

Before (left), after (right): The deduster prevents build-up from forming on the screw.

Dusted

REMOVING CONTAMINANTS AND DUST FROM GRANULATE FLOWS During the production of plastic parts, microparticles such as granulate debris and streamers in the material flow often result in a lower quality end product. A manufacturer of exposed cisterns is one of many firms to experience this problem. Though dark spots on the housing surface do not affect the functionality of the cistern, they make for a poor visual impression. To fix this problem, the granulate had to be dedusted.

“No manufacture of high-gloss surfaces produces parts without tiny discolored spots. But if the spots reach a certain size and quantity, consumers see them as visual defects,” said Andreas Burth, head of Materials and Process Engineering at the sanitary technology manufacturer Geberit. Burth was describing their initial production difficulties in the manufacture of cisterns from ABS.

In the production hall, the pre-dried, uncolored ABS raw material is moved to the injection molding machine and fed into the machine’s hopper. A gravimetric feeder meters the master batch into the machine’s inlet. After the mold is injected, a linear handling unit removes the housing, cuts off the sprue and places the part on a conveyor belt. Next, an employee inspects the part and puts it on a

workpiece carrier. The different parts of the cistern are then automatically finished and put together on an assembly line.

To find out what was causing the dark spots, the screw feeder was removed from the injection molding



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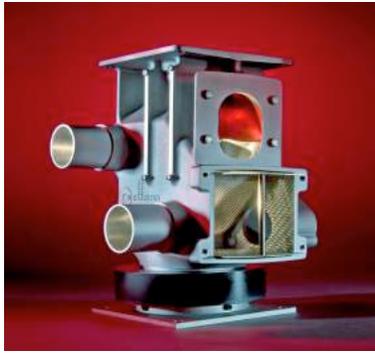


“Microparticles in the granulate result in flaws with burns and inclusions in the plastic part.”
Gerhard Gielenz, Geberit International

machine. Burth found a greasy build-up on the surface of the feed zone. “Microparticles were carbonized, detached sporadically and then found

their way onto the housing surface after the injection molding process. We were sure that dust in the granulate had to be what was causing issues. To improve the visual quality of the part, we had no choice but to dedust the granulate.”

The plastics processor first consulted with its master batch vendor to find out whether dedusted granulate could be obtained. They found out, however, that the raw material would be more expensive and that new dust would be produced during transport of the granulate. This was the basis for their decision to dedust the granulate immediately before the injection molding machine.



The compact deduster series was developed specially for use with injection molding machines.

what is known as the Lorentz force. The microparticles detach from the granulates and are suctioned off. The interaction between the air current and the magnetic field can be adjusted for individual applications.

Dust particles cause defects

Physician Gerhard Gielenz, head of Polymeric Materials at Geberit in Rapperswil-Jona, Switzerland, has spent the last few years working on the microextrusion of catheter tubes for medical use. He has spent much of that time working on dedusting. “For catheter tubes with diameters under 2 mm and walls sometimes significantly less than 0.1 mm thick, dust particles in the extrusion process will inevitably result in flaws with burns and/or gel-type inclusions in the tubes.” Gielenz has had very good experience with a smaller version of the deduster and is a proponent of its method.

Since then, they have been using the P1S deduster from Pelletron. Instead of being in its usual location (on top), it has been placed next to the machine. “This way we can use the unit more flexibly with other machines,” Burth said. “We decided to use the deduster because it is very compact and simple to set up. With it, we no longer have problems with dark spots on the housing surface.”

The deduster works like an air separator line on an inclined plane. The granulate slides down at an oblique angle against an air current. The light components in the granulate such as dust and streamers are blown higher than the heavier parts. A vacuum is connected to the upper end to suction these light particles out of the material flow. The problem with polyamides, however, is the electrostatic adhesion of the small particles to the granulate. The air current alone is not enough to separate the dust. That is why an electromagnetic coil was placed above the air separator to create an alternating magnetic field. It temporarily reduces the adhesive electrostatic forces created by

The process differs significantly from the ionization technique also used for dedusting. Gielenz said, “The ionization process does not work in this case, because the granulate contains a mixture of electrostatic charges. Ionization can only create positive or negative electrical charges. That means that it will not remove the adhesions of microparticles from all of the granulate grains. The ionization process also produces ozone. Naturally, this is an undesirable side effect.”

Burth is pleased about an entirely different side effect experienced in the production hall in Pfullendorf. “Since

Clean granulate

An electromagnetic field in the deduster breaks the static adhesion between the plastic granulate and small dust particles. This efficiently removes even the smallest (one micron in size) particles. The granulate flows continuously through a discharge channel or other feed system into the deduster. The adjustable inlet plate distributes the product evenly onto the wash decks and ensures a gentle flow. A powerful fan creates a wash of air, pressurizing the air through holes and slots in the wash deck for efficient removal of dust and streamers. The product flows from the upper wash deck through the venturi zone. This zone is designed to separate out long streamers and heavier dust particles.

we’ve been using the deduster, no more dust is being produced outside the injection molding machine either. That means less cleaning work for us.” -Oliver Lange

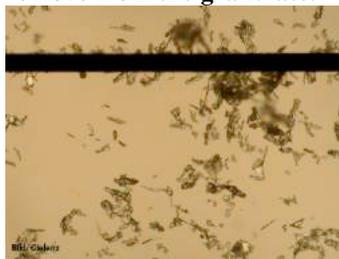
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The 0.2 mm wire shows the size of the particles that the deduster can remove from the granulate.



The deduster can be placed on or next to the machine.

