Controlling Dust and Mist in the Industrial Environment

Capture, Contain, Convey, and Collect your way to a better work environment

Presented By

AIR SOLUTIONS℠

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DUSTHOG® BY UAS

SMOGHOG® BY UAS

Dust and Mist Facts

In wood processing facilities dust is a common and rampant problem.

Understanding dust and mist in the workplace is the first step in assuring a safe, healthy, and productive industrial work environment. A wide range of airborne contaminants can affect the workplace, and each type has its own characteristics and challenges. Dust and mist are two major kinds of contaminants that are widely prevalent in the workplace and generated by a broad range of natural and work-related processes.

Dust as a Pollutant

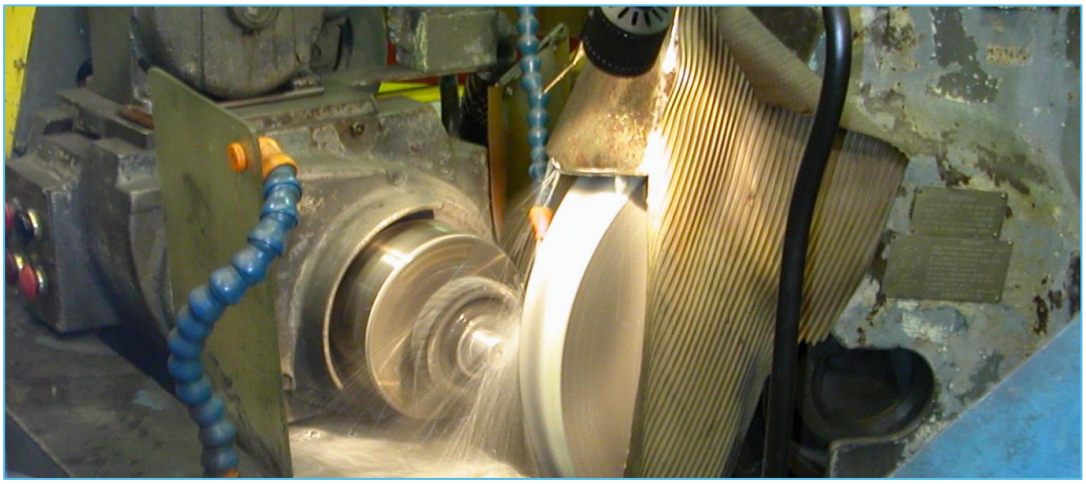
The International Organization for Standardization (ISO) defines dust as:

"Small solid particles, conventionally taken as those particles below 75 µm in diameter, which settle out under their own weight but which may remain suspended for some time."

Comparatively speaking, a strand of human hair is 100 µm in diameter, so dust particulate can be invisible to the naked eye. While the dust itself may be difficult to see, its cumulative impact can be very significant and detrimental.

Combustible dust is a particularly hazardous type of dust, which is specifically addressed by the Occupational Safety and Health Administration (OSHA) and the National Fire Protection Association (NFPA). Any dust that has explosive potential when present in the air within uncontrolled conditions is considered combustible dust. Explosions caused by combustible dust have been the subject of extensive study by the U.S. Chemical Safety Board (CSB).

Mist as a Pollutant



According to OSHA definition, mist is described as:

"Liquid droplets of a substance or mixture suspended in gas (usually air)."

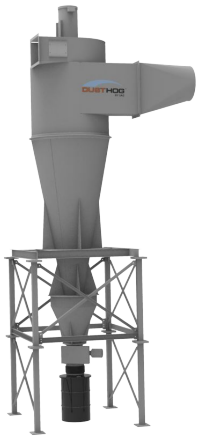
Mist and fumes are common parts of many product processes.

Mist can result from any process in which water or liquids are sprayed. The chemical make-up of mist determines whether or not it is classified as a pollutant. OSHA regulations establish threshold limits for mists, gases, vapor, fumes, and dust.

Potential health issues resulting from exposure to mists depend on the toxicity and concentrations of the elements in the mist, as well as the duration and intensity of exposure. The National Institute for Occupational Safety and Health (NIOSH) under the Centers for Disease Control and Prevention (CDC), has done extensive studies on the risks of mist pollutants and offers resources for identifying chemical hazards.

Dust and mists of all varieties impact the environment and workplace in a wide range of industries. Next, we will look at how this contamination occurs and the potential effects.

The Impact of Dust and Mist on Indoor Air Quality



The C Series is a high-efficiency cyclone dust collector designed to effectively remove large to moderate size particles (chips, metal grindings, sawdust) from the air stream.

