Refer to ***document*** “Canadian Environmental Protection - Concerns about total welding fume and manganese exposure limits show trends in workplace safety”  
  
Manganism is a condition that occurs when someone has been exposed to toxic levels of manganese. Symptoms tend to mimic Parkinson's Disease and include gait disturbances, clumsiness, tremors, speech disturbances, and psychological disturbances.  
  
Metal Fume Fever  
  
Metal fume fever is a temporary condition caused by inhaling manganese fumes. Symptoms typically include chills, fever, upset stomach, vomiting, dryness of the throat, cough, weakness, and achiness.

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| **Exposure Limit** | **Limit Values** | **Health Factors and Target Organs** |
| **OSHA Permissible Exposure Limit (PEL) - General Industry**  See [29 CFR 1910.1000 Table Z-1](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992&p_text_version=FALSE) | 5 mg/m3 Ceiling | Manganism\*  Target organs: Brain, central nervous system |
| **OSHA PEL - Construction Industry**  See [29 CFR 1926.55 Appendix A](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10629) | 5 mg/m3 Ceiling | Manganism\*  Target organs: Brain, central nervous system |
| **OSHA PEL - Shipyard Employment**  See [29 CFR 1915.1000 Table Z-Shipyards](https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10286&p_text_version=FALSE) | 5 mg/m3 Ceiling | Manganism\*  Target organs: Brain, central nervous system |
| **National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL)** | 1 mg/m3 TWA 3 mg/m3 STEL | Metal fume fever |
| Poor coordination, memory/judgment trouble, emotional instability, shaking/tremor in hands and/or legs, difficulty speaking properly, hallucinations |
| Manganese pneumonia |
| American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV)\*\* (2013) | 0.02 mg/m3  (respirable fraction)  TWA   0.1 mg/m3  (inhalable fraction)  TWA A4 | Neurophysiological and neuropsychological effects, including impaired visual time, eye-hand coordination, and hand steadiness, decreased motor function, decreased behavioral tests, tremor |
| [\*\*CAL/OSHA PELs\*\*](http://www.dir.ca.gov/title8/5155table_ac1.html) | 0.2 mg/m3(respirable fraction)  TWA 3 mg/m3  STEL | Neurobehavioral dysfunction, decreased eye-hand coordination |

<https://www.osha.gov/dts/chemicalsampling/data/CH_250200.html>  
  
<http://www.thefabricator.com/article/arcwelding/new-guideline-reduces-manganese-exposure-limit-dramatically>  
  
<https://www.des.nh.gov/organization/commissioner/pip/factsheets/>