

Another One Fights the Dust

Improve safety and lower operational costs with proper dust monitoring.

>> BY EARL PARKER, VICE PRESIDENT, AUBURN SYSTEMS LLC

Particulate monitoring has become a necessity in the industrial workplace where dust and other particulate emissions can be problematic. Many forms of dust are combustible and operations generating or handling emissions require special efforts to minimize emissions in these areas. In addition to increased air pollution, dust collection filter failures can result in costly unscheduled shutdowns and product loss.

Stricter local, state and federal regulations have made the need for efficient dust collection more urgent and demanding. There are many approaches to monitoring particulates using visual inspections, differential pressure gauges or bag leak

upon the principal of unifying DC (impaction) and AC (induction) signals, and incorporating other proprietary circuit innovations. This higher signal resolution technology results in a more robust and stable measurement for detecting the presence of particulate in a dust collector emission duct or a flow process pipe.

The Working Principal

As dust particles collide with, or closely pass by a probe, electrical charge transfers occur. It is necessary to detect the signal created by the changes in particulate concentration, as in the onset of a bag leak or an increase or decrease in flow. Unlike monitors that use only the DC or only the AC induction signals, using only a portion of the complete electrostatic signal, this technology combines the benefits of each method, which provides the user with a superior reliable, accurate and repeatable signal. (See schematic that illustrates the technology).

Some benefits from this advancement are:

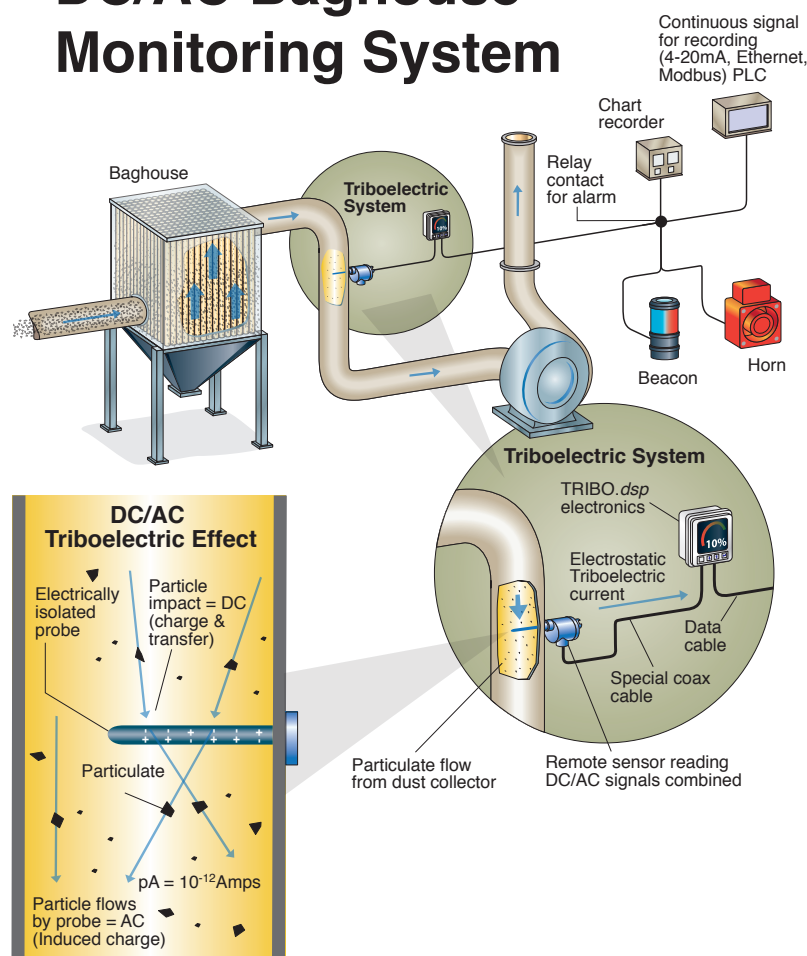
- Wider dynamic range resulting in easier system setup. This new circuit eliminates the need to adjust sensitivity, resulting in the monitor fitting the application. Once installed in the process, the signal is immediately available.
- By combining the DC/AC signal, the new technology continuously monitors particulate matter and provides the user with indications when probe fouling or other false signal conditions exist.