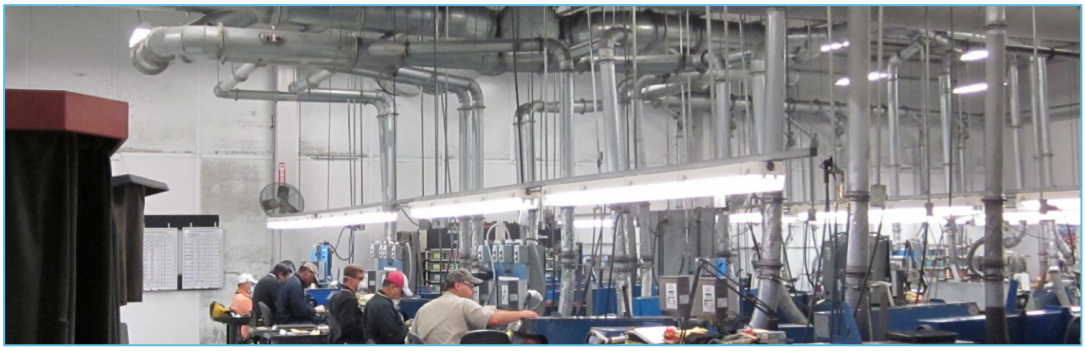
Portable weld fume collectors are specifically designed to capture and contain submicron weld fume from multiple locations within a facility.

The effect of dust and mist on indoor air quality has become a significant area of focus in consideration of health and safety. Many adverse health effects are linked to poor indoor air quality including fatigue, headache, lack of concentration, and breathing problems. Irritation of eyes, nose, and throat can also occur. In the worst case scenario, ongoing exposure to airborne pollutants leads to severe chronic diseases such as cancer.

A variety of factors can affect indoor air quality. Any activities or conditions that affect the flow of fresh air coming into a building are a consideration. These might include:

- Poor ventilation
- Temperature control problems
- High or low humidity
- Recent remodeling
- Process expansion

In some cases, indoor air quality is compromised by specific chemicals or pollutants such as pesticides, cleaning solutions, construction material dust, and mold. Contaminants such as these often involve unique challenges. As previously mentioned, combustible dust presents a particularly dangerous risk. Regulatory compliance for the proper management of combustible dust is essential.



Sometimes processes can produce a lot more than dust. Here is are two examples of heavy, hard to clean up, by-products we've come across in the workplace.

Dust and mist in the workplace often lead to serious indoor air quality issues and causes other costly problems, such as:

- Deterioration of the roof and water leaking into a food manufacturing facility due to mist blowing out onto the roof.
- Walls and ceilings discolor prematurely and lead to higher cost in maintaining the facility due to mist within the building.
- Eye irritation and respiratory problems for employees from dust and vapor in the air.
- Possible OSHA violations and increased housekeeping expense resulting from fugitive emissions of combustible dusts settling and collecting on overhead structures, piping, and electrical trays..
- Contaminated air is discharged into the atmosphere surrounding the facility, leading to particulate accumulation and then damage to vehicles in the parking lot.
- Production time sacrificed to clean-up time required to manage unaddressed indoor air pollutants.

Fortunately, there is a wide range of solutions for dealing with workplace dust and mist and improving indoor air quality. Next, we will look at the three approaches that are typically involved in dust and mist solutions, as well as the equipment most often used for these processes.

The International Centre for Indoor Environment and Energy

conducted a 2005 study on the effects of indoor air quality on health, comfort, and productivity. The findings revealed that:

- Indoor-air quality can significantly improve the performance of people
- According to studies, a 10% increase in dissatisfaction decreases performance by 1%
- Studies show significant improvements in performance with improved indoor-air quality
- Improved indoor-air quality leads to significant savings in health care costs

Source: Bakó-Biró Z, Olesen BW. Effects of indoor air quality on health, comfort and productivity: overview report January 2005. Copenhagen: International Centre for Indoor Environment and Energy, Technical University of Denmark; 2005.

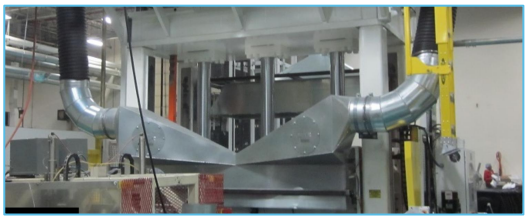
Dust and Mist Solutions: Capture, Contain, Convey, & Collect

Wall-mount weld fume collector are ideal for capturing submicron weld fume and smoke from a fixed workspace. Available with one or two extraction arms.

