

Real-Time Monitoring for Industrial Welding Fume Exposure



Application Note EXPMN-022 (A4)

Situation

Welding activities are common in metal fabrication operations. Most people are familiar with the multiple safety hazards associated with welding. High voltage electricity, UV light from the arc, and the fire hazard from stray sparks are well understood with clear procedures to control these risks.



The invisible health risks are not as well understood. Welding generates ultrafine particles of smoke and fume, which can be inhaled by workers. If not properly controlled, compounds in welding fume, like manganese and hexavalent chrome, have been found to cause Parkinson's-like symptoms and cancer¹.

Monitoring and controlling these inhalation hazards is an ongoing activity in many welding shops. The use of robotic welding systems can eliminate exposure to the welder, but other employees in the building are still potentially exposed if the welding smoke and fume is not controlled.

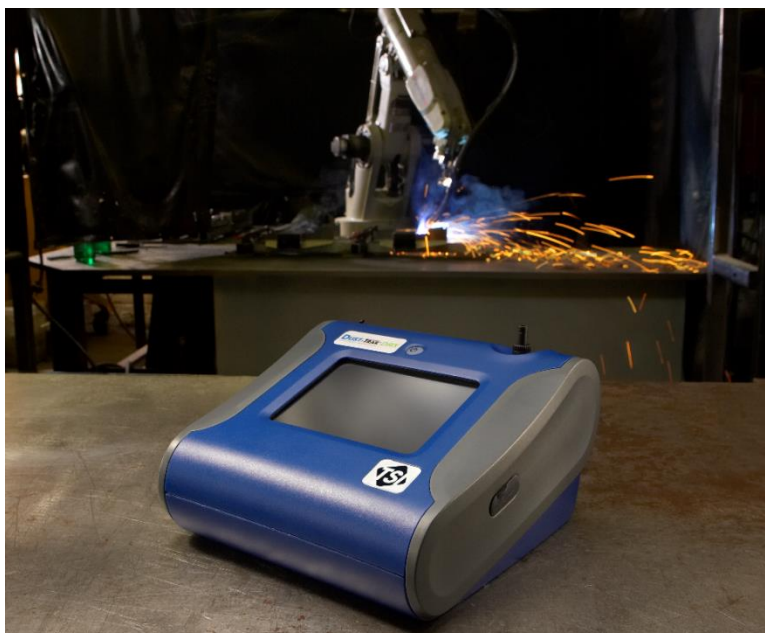
¹[OSHA Fact Sheet: Controlling Hazardous Fume and Gases during Welding.](#)

Solution

Some welding shops in the US are making use of the TSI DustTrak™ Aerosol Monitor to measure airborne concentration levels of welding related smoke and fume in real time.

The DustTrak™ Aerosol Monitor is a light-scattering, photometric aerosol mass concentration instrument. The DustTrak provides a precise, repeatable, real-time measurement of aerosol mass concentration based on light scattering properties of a known test aerosol.

Shops using the DustTrak™ Aerosol Monitor have ventilation systems in place and data from personal air monitoring to prove employee exposures are below the levels of concern. These shops use the DustTrak to monitor the ongoing effectiveness of the ventilation control. Instead of sending air samples to a lab for analysis with results 10 days later, the DustTrak Aerosol Monitor provides aerosol mass concentration in real time, all day every day.



When the welding set up is changed, the DustTrak Aerosol Monitor readings are checked to verify the ventilation controls are properly positioned to control welding fume at the point of generation to minimize fume buildup in the shop. The portability of the DustTrak Aerosol Monitor facilitates using the instrument to spot check specific workstations and troubleshoot areas with higher aerosol concentrations.

Conclusion

A direct reading, aerosol mass concentration instrument is the fastest way to ensure ongoing welding fume levels are adequately controlled.

Light scattering, photometric aerosol mass concentration instruments, like the DustTrak Aerosol Monitor, are valuable tools to easily identifying changes in welding fume levels. These instruments provide measurements of welding fume levels during the activity, instead of waiting several days for lab results, ensuring the safest possible work environments.

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