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WELDERS EXPOSED TO MANGANESE ABOVE RECOMMENDED LEVELS, RESEARCHERS FIND

*Local Exhaust Ventilation Reduces Exposure, Researchers Recommend
OSHA Revise Its Sampling Procedure for Welding Fumes*

Researchers investigating welding fume exposures have found that welders frequently are exposed to manganese at or above the American Conference of Governmental Industrial Hygienists (ACGIH) recommended limit of 0.2 milligrams per cubic meter (mg/m³). Some studies have detected a link between manganese exposure and a neurological condition similar to Parkinson's disease. U.S. workers who may be exposed to welding fumes include more than 410,000 full-time welders and an additional one million workers who weld intermittently. Pipe-fitters, ironworkers, boilermakers and sheet metal workers are the main construction trades that do welding.

Michael Flynn, ScD, of the University of North Carolina's Department of Environmental Sciences and Engineering and Pam Susi, an industrial hygienist and MSPH with CPWR–The Center for Construction Research and Training, analyzed three large data sets containing welding exposure information. In particular, the researchers looked at how ventilation and other workplace conditions affect welders' exposures. Their findings were published in the February issue of the *Journal of Occupational and Environmental Hygiene*.

By comparing different exposure data sets, the researchers found a correlation among three welding fume components—iron, manganese, and total particulate. They used the findings to devise simple equations to estimate one component from either of the other two. (The formulas are included in the journal article.) “With these formulas we may be able to estimate manganese exposure when we only have iron or total particulate data,” said Susi.

Researchers also noted that local exhaust ventilation (LEV), which is placed right next to the operation generating the welding fumes, reduced exposure to welding fumes. On the other hand, area fans or “natural” ventilation, such as open windows, generally did not provide adequate exposure reduction. Also, the data suggest that exposure levels are higher for welders working in enclosed spaces without LEV.

The researchers recommend that OSHA reconsider its policy requiring compliance officers to place the sampler behind the welding helmet when evaluating welding fume exposures. The

researchers found that this approach gives lower exposure readings than sampling outside the helmet, suggesting that the helmet itself helps reduce exposure. Thus, the method seems to deviate from OSHA's standard practice of measuring exposure without regard to the reduction provided by personal protective devices, such as respirators.

Susi and Flynn wrote, "PELs [permissible exposure limits] are based on breathing zone exposures irrespective of respirator use and are used to determine the adequacy of the existing engineering controls. OSHA's approach complicates the ability to measure the effectiveness of these engineering controls by introducing the welding helmet as an exposure attenuating device."

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