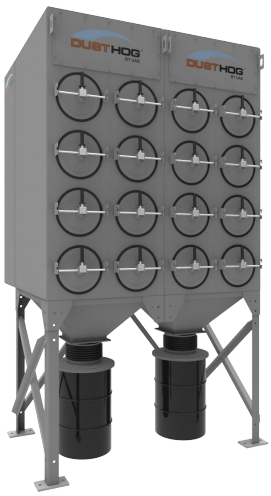
Ceiling mount ESP mist collectors are two-stage electrostatic precipitator with in-place cleaning system captures contaminants at the source.

Capturing dust and mist at or near the source of generation is the most efficient and effective way to control airborne contaminants and particulate. The goal is to capture all of the pollutant while minimizing the amount of ambient air required to hold the pollutants, a challenge due to the process layout, building cross drafts, negative or positive room pressure, worker access and machine design. The less air captured, the smaller the system horsepower, duct diameter, and footprint.

The containment of dust and mist is the next step in the process. Containment systems designed for efficient capture of harmful dust and mist are engineered to a high level of specification. Handling of toxic or hazardous compounds, such as those encountered in pharmaceutical environments includes features to eliminate exposure of the employee to the dust or compound. These systems use bag-in bag-out filters, double valve bag-in bag-out hopper discharge, and bag-in bag-out HEPA Filter assemblies.



Contained particulate must be conveyed to the next step in the dust and mist management process using a system of ducting. The diameter of the duct and the airflow must be designed with a velocity that keeps the captured pollutant in suspension. Lower air velocity requires less horsepower and less friction loss occurs. Hood entry losses, branch entry losses, and elbow losses all need to be considered as well. Lower system losses mean less horsepower is required with lower capital plus operational cost savings.



Downward flow cartridge collector is a patented pulse-jet cleaning system for heavy duty dust and smoke removal.

Modular industrial baghouse is best in class filtration technology, customizable configurations meeting unique requirements and technical expertise.

Finally, materials are collected for reclamation or disposal. To optimize energy efficiency, heated/cooled air needs to be retained and re-circulated. Dust and mist management equipment includes:

Cartridge Dust Collectors - Cartridge collectors use perforated metal cartridges with a pleated, nonwoven filtering media for the collection of pollutants.

Baghouse Collectors - Baghouse collectors utilize a bag or pleated filter made of woven or felted fabric as a filter media to collect mist and dust.

Cyclone Collectors - Cyclone collectors use centrifugal force to remove large and high-volume dust from industrial applications.

Ceiling/ Wall Mount Media Bag Dust and Mist Collectors - Multi-purpose systems collect small, large or conductive materials to remove smoke, dust, oil mist, and other pollutants.

Dust Control and Industrial Paint Booths - Remove fine airborne dust from industrial processes and control overspray for efficiency and significantly reduced preparation time.

