

Case History

Dedusting unit effectively removes dust from product stream

A resins producer purchases a mobile dedusting unit for its truck-loading operation to ensure that its customers receive quality products.

RP Compounds GmbH, Schkopau, Germany, produces pelleted plastic resin compounds that are used by plastics processors for making a range of products. The company pneumatically conveys the resin pellets into large silos for storage and transfers them as needed into bags, octabins, or trucks for transport to the customers' facilities. To minimize the fine dust generated by friction during conveyance to the silos, the company uses dense-phase conveying systems for moving the pellets short distances and dilute-phase conveying systems with counter-flow elutriators installed on the silo tops for long distances. However, until recently the company had no way of controlling the dust generated by friction in the conveying systems and with the silo walls when discharging the pellets to load the trucks. This dust could exceed 400 parts per million (ppm) in the finished product, depending on the loading rate. Since the customer requires that the pellets it receives have less than 50 ppm of dust, the company needed to find a way to reduce the dust produced during the truck-loading process to acceptable levels.

Finding a way to dedust the pellets

RP Compounds produces more than 110,000 tonnes of polypropylene and polyethylene resin pellets per year for use by its customers. Because dust is an unwanted contaminant that reduces the plastic resin pellet quality and causes defects in finished products, as well as excessive scrap, production interruptions, and high housekeeping costs, the

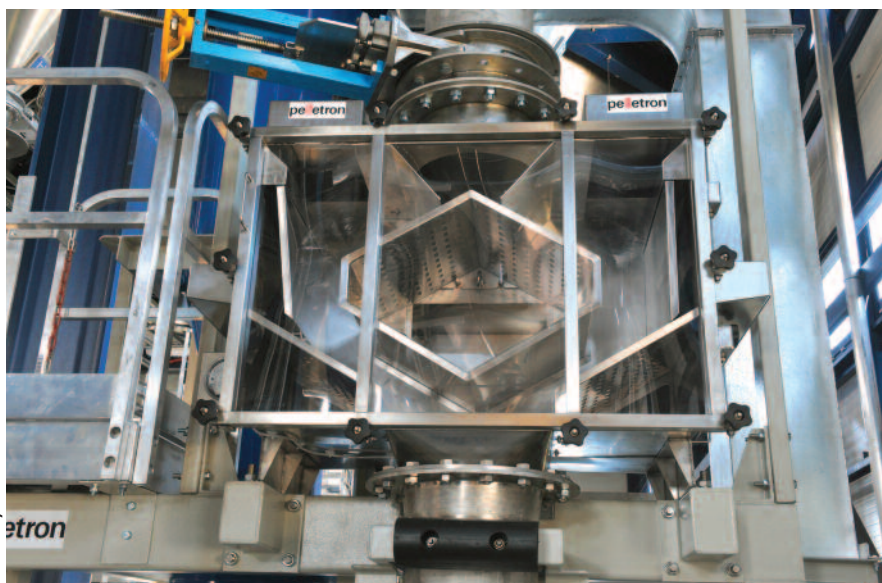


Photo by Horst Fechner

Handling up to 36 tonnes of pellets per hour, the efficient dedusting unit consistently reduces the dust levels to less than 30 ppm.

customers have set strict limits on the amount of dust allowable in the pellets they receive. So to ensure that it continued meeting the customers' quality standards, in autumn 2007 RP Compounds contacted Pelletron Inc., Lancaster, Pa., USA, looking for an efficient and economical solution to remove excess dust from the resin pellets in the trucks. The supplier provides dedusting systems, pneumatic conveying systems and components, and other bulk material handling equipment to the plastics, chemical, pharmaceutical, mineral, food, automotive, and other industries.

"We needed dedusting equipment for the truck-loading operation to maintain our customers' business," says Harald Brückmann, RP Compounds plant manager. "Otherwise we would have lost them as customers, which would have resulted in a large loss for

our company. The supplier was the only one we knew of that could provide a technical solution that would allow us to reduce the dust amount in the trucks to below fifty parts per million while handling up to thirty-six tonnes of pellets per hour. They also responded quickly and offered to customize their standard equipment to meet our requirements for a mobile unit that could be easily moved under each silo during truck loading."

