SUPPLIERS' TIPS

How can I reduce the amount of compressed air my dust collector's filter cleaning system uses?

Air consumption is typically rated by the valve's size, the amount of compressed air used, and the duration between pulses. The most basic way to reduce compressed air use is to control the pressure drop to the fan's design level.

Many dust collectors have a basic cleaning system that pulses on a regular basis — whether the filters need cleaning or not. This is a valid method under some circumstances, but it consumes more energy and compressed air than is usually necessary. Ideally, you want to pulse-clean the collector only when cleaning is needed. That is, when the pressure drop (ΔP) across the filters reaches a certain high level and causes a decrease in the airflow (capture velocity) at the hood. You can easily accomplish this task by using a pressure switch or a single-relay switch, which allows your system to use compressed air only when needed. In most applications, this reduces air consumption over time.

Though most dust collectors' cleaning systems operate with these principles, different models are "tuned" differently. Theoretically, the system should operate to maintain a given airflow; however, some collectors have more effective pulse mechanisms, better quality valves, or filters with superior dust-release characteristics. These factors may result in less compressed air used, lower PSI needed, or longer intervals between pulses. The filter media type you're using affects the air consumption too. For example, surface-loading media is cleaned off more thoroughly with each pulse, resulting in the system not having to pulse as often.

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There are many ways to reduce your dust collector's air consumption. However, you can't sacrifice the filters' cleaning since they are the heart of your system and must be maintained and cleaned within the design parameters of your dust collector. If you install an on-demand cleaning system, you can ensure that your filters are cleaned properly but only as often as needed. Some plants mistakenly turn down the baghouse's air pressure to lower the amount of air consumed during each pulse. While this seems like an easy fix, it typically means that you'll have to pulse the bags more frequently because the filters aren't being cleaned adequately during the pulse. Thus, you don't end up lowering air consumption after all.

Make sure your diaphragms are in good working condition and not leaking compressed air into your baghouse. Many times this isn't checked until a plant notices it doesn't seem to have the amount of air available that they're used to. Pulse systems should be checked at least quarterly for bad solenoids and diaphragms. You should keep about 10 percent of the necessary diaphragms on hand in case you need to make quick changes. Placing a pressure transducer on the header tank can help diagnose problems very quickly. When tied into your DCS or PLC, you can monitor the pressures in your header tanks. If the tank has lower pressure than normal, you may need to replace a bad diaphragm or solenoid.

Keep in mind that the firing time for most pulse valves should be in the range of 100 to 150 milliseconds. Typically, if the valve is fired for much longer, the compressed air is wasted since it's the initial shock wave of compressed air that knocks the dust cake off of the filter.

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You can reduce the amount of compressed air that your dust collector's filter cleaning system uses by using a compressed-air regulator and indicating gauge at the collector's air manifold tank to regulate the air pressure properly. In addition, the timer board that controls the cleaning rate is often factory-set. By monitoring the differential pressure gauge on the collector, you can adjust the timer board's setting to pulse less frequently with little-to-no effect on the stabilized pressure drop of the system.

Keep in mind that using clean and dry compressed air at the dust collector will allow the cleaning system to work at its optimal potential. You should incorporate an air dryer in the compressed air system or use a point-of-use compressed air filter at the collector. This will provide clean and dry compressed air, which will produce the best filter cleaning and longest filter life.

Probably the best way to reduce the amount of compressed air for a dust collector is to use a Photohelic pressure gauge on the cleaning system (also called on-demand cleaning). This gauge will control the cleaning function by turning the cleaning on and off at desired set points. The key here is to set this gauge correctly. If not set properly, filter life will be shortened and any dollar savings on compressed air usage will be offset by additional filter changes. By setting the gauge correctly, you'll conserve compressed air and get the longest filter life possible.

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