

# Health Hazards of Welding Fumes: Manganese



**What is Manganese?** Manganese is a metal that occurs naturally in the environment and is used in steel and welding processes to improve strength, stiffness, and the hardness of the metal. It is present in most steels, welding wires, and rods.

**What are the effects of exposure to manganese fumes?** Inhalation of manganese can potentially cause adverse affects to the lungs, liver, kidneys, reproductive system in males, and the central nervous system. Long-term exposure to manganese may cause maganism or manganese-induced parkinsonism (MIP).

**Symptoms** include: tremors, slowness of movement, muscle rigidity, poor balance, headache, spasms, weakness or cramps in the legs, a characteristic psychosis with euphoria, impulsiveness, and mental confusion.

**If you have any of these symptoms, go to your doctor as soon as possible.** Welders with these symptoms are often misdiagnosed with other neurological disorders such as: Parkinson’s disease, multiple sclerosis, and Lou Gehrig’s disease.



## How do you reduce exposure to manganese fumes?

- Increase ventilation with either local exhaust ventilation (preferred) or general dilution ventilation.
- Point-source capture with a fume hood
- For MIG welding– use a fume extraction weld gun
- Perform a type of welding that produces less fumes
- Provide respiratory protection equipment

## Occupational Exposure Limits for Manganese

OSHA: Permissible Exposure Limits **5 mg/m<sup>3</sup> Ceiling**

ACGIH Threshold Limit Values (TLV)<sup>®</sup> **0.2 mg/m<sup>3</sup> TLV**

NIOSH Recommended Exposure Limits **1 mg/m<sup>3</sup> TWA**  
**3 mg/m<sup>3</sup> STEL**

NIOSH IDLH **500 mg/m<sup>3</sup>**

UK WEL (Workplace Exposure Limits from 2007) **0.5 mg/m<sup>3</sup> TWA**

## References and Additional Resource:



ATSDR’s Manganese ToxFAQs™: <http://www.atsdr.cdc.gov/tfacts151.pdf>

IBEW JOURNAL, JULY/AUGUST 2003: Welding and Manganese Poisoning: <http://www.elcosh.org/record/document/613/d000595.pdf>

Flynn, M. R. and Susi, P., 2009. Neurological risks associated with manganese exposure from welding operations - A literature review. International Journal of Hygiene and Environmental Health 212, 459-469.

NIOSH Manganese Topic page: <http://www.cdc.gov/niosh/topics/manganese/>

OSHA Manganese Topic page: [http://www.osha.gov/dts/chemicalsampling/data/CH\\_250200.html](http://www.osha.gov/dts/chemicalsampling/data/CH_250200.html)

Center to Protect Workers’ Rights (CPWR) <http://www.cpwr.com/hazpdfs/kfwelding.pdf>