Suppliers' Tips

What issues can occur with my outdoor dust collector during the changing seasons?

When temperatures fluctuate, a dust collector can experience moisture problems. Moisture can condense on the collector's inside surfaces when the outside temperature drops below the dew point. The effects of this can cause wet dust clumps, rust formation, and damage to the cellulose cartridge filters. To prevent these issues, consider exterior insulation for the dust collector and ducts. Identifying a moisture problem and taking the necessary steps to correct it can be crucial to ensuring that your process operates at the highest possible efficiency.

Collectors with a pulse-jet cleaning system use compressed air and the compressed-air line can experience moisture. The compressed air's temperature will tend to mirror the ambient temperature. A greater temperature differential will exist between the compressed air and the process air during the winter months, which may cause moisture condensation in the dust collector. To ensure a clean, dry air supply, install a water filter with an automatic drain and a coalescing filter in the compressed-air line, which can help to prevent moisture in the system.

During pulse-jet cleaning, a sequential timer actuates solenoid valves, allowing the air diaphragm to open and release high-pressure air from the air manifold reservoir into the cartridge filters, removing the dust from the filter media. These solenoid valves located on the collector's dirty side, can also experience moisture condensation. Installing a solenoid-valve heater can prevent the electric solenoid from condensation freezing in cold temperatures freezing. Defective solenoid valves can result in cleaning system failure, causing the collector to work inefficiently.

Outdoor dust collectors may also have explosion vents or panels to comply with safety standards. To prevent snow or ice accumulation on explosion vents I recommend not installing vents in the horizontal position.

Lastly, establishing a periodic maintenance schedule where filters are replaced during the warmer months will keep your maintenance team happy and warm.

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Depending on the process being filtered, the change in outdoor temperature from summer to winter could cause condensation to occur in the dust collector, resulting in dust buildup on the sidewalls and hopper and even in the airlock pockets. This buildup can cause hopper discharge problems and provide a place for mold and bacteria to grow. Insulating the dust collector and ductwork may help prevent condensation.

Make sure to service the air compressor and air drier on the compressed-air supply. In cold climates, it's a good idea to monitor and control the condition of the compressed air used to pulse-clean the filters. The air should be clean and very dry because the moisture in the compressed air can freeze in the pulsing solenoid valves, causing them to malfunction. If the collector has solenoid or diaphragm valve heaters, they should be checked to make sure they're operational.

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The two main outdoor dust collector problems associated with the changing seasons are:

1. Water in the pulse-jet cleaning system's compressed-air source. With the cleaning air pressure requirements of 80 to 100 psi for many pulse-cleaned dust collector designs, water in the compressed-air system can cause issues once the temperatures drops below freezing. System components such as solenoid valves and diaphragm valves can freeze, resulting in broken springs and split diaphragms, both of which cause a failure of the collector's cleaning system. A quality compressed-air dryer will help address many of these issues and keep your collector's cleaning system running properly through the winter.

2. Water or other liquids condensing in the dust collector. The major ramification of colder temperatures is condensation within a dust collector installed outdoors. This is particularly important with hot gas stream processes or those where condensable oils are a part of the process gas stream (for example, foundry fume ventilation and plastics compounding). In these applications, the airstream is likely to pass the moisture dew point and begin forming liquids in the collector. This can lead to material sticking to the filters and the collector walls, promoting high pressure drops and the potential to form material bridges over the hopper outlet. In addition, airstream chemistry can cause interaction with condensing water, leading to acid formation that can aggressively attack the metal housings of a typical collector. Telltale condensation signs in a collector are liquid trace lines in the collector hopper (typically the coldest point in any system). There are several ways to address condensation issues, including collector insulation, heating the collector with any number of various heating elements, and maintaining airstream temperature by insulating the dirty-air duct.

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