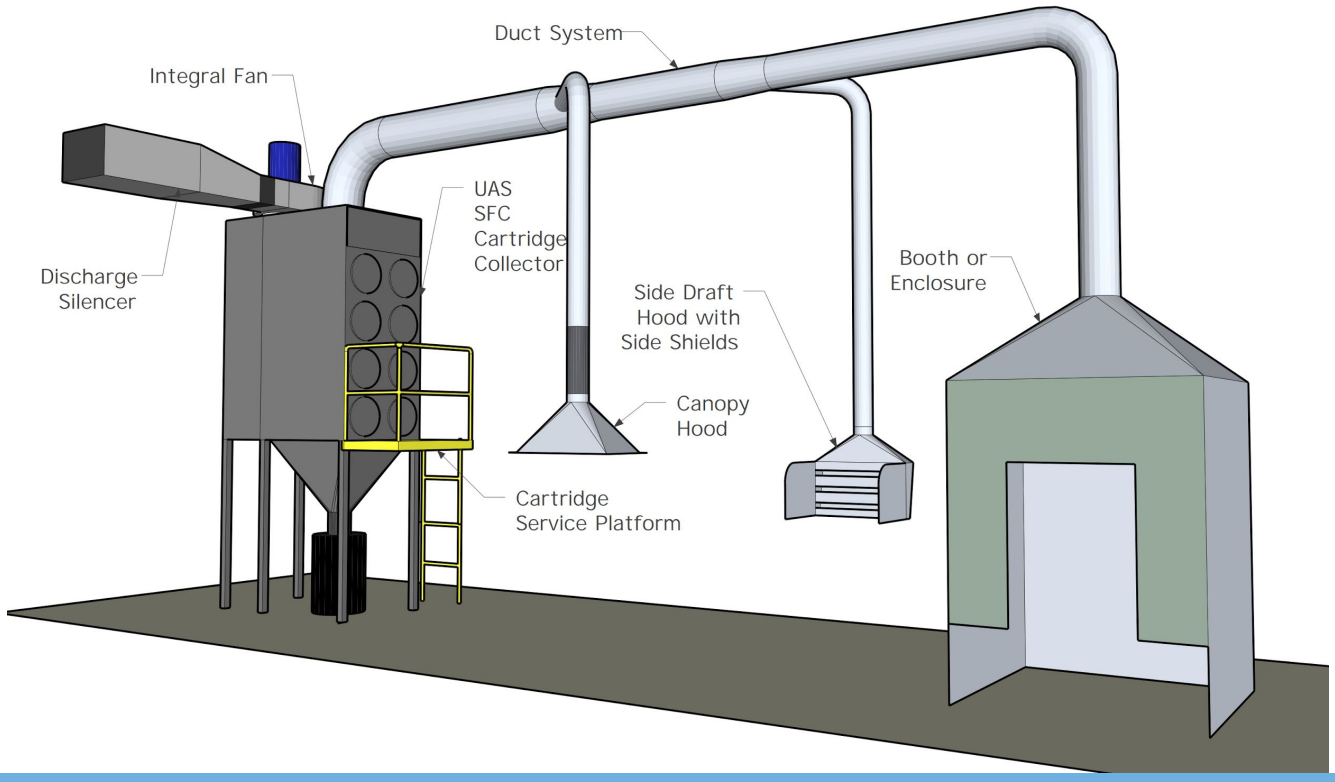
Portable Dust and Mist Collectors - Portable collectors are for confined areas and when movement from one application to another is required.

Extraction Hoods - Table and wall mounted source capture hoods can be adapted to accommodate a wide range of work area configurations.

Extraction Arms & Telescopic Arms - Extraction arms and telescopic extraction arms are easy to position, offering extreme flexibility for optimal placement at the source of dust and mist generation.

The key to an effective dust and mist solution is to develop an entire system that meets comprehensive facility needs, which may involve a combination of dust and mist management equipment.

System Components for Dust or Mist Collection Systems Dust-Hog® or Smog-Hog®



Effective source capture systems for collecting smoke, fumes and dust require common system components. The graphic above shows a Dust-Hog® product, the Model SFC Cartridge Dust Collector, with a system displayed employing various hoods and enclosures to capture and contain the fugitive emissions. The duct system allows the captured dust to be conveyed to the collection point, the dust collector. In this example, the air is returned to the manufacturing space after the dust is separated from the air stream. An integral fan is shown on the collector and the air discharges from the fan through a silencer before being returned to the space. This system exemplifies the principles of capture, contain, convey, and collect all in one system.

With dust or mist the same principles apply. Good system design starts with good hood or enclosure design and establishing the proper air flow at the hood or enclosure to insure success. Capture or contain the emission and then deliver that emission to the collection device. Equipment selection is finalized after the required flow is established and application parameters are considered. When a good system comes together, the exposure to emissions is minimized and the operating and maintenance costs are optimized.

Creating a More Profitable and Productive Environment

Machine mount ESP mist collectors are ducted, self-contained electrostatic precipitator captures smoke at the point of generation.

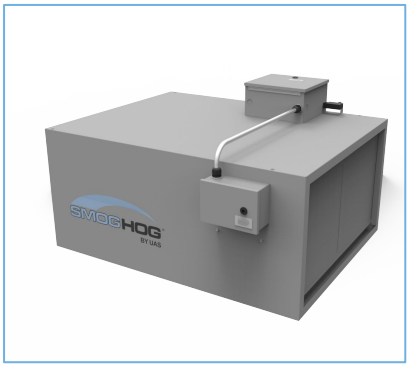
Self-contained shaker dust collectors safely and effectively collect airborne pollutants captured at the source helping ensure the safety of workers, for combustible or explosive dusts.

