Fume Extraction Strategy: Four Steps To Help Clear the Air

No two welding operations are alike. Each is subject to a host of variables, some internal and some external. These include the size and configuration of the materials being welded, the material type, the choice of consumable, the welding process - on-time handheld versus automatic – as well as other conditions and work practices taking place in the work environment. By the same token, welding fume and other byproducts of the welding operation will vary, so fume extraction needs to be tailored to the specific situation or application.

When it comes to fume extraction solutions, there is no one-size-fits-all. The specific circumstances and variables of your welding operation will require you to make choices. The more data and knowledge that you are armed with up front, the better the choices you will make.

Partnering with a knowledgeable industry supplier and following four simple steps could provide you with a wealth of information to help you make the right decisions about fume extraction solutions for your welding operation:

1. **Have a qualified professional conduct a systematic industrial hygiene assessment of worker exposures.**
2. **Evaluate your welding processes for changes that can be considered in order to reduce fume while still achieving the desired weld.**
3. **Evaluate your site for potential opportunities to improve fume capture and for deploying other fume control measures.**
4. **Educate welders and implement safe work practices**

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Measure worker exposure

Before you can develop and implement a fume extraction system, you need to establish a baseline measurement of worker exposure. This assessment should be made by a qualified professional such as a Certified Industrial Hygienist (CIH). With this proper exposure data, you can then review the applicable exposure limits and any specific compound based regulatory requirements, consumable labeling requirements and consumable Safety Data Sheets (SDS) that apply to your welding operation. Whether the hygienist you enlist to conduct the assessment is an employee or an outside contractor, you're likely to optimize the accuracy of the assessment by engaging your EH&S team in the process, as well as your workforce. Suggested reading and reference material is available from the American Welding Society (http://www.aws.org) or by contacting AWS at 800-854-7149. The American Industrial Hygiene Association (AIHA) also provides references for locating qualified professionals in your area.

Evaluate your welding process for changes that can be made to reduce fume

There may be alternatives to some welding processes and shielding gases that may reduce welding fume generation without compromising weld quality. Surface coatings like paint should be removed before welding or cutting whenever possible. When not feasible, a proper respirator should be selected and used. Also, the contribution of any other coatings such as corrosion inhibiting compounds to airborne exposures should be assessed prior to welding. (Consult the manufacturer's Safety Data Sheet). For example, you may be able to switch from FCAW to GMAW-pulsed, or switch from straight CO2 to a CO2/argon/oxygen blend. Reviewing these alternate options can help identify ways to reduce the generation of welding fume and potentially lower the up-front cost of the fume extraction equipment solution you choose, because having fewer fumes generated will mean less money spent on purchasing and implementing fume extraction equipment.

With so many variables that can effect welding fume generation, a knowledgeable supplier is critical. Look for a supplier with expertise in welding consumables, welding equipment, welding processes and fume extraction solutions – and who understands how all these variables affect not only the generation and collection of fume, but also how they may affect the welding process overall. Someone with the depth of knowledge needed to assist with these decisions and equipment choices will be the best equipped to help you understand the options available so that you can make a decision that is optimal for your operations.

Evaluate your site

Once you've evaluated your welding process, it's time to take a look at your overall location for your welding operation. A reputable supplier will have the resources and the know-how to conduct a site assessment. The site assessment, in conjunction with the data derived from the welding process evaluation conducted in the previous step, will identify the application-specific variables that need to be considered when developing the most appropriate fume extraction solution.

Ideally, the site evaluations should be a collaborative process wherein the supplier and the welding operation's internal team work together to determine the optimal fume extraction strategy for the welding application (or applications) involved. For example, a weld fume extraction gun might be best suited for areas where large parts require multiple welds, while stations with smaller parts requiring straight welds might warrant a portable or mobile weld fume control system.

The site assessment can also be helpful in identifying areas that pose specific challenges that might need special attention. These are parts of the plant or work space that would require more customized solutions, such as automating a welding process and isolating the area from employee exposure, or providing general ventilation in an area where large welded parts may deliver a higher volume or higher concentration of welding fume into the shop environment.

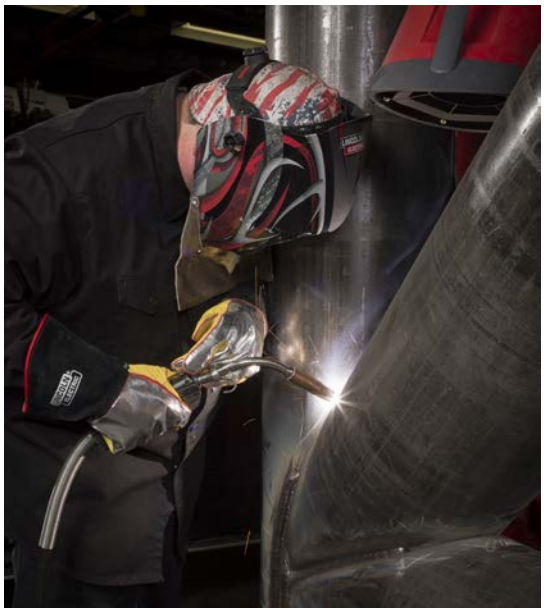
When it comes to welding fume extraction, every operation is unique and one size does not fit all. The four steps outlined here are critical in selecting and implementing the best overall fume reduction and control solutions for your workplace. What's more, your team will have the support, motivation and training needed to maximize the potential of that system.

In the end, these efforts can help create a work environment that is safer, cleaner, more efficient and more productive.

Educate and implement safe work practices

As always, safety should be the first – and ongoing – consideration when examining options for fume extraction equipment. Any system in any workplace is only as effective as the level of training and safety awareness of the workers who use it every day and those that maintain the equipment in operation. The work practices used by the welder can potentially have a large impact on their airborne exposure to fume and fume constituents. Instruction regarding the proper positioning of the head and body relative to the airflow and the fume plume, in addition to the need for consistent proper use and placement of fume extraction hoods, is critical. Also, after the initial training, employee behaviors should be monitored on an ongoing basis to ensure that operators are following proper safety procedures. Using the appropriate personal protective equipment and proper fume extraction equipment must be a requirement, not a choice.

Some suppliers offer materials and services aimed at helping companies implement a safe welding work practices. This effort can also be enhanced by including posters, signage and other messaging explaining proper equipment usage, interactive welding safety lessons, and other initiatives that can be easily incorporated into a company's overall training plan.



The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.