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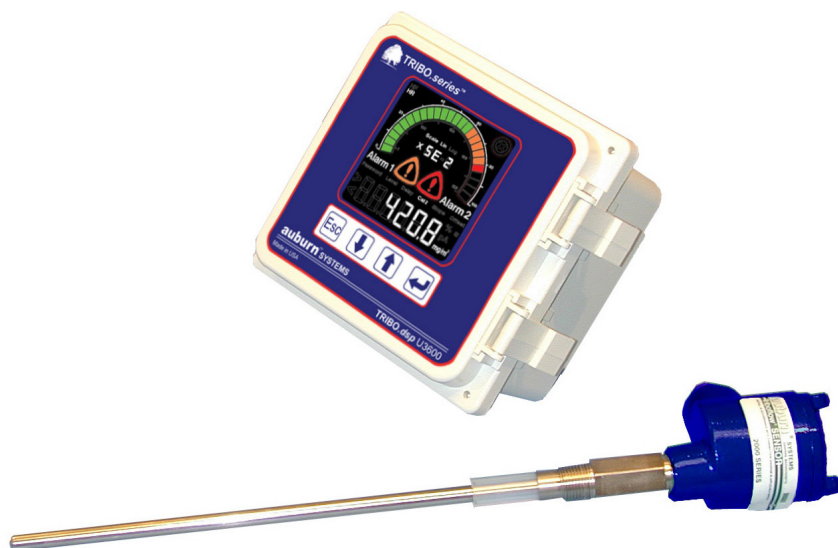
detection systems. Bag leak-and monitoring-detection systems can be optical, light based or electrostatic/triboelectric.

Recent developments have advanced the efficiency and reliability of electrostatic/triboelectric style monitors. New technological improvements have been developed based

DC/AC Baghouse Monitoring System



Shown above is a schematic drawing of a typical electrostatic monitoring system.



The probe above is the U3600 electrostatic monitoring system from Auburn Systems LLC.

- Other improvements to the technology include superior signal filtering resulting in a stable signal, even in harsh industrial environments, or applications with high electrical noise.

DC/AC Technology Applications

Dust Collector Monitoring/Maintenance -

Monitoring dust collectors, such as fabric filter baghouses, cartridge filters or bin vents, offers early warning of filter failure; allowing for non-disruptive, maintenance scheduling. By continuously monitoring dust collector emissions, valuable diagnostic information can be used to improve the performance of the collector.

The DC/AC technology can help eliminate the guesswork of isolating compartments or performing time-costly dye tests and can safely extend the use of filter media beyond a manufacturer's recommendation, resulting in fewer preventative maintenance shutdowns.

Process Improvement -

The conveying or transporting of dry particulate requires a reliable means to convey the material. Conveying systems typically use filter receivers or silo bin vents as components of the conveying system. Devices using DC/AC technology monitor not only the emissions and filter performance, but because of its wide dynamic range, they can provide a reliable dry solids flow measurement in these systems.

Therefore, the user has a means to monitor the flow or no flow of the dry solids as well as a relative measurement of more or less flow in the conveyor lines. This ability can provide the user with a means to improve process control. Typical examples include monitoring for blockages or no-flow detection in pneumatic conveying/material handling systems, screw feeder or other gravity feed systems, material injection and particulate velocity.

Fugitive/Ambient Dust Monitoring -

Many dusts are combustible and those operations generating or handling dusts can require special efforts to minimize dust emissions. When these dust excursions occur in areas where there is no dust collection equipment, there needs to be a method of particulate detection. Particulate monitoring, using a venturi style sensor allows for early detection warnings indicating a rise in ambient or fugitive dust in these areas.

DC/AC electrostatic technology detects unexpected rises in ambient dust levels within the workplace. Using compressed air to create a venturi effect, room air is drawn through the sensor, generating the electrostatic/

triboelectric signal. The signal level can activate a relay contact or be represented as a continuous 4-20 mA output for monitoring and recording. This method of monitoring can be used to detect dust in areas such as: silos, silo penthouses, bulk packaging areas, loading/unloading, dry mixing/sifter rooms, filling/product transferring and hazardous dust monitoring.