The dangers and problems associated with dust and mist in the workplace are clear. Fortunately, dust and mist collection solutions not only resolve these issues, but they also provide a host of advantages:

- Protected breathing zones free from harmful pollutants
- Improved air quality for greater worker health and comfort
- Reduction of cleaning and facility maintenance
- Extended machine life
- Reclaim and recycle material
- Improved part/product quality
- Reduced housekeeping costs
- Reduced energy costs by retaining and re-circulating heated/cooled air

Compliance with Regulatory Requirements

When investing in an industrial dust and mist collection system, it is important to look for well-designed quality equipment that will deliver performance and dependability. Quality equipment is just one critical aspect of finding your solution. It is important to work with an experienced air quality solutions expert that will provide a thorough assessment of your processes and facility, then design and develop a total system solution to meet your unique applications needs.

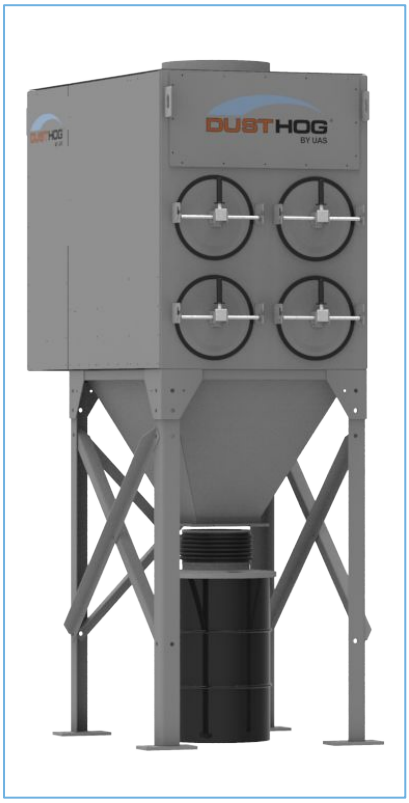


Machine mount and ceiling collector are electrostatic precipitator used for source capture on individual machine tools.

When considering suppliers and equipment, questions to consider include:

- Will you perform an onsite evaluation before designing my system?
- Can you provide references from other customers?
- May I visit the manufacturer's facility?
- Can you help coordinate installation and training?
- Can you provide complete system components, including duct, hoods, and enclosures?
- What kind of maintenance is involved?
- Are service and support plans available?

Finding Your Custom Dust and Mist Solution



Downward flow dust collector patented pulse-jet cleaning system with optional after-filter for heavy duty dust and smoke removal.

Air Solutions partners with UAS, now part of Parker Hannifin Corporation, to deliver you the dust and mist solutions that will meet your needs and goals while working within your budget.

UAS offers better equipment solutions and significant advantages with the SmogHog® and DustHog® product lines:

- High performance
- Energy efficiency
- Durable construction and finish
- Low operational cost
- Easy maintenance
- Quick and simple installation
- UL flame resistant components for thermal processes
- Wide range of sizes and configurations
- Multiple technology options

The DustHog SFC Series cartridge dust collectors effectively remove dust, fumes, and smoke from industrial manufacturing processes and applications. This proven, high-performance, energy-efficient downward flow cartridge dust collection system features patented pulse cleaning technology, greater air capacity, and easy maintenance.

DustHog dust collectors and SmogHog mist collectors are the most dependable and widely-used industrial filtration systems. A variety of models and configurations are available to meet your specific needs.

Visit www.uasinc.com to view an interactive map and check out the widest selection of equipment options.

Turn the Unpleasant into Something Pleasant

SmogHog SHM is a media mist collector featuring PEACH® saturated depth coalescing technology.

Not only will the implementation of a dependable and effective dust and mist collection system help you manage unpleasant issues, it can also lead to some very pleasant results, such as:

- **A 1% increase in office work can offset annual costs of ventilating a building**
- **The cost of installing effective facility ventilation can be offset by productivity gains of just under 10%**
- **Doubling the outdoor air supply rate can reduce illness, decrease the occurrence of sick building syndrome roughly by 10% and increase office work by roughly 1.5%**
- **Every 10% reduction in the percentage dissatisfaction with air quality can increase the performance of office work by approximately 1%**
- **Typical payback time for investments to improve indoor-environment quality is less than two years**

Source: Clements-Croome DJ. Creating the productive workplace. 2nd edition. London: Routledge; 2005.

Air Solutions Puts Everything Together to Efficiently Meet Your Needs

Providing air quality solutions since 1998, Air Solutions is your source for leading-edge technology to fit your specific needs. Our commitment is to provide the best service, including product customization, prompt delivery, strict quality assurance, and ongoing support.

Ready to take the next step toward finding your dust and mist solution?

Contact us to set up an onsite dust and mist assessment.

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