

## CLEANING CORN GRITS WITH A PELLETRON DeDuster™



When preparing the raw materials for food processing, it's important to remove any unwanted dust. This dust will cause problems with processing, (cooking) equipment, housekeeping, and may require the use of expensive additives to maintain high nutritional levels. The dust will also increase the need for water in addition to increasing the process time. All this results in lower quality finished product at higher production costs.

Most dust from grain products is dangerously explosive under the right conditions. Containing and controlling the dust is an important safety requirement.



*In a test explosion at a combustion research center, a vent panel on a dust collector ruptures to safely vent the explosion. Flashback down the collector's inlet duct (at bottom) illustrates why it's important to incorporate an explosion isolation system between connected process equipment.*

(Photo courtesy of Fenwall Safety Systems)

Strict Environmental laws require dust collection bag houses be locate adjacent to exterior walls, and equipped with blow out panels ducted to openings to the out doors for the purpose of safely venting explosions out of the building. Thoroughly removing the dust from grain products is difficult. Most plants employ screeners, or rotary sifters, which remove 50 to 75% of the dust, filling portable containers. The dust is recovered for use in the process further down stream. Pneumatic conveying lines to the cooking process then transport the cleaned granular product.

The transport systems normally are pressure type dilute phase, which feed the product into the conveying lines by rotary airlocks. Venting the air at the airlock inlet is a big problem, in that even the smallest pressure results in a considerable amount of the remaining dust to be forced out of every tiny opening in the screeners and sifters. Not only was this a big challenge to the problems of housekeeping, but also the explosion hazard is a real concern

Consultant, and former ranking Plant Engineer, John Christenson with C. J. Schneider Engineers had been searching for a better method for years. While reading a trade magazine, he spotted an advertisement for a newly patented DeDusting machine manufactured by PELLETRON CORPORATION in Lancaster, Pennsylvania. He was very interested in the compact design, and the simple construction. The unit was built in 304 stainless steel for sanitary applications. Writing for additional information, he contacted his friend and colleague, an area Engineer for an international cereal product manufacturer.

Together, they conducted a series of tests in the PELLETRON Laboratory, and determined the cleaning ability and flow capacity of the DeDuster™. Based on the results, an order was placed for a model P400 gravity DeDuster™ for cleaning "Corn Grits" at the rate of 20,000 lbs/hour. Installation was completed in the fall of 1998, and the operators began the measurement of Process improvement.

This compact unit replaced a rotary sifter. The product was fed by gravity from an existing feed hopper, and discharged into a weigh hopper feeding a dilute phase pressure pneumatic conveying system, delivering the corn grit to the cooking process feed hopper.

The unit included a wash air fan for the fluidizing wash decks, and an exhaust fan for drawing the dusty air to an existing dust collector. The operation is simple, as the dusty corn grit enters the unit it passes through a magnetic flux field, which disrupts the static attraction of the dust to the coarse grit. An inlet deflector spreads the corn grit across the primary fluidizing deck, where the air lifts the fine dust up and out of the coarse corn grit.

At the end of the primary deck, the cleaned corn grit drops into the Venturi chamber, where a rising column of wash air lifts the dust up and out of the dusty air outlet. The separation is enhanced by application of the magnetic flux field, disrupting the static charge attraction. The cleaned corn grit passes across a secondary deck, which ensures good separation, is discharged into the weigh hopper for feeding the product to the process cookers

The dust-laden air is drawn to the remote dust filter cleaning. The recovered dust is retained for further processing.

Following several months of operation, the new system was carefully evaluated for the purpose of determining the capital investment recovery. Management was very pleased to learn that their investment had been recovered, and the savings was now contributing to profit after only three months of operation.

How is the return on investment measured?

1. Increased production. (as much as 10%)
2. Lower water usage in the process. ( reduced 5% or more)
3. Less addition of costly nutrients. (more than 30% saving)
4. Lower man-hours for cleanup. ( down to one hour from as much as twelve hours)
5. Improved product quality. (rejects down by 3%)

The plant operates (24) hours per day, (6) days per week. The seventh day is for sanitizing all process equipment. The original installed cost for the DeDuster™ system, including demolition of old systems, and rework of some existing equipment was \$ 165,000.00. A three month payoff, meant that the DeDuster™ was now contributing **more than \$600,000.00 per year to profit.**

Newer DeDuster™ designs have reduced the installed costs even further by incorporating the fans and dust collector as an assembly, prepackaged in the Factory for ease of install at the Plant site.