DC/AC Electrostatic Technology in a Refractory Plant

The Problem -

This facility produces a variety of refractory products and operates a rotary kiln system with a large baghouse. In making these products, a variety of fuels and raw materials are used, resulting in changing process conditions with changes in the airflow through the system. This is a difficult application to monitor due to the differing products and changing air flows. This plant is located near a highway with close proximity to the public, state officials and environmental personnel. Thus, the plant receives special attention to assure visual emissions from the exhaust stack are below permit levels at all times.

The Search for a Solution-

DC/AC electrostatic technology was selected to be installed as the bag leak detection system (BLDS) to monitor the baghouse emissions. This technology is able to monitor

performance of the exhaust stack's five-chamber baghouse system with a single sensor, minimizing equipment costs. The analog signal from the electronic control is wired to the main control room with other operating parameters from the kiln for connection to a chart recorder. Calibration runs were made with different air flows as new products were introduced, establishing a linear chart baseline for each product/air flow combination. Bag leaks are located to the specific chamber by relating the DC/AC flow signal to the baghouse cleaning cycles. The BLDS provides a more comprehensive analysis and a better understanding of baghouse performance, enabling the customer to diagnose process problems and pinpoint equipment failures. The wide dynamic range and stable, repeatable signals of the DC/AC technology allows the refractory products manufacturer to monitor dust collector performance at differing air flows and still assure environmental compliance.

Conclusion

DC/AC electrostatic particulate measurement technology is proven to be a reliable and cost-effective technology for difficult and challenging dust/particulate emissions. DC/AC technology exceeds the EPA-recommended BLDS monitoring guidelines. 🍀

*Earl Parker is vice president of sales at Auburn Systems LLC.
Send any questions to sales@auburnsys.com.*



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TRIBO.dsp U3000 Series of Bag Leak Detectors and Solids Flow Monitors

Auburn's TRIBO.dsp U3000 series of electrostatic/triboelectric bag leak detectors, emission monitors, and solids flow monitors effectively measure dust emissions and dry solids flow in a wide variety of industrial processes including, but not limited to the following:

Common Industries Served

| | | | | | |
|-------------|--------------|-----------|--------------|----------------|--------------|
| Agriculture | Battery | Food | Hazardous | Nutraceutical | Steel |
| Aluminum | Carbon Black | Foundry | Incineration | Paper | Tires/Rubber |
| Asphalt | Cement | Furniture | Metals | Pharmaceutical | Tobacco |
| Automotive | Chemical | Glass | Mineral | Power/Utility | Wood |

Environmental Compliance Monitoring

- Auburn monitoring systems are installed to satisfy governmental emission compliance regulations
- Eliminates the need for visual inspections of emissions or daily logging of DP measurements
- The USEPA recognizes the Auburn line of monitors as acceptable for use as Bag Leak Detection Systems (BLDS) for MACT standards (Maximum Achievable Control Technology)

Dust Collector Monitoring/Maintenance

Monitoring dust collection equipment (fabric filters, cartridge collectors, bin vents, etc.) can reduce maintenance costs and eliminate product loss as well as provide equipment protection. Auburn equipment is used to establish normal baseline trends and cleaning cycle signals providing benefits such as:

- Early warning of impending filter failure avoids shutdowns; allowing for proactive maintenance scheduling
- Leak location eliminates the guess work of isolating compartments or performing time-costly dye tests
- Safely extends the use of filter media beyond manufacturer's recommendation, resulting in fewer preventative maintenance shutdowns

Process Improvement

The conveying or transporting of dry particulate for manufacturing processes creates the need to know if there is flow in a pipe or feeder system. Auburn monitoring equipment improves process efficiency for higher financial return by providing reliable Flow or No Flow indications for many process applications such as:

- Powder injection
- Pneumatic conveying
- Screw conveyor flow, etc.
- Simple, durable, probe design is superior to conventional mechanical or optical flow detectors

Data Management

TRIBO.vision is an open architecture, OPC compliant, data management software designed to monitor and record data from dust collection systems and other plant operating data

- Capable of handling data inputs from all plant processes and areas
- Flexible, user defined, configurations provide custom alarm schemes and reporting
- Performs as a stand alone system or as a compliment/enhancement to existing plant software

We are confident Auburn can satisfy your monitoring application or technical support needs.

For additional information or to request a quote, please contact us or visit www.auburnsys.com.