Weld Fume Mitigation

Donaldson
FILTRATION SOLUTIONS

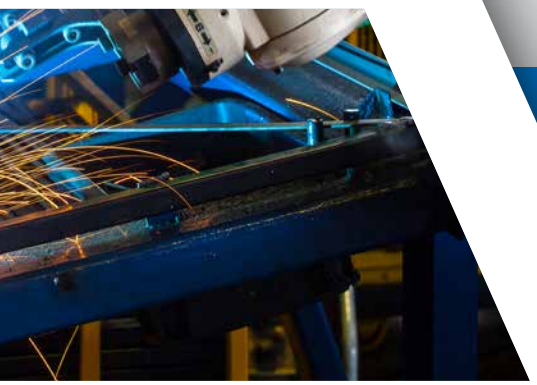
INDUSTRIAL AIR FILTRATION

INDUSTRIES WE SERVE

Since the late 19th century, welding has grown to become an essential fabrication method in modern manufacturing. Welding is prevalent throughout a multitude of industries and continues to expand as techniques, equipment and needs broaden.

For nearly 50 years, Donaldson has been providing weld fume solutions across all industries through a diverse portfolio of products tailored to meet specific application requirements.

Automotive



General Fabrication

Heavy Fabrication

Welding Schools

Modern welding technologies have evolved from the original arc application to include resistance, oxy-fuel, laser and others. The adoption of robotic welding automation has also had a significant impact on the industry, increasing welding speeds and production rates with each iteration.

Uncaptured Weld Fumes Present Multiple Challenges for Process Owners

As varied and versatile as these welding methods are, they all have one thing in common: they generate weld fumes that require mitigation. Process owners are under increased pressure to consider the impact unmanaged weld fumes can have on their employees and facilities.

- **Welding fumes contain metal oxides, gases and process by-products.**
- **Hazy, dirty workplaces full of weld fumes can make it difficult to attract and retain quality workers and can send the wrong message to your customers.**
- **Unmanaged weld fumes may render your facility unable to meet state and federal regulations.**

Given these significant downsides, capturing and filtering weld fumes is a worthwhile investment.

Complete Solutions for Your Weld Fume Challenges

Organizations around the world count on Donaldson to help them effectively address their dust, fume and mist collection challenges, as part of their overall EHS program. Backed by more than 50 years of industry experience and more than 250,000 global installations, Donaldson's experts will work with you to understand your unique processes and needs.

After a thorough review of your operation, Donaldson can identify dust collection solutions using our airflow modeling application and selecting from an extensive portfolio of industry-leading equipment and innovative filter media technologies.

250,000 Global Installations

Finding the Ideal Solution for Your Operation

Installing a weld fume extraction system should always start with a thorough review of your facility and processes.

Production Materials

What types of materials are being welded?

Production Volume

What is the rate of fume generation?

Work Cell Layouts

Is the area open or divided into individual cells?

Work Piece Size

Is the welder stationary or moving around the part?

Production Area

Are there physical space limitations due to structures?

Understanding Your Weld Fume Capture Options

When considering a weld fume control solution, source capture is the preferred method and should be considered first during a process review. If source capture solutions prove too difficult to implement, evaluate ambient collection solutions as an alternative. Each method has its advantages and challenges, which should be discussed with a qualified professional.

Space Flexibility

Is it important to have the ability to rearrange work cells?

Welder Preference

Are workers willing to use a capture hood or portable system?

Source Capture

ADVANTAGES

- Most effective at capturing weld fumes
- Prevents weld fumes from spreading throughout the facility
- Portable options can move with the welding operations

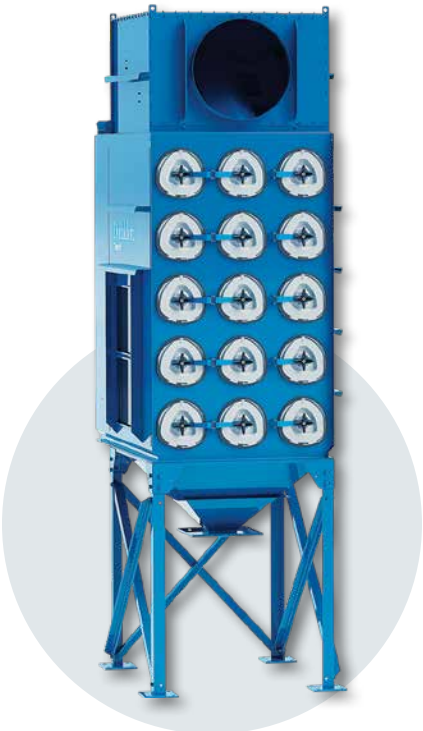
CHALLENGES

- Some plant layouts prohibit the use of source capture equipment
- Stationary equipment cannot move with the welder on longer welds
- Relocating equipment can be difficult and time consuming

Capturing fumes at the source is ideal. When properly set up, the source capture method captures fumes before reaching the welder's breathing zone and before they are dispersed throughout the facility. There are multiple source capture options, including hoods, extraction arms and downdraft benches. Additionally, portable equipment options give welders the flexibility to move the extraction arm to the location that works best for them.

Weld Bench Fume Collector

PowerCore® TG Dust Collector



Downflo® Evolution Dust Collector

Easy-Trunk™ Fume Collector

Trunk 2000 Fume Collector

CASE STUDY

Challenge: An equipment manufacturer needed multiple solutions to capture weld fumes at different stations throughout their facility, while simultaneously helping keep their energy costs in check by recirculating the filtered, pre-conditioned air back into the plant.

