from getting choked by the chaff.

The so pre-cleaned product is spread to the different pre-screen layers where the coarse particles (big impurities) are separated out of the product. The grain which falls through the pre-screens gets separated via the main-screens into the first grade (good product) and the second grade (small and broken kernels). The first grade is aspirated again in the vertical sifter with adjustable cross-section to get out light particles which were generated through the friction of the kernels on the

sieves. The outlet hoppers for the second grade and the coarse particles are arranged underneath of the machine. In general the aspiration of the product is an important must because dangerous environmental pollutant and mycotoxins are mainly on the surface of the kernel.



Through the separation of the light materials the contaminant loads of the cleaned product is dramatically reduced. A particularity of the TAS machine is the fact that the inlet and outlet aspiration system is connected. The twice-over use of the aspiration air ensures less working costs (reduction of air volume) compared to separated systems, but high effectiveness at the same time. Easy control of the cleaning results is facilitated by different separator chambers for inlet and outlet aspiration.

### Conclusion

A huge number of different cleaning principles for grain is available. This article has introduced only one of the most common techniques of mechanical cleaning. Hygienic requirements and grain will increase in the future more and more. Therefore grain cleaning is and will still be an essential step in the process from grain from the field to the end-user and requires a continuous development of cleaning principles.

