

## Case history

# Scrubber cleans airstream

**A wet scrubber cleans the exhaust airstream after a drying process.**

**A**veka (also known as Cresco Foods) manufactures flavorings and additives for use in the food, beverage, and nutraceutical industries. An important part of the company's manufacturing process is drying a liquid slurry feedstock using a drum/roll dryer. The dryer consists of two rotating drums that are heated internally using steam to increase their surface temperature.

The liquid feed is sprayed onto the outside of the heated drums as the drums rotate. The wet material sticks to the surface of the drums in a thin layer and the heat evaporates the moisture, leaving a film of dried material on the drums. A knife system then peels the dried material from the drums for collection, and the evaporated moisture is exhausted through a discharge at the top of the dryer.

The dryer's exhaust airstream also contains dust particles and flakes from the liquid feedstock, which

must be removed by a dust collector before the airstream can be exhausted back to the atmosphere. This moisture-and-particulate-laden exhaust was causing problems, however, by plugging up the exhaust ductwork. Unclogging the ductwork required the system to be shut down and cost the company a great deal of time and money.

"We didn't have any filtration system installed before," says Dan Henry, process lead for Aveka. "We just had a regular exhaust fan, hood, and ducting, which we had to hand clean regularly."

### Scrubbing the airstream

For a solution, Aveka turned to Sly, a dust collection equipment supplier based in Strongsville, OH. The supplier solved the problem by mounting an Impinjet wet scrubber system directly on top of the dryer, removing the need for ductwork between the dryer and the dust collector. To fit the new system into



**The Impinjet scrubber was custom-built to fit on top of Aveka's dryer to clean food flavor particles and dust flakes from the exhaust air.**

Aveka's processing equipment for which there was a height restriction of 12 feet above the dryer hood, the supplier specially designed the system to be just over 10 feet tall, with two inlet openings at the bottom. Because of the space restrictions, the supplier also moved the air and liquid discharge outlets from the top to the side of the unit.

*"The new scrubber eliminates the buildup of product in the ducting and also helps the exhaust smell better."*

With the new system, the dryer's exhaust airstream enters the scrubber and passes through openings in a perforated plate (or tray) that holds a bed of scrubbing liquid. The airstream moves through the holes at a high velocity (between 60 and 75 feet per second), causing each perforation to become a jet, atomizing the liquid into droplets as small as 100 microns in diameter. An impingement baffle grid is mounted above the perforated plate so that a baffle is located in the liquid bed above each individual hole in the plate.

This creates turbulent interaction between the dust-laden exhaust air and the scrubbing liquid and also reduces the amount of scrubbing liquid needed for efficient cleaning. This interaction between the airstream and the scrubbing liquid entraps the dust particles in the liquid, which then carries the particles across the plate to a discharge drain, while the cleaned air passes through the liquid bed and exhausts through an outlet at the top of the scrubber.

"The new scrubber eliminates the buildup of product in the ducting and also helps the exhaust smell better," Henry says. "The scrubber and ducting are now clean-in-place (CIP), so we only have to clean the hood manually."

**Note:** Find more information on this topic in articles listed under "Dust collection and dust control" in *Powder and Bulk Engineering's* article index in the December 2017 issue or the Article Archive on *PBE's* website, [www.powderbulk.com](http://www.powderbulk.com). (All articles listed in the archive are available for free download to registered users.)

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