Solution: After reviewing their process, facility airflow, and energy consumption requirements with the manufacturer, Donaldson suggested the installation of several different collection solutions including the Downflo® Evolution, Downflo® Oval, and Downflo® Workstation cartridge collectors. The system allowed each weld cell to be automatically regulated to the correct booth velocity via individual branch lines with Variable Frequency Drive/Programmable Logic Controller (VFD/PLC) capabilities. The integrated design helped ensure proper capture within each cell throughout the stainless steel welding operation.

Why Donaldson? Donaldson has worked with equipment manufacturers for years bringing multiple solutions to their operations. Donaldson's engineers assess the organization's fume collection and energy consumption needs and provide the ideal solution for their unique applications.

Spark Cooler

Ambient Air Collection

ADVANTAGES

- Can be used in addition to source capture
- Allows easier facility reconfiguration
- Fits challenging facility layouts

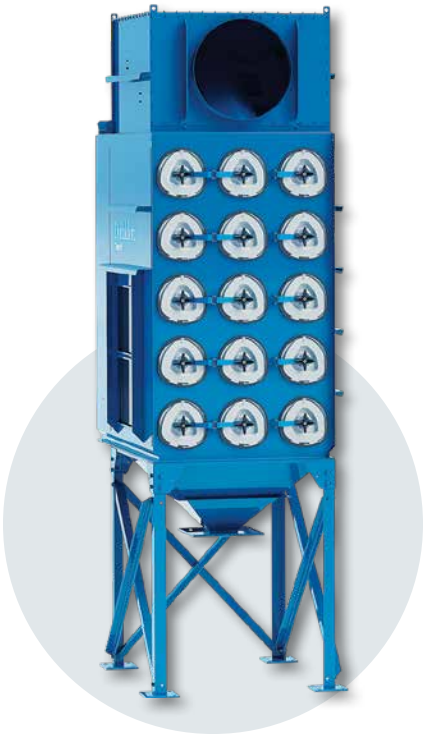
CHALLENGES

- Weld fumes may circulate farther
- Air movement constraints
- Plant layout limits collector placement

Working in the background to remove weld fumes from the entire welding area, ambient collection is an alternative to source capture by addressing overall room air filtration. An ambient collection approach is designed to limit average overall concentrations of weld fumes. Unlike source capture methods, ambient collection does not address each weld process but instead focuses on weld fume levels on average across the overall room volume.

The key to effective ambient collection is maintaining proper air movement throughout the entire air volume around the designated work zone. Weld fumes naturally rise to a stratification layer approximately 10-15 feet above the shop floor. Locating the air intake for an ambient collector at this height supports its effectiveness. Returning filtered air near floor-level helps support the natural circulation in a facility.

Ambient collectors are typically placed throughout a facility. The number of collectors required for an operation is determined by the size of the work area, rate of welding and application. Ambient collection may be an appropriate solution when weld stations or work areas are frequently reconfigured.



Downflo® Evolution Dust Collector

Downflo® WorkStation Dust Collector

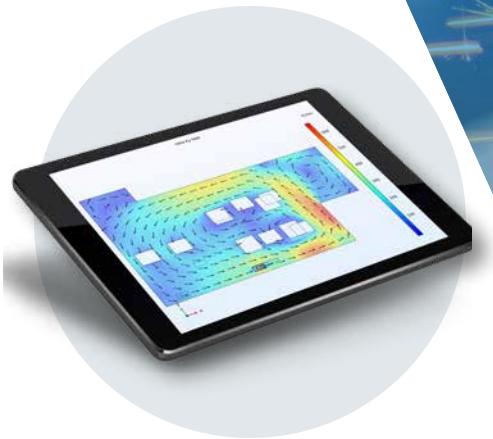
AT-3000 Ambient Collection System

CASE STUDY

Challenge: Located in a property teeming with obstructions, architectural irregularities and unusual space limitations, an equipment manufacturer needed a solution to capture weld fume that could reside in a peripheral section of the facility while minimizing impact on the production floor.

Solution: Donaldson's sales and engineering teams reviewed the facility's challenging layout and process needs and modeled the airflow patterns to create an air movement that efficiently captured and removed weld fumes from the work areas. The system included 12 distinct air capture points, separation curtains and a Donaldson Downflo® Evolution cartridge collector with a special low-height base that allowed the equipment to fit in the compact space. The system provided a filtered work environment with one complete air exchange every 15 minutes.

Why Donaldson? Donaldson's sales and engineering teams have spent nearly 50 years helping customers address their dust, fume and mist challenges – along with more than a few building design challenges. Having an extensive portfolio of flexible, fully-scalable equipment options and configurations means Donaldson is always up to the test.



Airflow Modeling Tool

COMPREHENSIVE SOLUTIONS PROVIDER

At Donaldson, we're dedicated to building the world's most advanced dust, fume and mist collectors, but that's just part of what drives us. Our goal is to provide you with comprehensive dust control solutions to solve your problems.

PROCESS REVIEW

From the initial facility survey and airflow modeling procedure to supporting your dust hazard analysis and installation efforts, Donaldson's professionals will help ensure your solution fits your application.

EXPANSIVE SOLUTIONS

With an extensive product portfolio, a global dealer network and more than 250,000 installations worldwide, you're never far from the ideal solution.

UNPARALLELED SUPPORT

With unlimited access to expert pre- and post-sale assistance, an unrivaled inventory of replacement filters and parts and the monitoring convenience of the Industrial Filtration Services, Donaldson has what you need, every step of the way.

To learn more, contact a Donaldson representative at 800-365-1331, or donaldsontorit@donaldson.com

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