When the company agreed to purchase a mobile dedusting unit in December 2007, the supplier began modifying its standard unit to meet the company's requirements. "We visited the company's facility, listened to their needs, and developed a new mobile machine for them," says Heinz Schneider, Pelletron CEO and president. "We customized a newly patented washdown unit that allows easy

Until recently, the company had no way of controlling the dust generated when discharging the pellets to load the trucks.



Photo by Horst Fechner

The mobile dedusting unit, installed between a silo discharge and truck inlet, removes dust particles as small as 1.6 micron during truck loading.

access to all areas for cleaning between product changeovers, and we installed components inside it to help better regulate the product flow through it. We assembled the unit and tested it in our facility, and then labeled, disassembled, packed, and shipped it to the company. The company installed the unit without any problems and didn't need our start-up support because it's so easy to operate."

The mobile dedusting unit

The XP360 DeDuster closed-loop compact cyclonic dedusting (CCD) system can remove angel hair and dust particles as small as 1.6 micron from a product stream without impacting the loading capacity. The customized unit's low height profile allows it to be easily moved under the company's silos using a forklift. A telescopic pipe connects the unit's inlet to a silo discharge and another

er connects the unit's discharge to a truck inlet. The silo outlet flanges and the truck inlets have fast-connectors for quick assembly and disassembly. The unit is easily cleaned with compressed air or water between product changeovers to prevent cross-contamination, and a standard clear polycarbonate panel (hardened glass is available on request) allows an operator or camera to monitor the dedusting process.

The dedusting unit is partitioned into three cleaning zones — the upper wash zone, the venturi zone, and the lower wash zone — that are separated by wash decks. During operation, the resin pellets discharge from a silo by gravity via the telescopic pipe to the dedusting unit. As the pellets pass through the unit's inlet, a primary flux field generator creates a magnetic field that interrupts the electrostatic charges that bond the dust to the pellet surfaces, allowing the dust to detach from the pellets. After passing through the inlet, an adjustable inlet deflector distributes the pellets proportionally onto the first wash deck in the unit's upper wash zone, where upward-flowing pressurized air further separates the dust particles from the pellets. A wash deck has slots and holes that are located and designed to enhance the air-wash effect to effectively move the dust up and away from the pellets.

The pellets move off the wash deck to the unit's venturi zone, where regulated high-velocity updraft air moves the dust particles and any angel hair away from the pellets and into a vacuum airflow that pulls them out of the unit to a dust collector. The airflow in the venturi zone can be increased or decreased, depending on the dust particle size to be removed. The pellets continue moving by gravity to the second wash deck in the unit's lower wash zone, where any remaining dust particles are removed from the pellets to ensure complete cleaning. The virtually dust-free pellets discharge from the unit via the telescopic pipe into a truck that transports them to the designated facility for processing.

Photo by Horst Fechner



Between product runs, an operator can easily access the dedusting unit's interior to clean it out using compressed air.

Improving customer satisfaction

Since the company began using the mobile dedusting unit in June 2008, it has significantly reduced the dust levels in the resin pellets loaded into the trucks. To verify the unit's effectiveness, the company conducted more than 100 particle analysis tests, and each test showed the dust levels in a truck to be less than 50 ppm. According to Brückmann, more than 90 percent of the results showed the dust levels to be less than 10 ppm, with the remaining 10 percent less than 30 ppm.

"The dedusting unit improves the quality of the final product, and our quality management team is very satisfied with the results," says Brückmann. "The unit has helped stabilize our business and allowed us to achieve high customer satisfaction. Since improving the product quality, we no longer receive customer complaints regarding a final product's

dust level, and the customers have accepted all of the shipments that we've sent to them. Because of this, we experienced a return on our investment after just twelve months of using the dedusting unit. In fact, the dedusting unit has performed so well that we recently decided to purchase another one for our octabin filling station."

PBEI

Note: Find more information on this topic in articles listed under "Dust collection and dust control" in *Powder and Bulk Engineering International's* comprehensive Article Index at www.pbeinternational.com and in books available through the Web site in the *PBE/I* Bookstore. You can also purchase copies of past *PBE/I* articles there.

[Click here for more info.](#)

Pelletron, Lancaster, PA USA
+1 717 293 4008
www.pelletroncorp.com

