



# Weld Fume Mitigation



**Donaldson**  
FILTRATION SOLUTIONS

**INDUSTRIAL AIR FILTRATION**



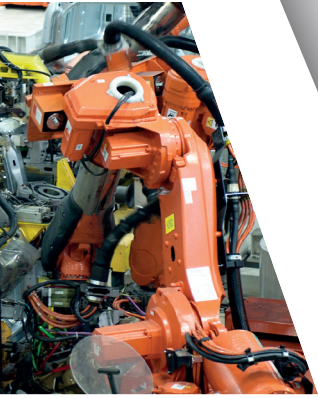
Since the late 19th century, welding has grown to become an essential fabrication method in modern manufacturing. Welding is prevalent throughout a multitude of industries and continues to expand as techniques, equipment and needs broaden.

## INDUSTRIES WE SERVE

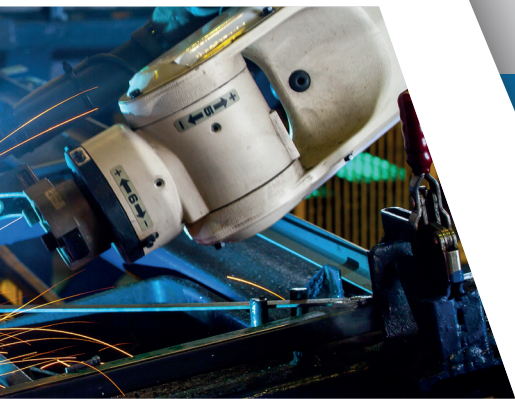




**For nearly 50 years, Donaldson has been providing weld fume solutions across all industries through a diverse portfolio of products tailored to meet specific application requirements.**



**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, compromise the quality of the delivered product, and convey a negative message to your customers.
- ✓ Poor management of welding fumes may result in your facility being unable to meet local and EU 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 conducting a comprehensive review of your operation, Donaldson can identify dust collection solutions that best address your unique needs. We offer a wide selection from our 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.



### Local & EU Regulations

Adhering to strict regulations, including those on hazardous substances and workplace safety.



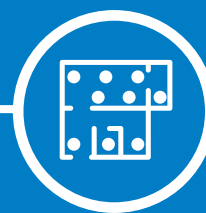
### Production Materials

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? Any structural limitations?



### Work Piece Size

Is the welder stationary or moving around the part?



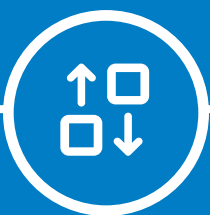


## Understanding Your Weld Fume Capture Options

When evaluating weld fume control options, it's important to consider both source capture and ambient collection solutions. While source capture is typically preferred and should be prioritized during process reviews, a combination of both methods is often ideal.

Each approach comes with its own set of advantages and challenges, so it's imperative to consult with a qualified professional to determine the optimal combination for your specific needs.

Contact us for further guidance.



### **Space Flexibility**

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



### **Welder Ergonomy**

Are workers willing to use a capture hood or mobile system? Does it facilitate their ideal working posture?



# Source Capture

## ADVANTAGES

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

## CHALLENGES

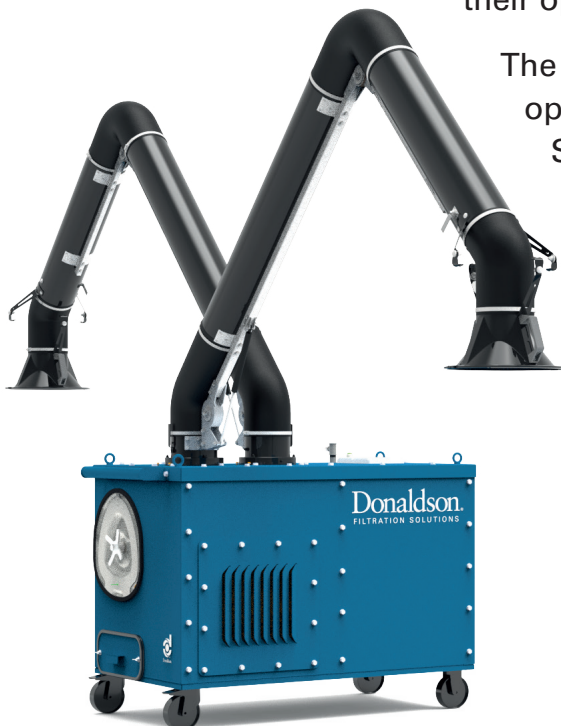
- Some plant layouts prohibit the use of source capture equipment
- Stationary equipment cannot move with the welder on longer welds
- Clean air recirculation may not be permitted in certain countries.

Source capture systems are crucial for ensuring worker safety in welding environments by directly extracting hazardous fumes at their origin. This method is particularly essential with highly toxic substances, preventing their dispersion into the breathing zone or across the facility. Systems deploy hoods, extraction arms, or other specialized devices positioned close to the welding arc, capturing fumes immediately upon generation and reducing exposure risk for welders and other personnel.

Various source capture options are available to suit different welding processes and facility configurations. These include hoods, extraction arms linked to central filtration systems like the DFE Dust Collector, downdraft benches, and mobile extraction solutions. Each option offers specific advantages based on factors such as workspace size, layout, welding process type, and regulatory requirements.

## DFPRE 1 FUME COLLECTOR MOBILE STANDALONE PACKAGE

Designed to meet the needs of welders, the DFPRE 1 offers unmatched flexibility without compromising on filtration quality. Welders can now maintain their preferred welding habits while fluidly relocating the extraction unit and arm to their optimal working position.



The DFPRE 1 is not only easy to install, maintain, and operate but also delivers superior filtration performance. Specifically engineered with welding and finishing operations in mind, this series offers seamless integration. Simply connect its single-phase 230V AC power source, and you're ready to start working.

What sets the DFPRE 1 apart is its unmatched versatility. You have the option to connect compressed air solely during cleaning phases, ensuring continuous filtration quality without compromising the welder's working comfort. Equipped with renowned triangular cartridge filters featuring Ultra-Web® Fine Fiber media and efficient pulse cleaning, it guarantees peak performance and reduced operational expenses for both continuous and high-emission applications.



## 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 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.

### CENTRAL FILTRATION SYSTEMS (DFE SERIES) CONNECTED TO EXTRACTION ARMS



Extraction arms linked to a central filtration unit.





# 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



### Downflo<sup>®</sup> Evolution Dust Collectors

The DFE Series offers superior performance, increased efficiency, and extended filter service life, enabling you to drive TCO down without compromising on filtration performance.

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. Welding fumes tend to ascend, forming a stratified layer approximately 3 to 4.5 meters 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.



### DFPRE Series Dust Collectors

The DFPRE series dust collectors are compact standalone units, designed to facilitate installation and operation for a wide variety of applications and operational needs.





## 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.



### Environmental Control Booth

Provides soundproofing and air pollution control for workers located outside the cabin while removing fine dust suspended in the air from various applications without obstructing workers' movements.



## 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 iCue™ Connected Filtration Service, Donaldson has what you need, every step of the way.

Discover superior Weld Fume Solutions with Donaldson.  
Visit [donaldson.com](https://www.donaldson.com) to learn more today!

**Donaldson**  
FILTRATION SOLUTIONS

Discover our range on [www.donaldson.com](https://www.donaldson.com)  
Shop for filters the easier way at [shop.donaldson.com](https://shop.donaldson.com)  
Contact us at [iaf-europe@donaldson.com](mailto:iaf-europe@donaldson.com)

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