• How can I detect major leaks in the system?
• How can I plan system shutdowns for maintenance?
• Is the system keeping my plant in compliance with state and federal emissions limits?

You can find the answers by assessing the dust collection system’s operating conditions. An easy, inexpensive way to do this is to equip the system with three simple gauges. For a total installed cost of about $750, the gauges can help you monitor the system and find clues to problems behind performance changes.

Individually, the gauges provide valuable system performance information. But together, the gauges give immediate information on the system’s status so you can plan preventive maintenance or predict future problems.

Monitoring system performance

Although a dust collection system is typically custom-designed for an application, all systems have common performance patterns. To get the most value from your gauge readings, you need to establish the best, or

Tips:

An easy, low-cost way to monitor and maintain your dust collection system

Maintaining your dust collection system can be a frustrating, expensive task. This tip describes a simple, low-cost way to monitor the system for information on why, what, and when maintenance is required.

A dust collection system can be the Jekyll and Hyde of your dry bulk materials processing or handling operation: Although the system is supposed to improve your environment, it often ends up being a major cost item for plant management and a headache for your maintenance workers.

To cut the system’s operating cost and simplify maintenance, you need answers to these questions:

• How can I tell if the system is operating well?
• When should I replace the filters?
optimal, performance level for your system. This level typically occurs either 1 or 2 days after initial system startup or after you’ve installed new filters in the system. (Be aware that even the optimal performance level may not meet your needs if the system has been poorly designed for your application.)

Once you’ve established this level, read the gauges at least once a week and record the readings to monitor any change in system performance. The following examples show how gauge readings can indicate performance changes and give clues about the problems behind the changes. The examples list readings over the course of one dust collection system’s operation. [Editor’s note: While the example system — as shown in Figure 1 — has a baghouse collector, the same principles apply to a system with a cartridge collector.]

**Optimal performance.** The readings are gauge 1 at 3 inches water gauge, gauge 2 at 11 inches water gauge, and gauge 3 at close to the system’s design level. These conditions represent this system’s optimal performance level.

**Decreased airflow.** The readings are gauge 1 at 7+ inches water gauge, gauge 2 at 16 inches water gauge, and gauge 3 at significantly below the system design level. These conditions indicate the airflow has significantly decreased, making the system less effective. It’s important to determine how — and how quickly — these conditions occurred. Blinded filter bags (typically caused by using moist compressed air during cleaning or an insufficient filter surface area) commonly cause such conditions and, if not corrected, can render your system useless.

**Increased airflow.** The readings are gauge 1 at about zero, gauge 2 at 10 inches water gauge, and gauge 3 above the system’s design level. These conditions represent an airflow increase — but for all the wrong reasons. Most likely, a filter has failed by developing a hole or coming loose from the tubesheet. If the filters aren’t replaced, the conditions can lead to uncontrolled emissions, EPA fines, and damage to equipment such as the fan.

**Plugged gauge connection.** The readings are gauge 1 at 8+ inches water gauge, gauge 2 at 12 inches water gauge, and gauge 3 at a steady level. These conditions indicate that gauge 1’s dirty-side connection (typically tubing or a hose) has become plugged with dust. This common problem often leads maintenance workers to make unnecessary corrective actions, such as replacing filters, when merely cleaning the connection will solve the problem.

**Long-term change or abnormal condition.** The readings are gauge 1 steadily increasing from 3 to 5 inches water gauge, gauge 2 steadily increasing from 11 to 13 inches water gauge, and gauge 3 steadily decreasing. If these conditions occur over several months, they represent a normal long-term change. But if they occur over days or weeks, they can represent an abnormal change. In the latter case, you need to find and correct the problem before the conditions get rapidly worse and cause the system to release emissions above your allowable limits.

**Some final advice**

With experience, you can use the gauge readings to learn considerably more about your dust collection system’s performance and to determine whether and when you need to take corrective action. Your record of weekly gauge readings is also a valuable resource when working with state or federal EPA officials to confirm your compliance with emissions limits.