Extraction of wet paint overspray: RECLAIM with new fluidizing rotor

New challenges lead to new solutions: During the painting of automotive axles at an automotive manufacturer, overspray is created that must be captured and entirely disposed of. In order to keep the separator functioning despite the forming of paint clumps, in this instance Keller Lufttechnik developed a fluidizing rotor - a solution that makes the system operate more efficiently with considerably reduced energy consumption.

Robots paint automotive axles at an automotive manufacturer. The small dimensions of the components result in a large volume of overspray that presents a challenge for the separation system. “Initially we designed a baffle plate ahead of the suction opening of the filtration system to collect excess paint deposited in front of the separator”, explains Christian Zöller, Project Manager at Keller Lufttechnik Sales. “However, in practice this meant that the paint booth became heavily contaminated. The customer therefore requested a solution minus this baffle plate.”

Paint clumps create problems inside the separator

“Without this baffle plate, the huge volume of paint particles presented a substantial challenge for our RECLAIM separation technology”, reports Christoph Schiller, responsible for technical project management. “Paint particles agglomerated with the limestone powder that is added as an auxiliary filtration agent, and ended up persistently forming clumps.” After filter cleaning by compressed air pulses, the paint clumps ended up in the limestone powder container. Normally, compressed air disperses the limestone powder-particulate mixture in the container and returns it to its original powder form, which allows it to be re-used and blown onto the filter plates again as an auxiliary filtration agent. However, in this particular case, that did not work out very well.

Fluidizing rotor loosens limestone powder-mixture

“We developed an innovative solution for this type of separation with our fluidizing rotor”, informs Schiller. “It mingles the contents of the limestone powder container continuously and is powerful enough to prevent agglomeration.” The continuous rotation inside the separator also creates a permanent cloud of limestone powder. Incoming paint particles promptly adhere to the limestone powder and can thereby pre-separated.

Technical obstacles overcome

“The solution is simple”, explains the supervisor for this technology, “but as always, the challenges are in the details. We needed some time to design a bearing for the rotor shaft that can remain functional when coming in contact with limestone powder.”

Efficiency increased - operating costs reduced

It was discovered that the new rotor technology possesses another advantage: It is much more energy efficient than fluidizing with compressed air. “This feature results in increased profitability despite initially higher acquisition costs”, says Zöller. “Our experience indicates that the improved admixing process actually reduces limestone powder consumption. The powder can be re-used more frequently before it has to be replaced.” This also positively impacts operational safety and system efficiency. The fluidizing rotor in RECLAIM systems will become standard equipment for the separation of paint aerosols, report the project managers.

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The continuous rotation creates a permanent limestone powder cloud, which quickly adheres to incoming paint particles.