

OSHA Occupational Chemical Database / MANGANESE, COMPOUNDS & FUME (as Mn)

MANGANESE, COMPOUNDS & FUME (as Mn)†

Chemical Identification	
CAS #	7439-96-5
Formula	Mn
Synonyms	Manganese metal: Colloidal manganese; Manganese-55 Synonyms of other compounds vary depending upon the specific manganese compound.

Physical Properties			
Physical description	A lustrous, brittle, silvery solid.		
Boiling point	3564°F	Molecular weight	54.9
Freezing point/melting point	2271°F	Vapor pressure	0 mmHg (approx)
Flash point		Vapor density	
Specific gravity	7.20 (metal)	Ionization potential	
Lower explosive limit (LEL)		Upper explosive limit (UEL)	
NFPA health rating		NFPA fire rating	
NFPA reactivity rating		NFPA special instruction	
Vapor hazard ratio (VHR)			
Historical exceedance percentage			
Target organs			

Monitoring Methods Used by OSHA			
Analyte code (IMIS no.)	1620	2587	
Sampling group		METALSSG-2	
Sampler/Sampling media	Tared low-ash 37 mm PVC filter, 5 microns [SLTC108]	Pre-assembled cassette with mixed cellulose ester filter (MCEF) 0.8 micron (37 mm) [MAWP037A0]	
Sampling time*	240-480 min	240-480 min	
Sampling volume (TWA)*	960 L	480-960 L	
Sampling flow rate (TWA)*	2 L/min	2 L/min	
Sampling volume (STEL/Peak/C)*	408-960 L		
Sampling flow rate (STEL/Peak/C)*	2 L/min		
Analytical method instruments	Gravimetric	ICP	
Method reference	OSHA PV2121 (partially validated)	OSHA ID-125G (fully validated)	

Monitoring Methods Used by OSHA			
Notes	If the net weight of the sample yields a concentration below the PEL after considering the associated SAE, the SLTC will perform no further work on the sample and the sample air concentration will be reported as the calculated gravimetric air concentration. If the net weight corresponds to an amount greater than the PEL value after considering the associated SAE, the sample may be analyzed for the applicable component and appropriate results will be reported.	Results are provided for the presence and amount or concentration of a specific element or elements. The stated identity of the actual sample contents (such as a specific form or compound) is based on the assumption that the material sampled is as identified by the compliance officer using available documentation of materials and processes. The physical form of a sample (dust, mist, or fume) is identified by the compliance officer using available documentation of materials and processes.	
Special requirements	FOR TOTAL DUST SAMPLES, DO NOT USE A CYCLONE!!	For the entire suite of analytes listed in METALSSG-2, request analyte code 2587 .	

* All sampling instructions above are recommended guidelines for OSHA Compliance Safety and Health Officers (CSHOs), please see the corresponding OSHA method reference for complete details.

Wipe Method	
Sampler/Sampling media	

Bulk Method	

On-Site Screening Techniques			
Device			
Model/Type			
Sampling information (see manufacturer instructions)			

Exposure Limits							
OSHA PEL 8-hour TWA (ST) STEL (C) Ceiling Peak		NIOSH REL Up to 10-hour TWA (ST) STEL (C) Ceiling		ACGIH TLV® 8-hour TWA (ST) STEL (C) Ceiling		CAL/OSHA PEL 8-hour TWA (ST) STEL (C) Ceiling Peak	
PEL-TWA		REL-TWA	1 mg/m ³	TLV-TWA	0.02 mg/m ³ (respirable particulate matter), 0.1 mg/m ³ ; (inhalable particulate matter) [2012]	PEL-TWA	0.2 mg/m ³

Exposure Limits							
PEL-STEL		REL-STEL	3 mg/m ³	TLV-STEL		PEL-STEL	3 mg/m ³
PEL-C	5 mg/m ³	REL-C		TLV-C		PEL-C	
Skin notation	N	Skin notation	N	Skin notation	N	Skin notation	N
Notes: See 29 CFR 1910.1000 Table Z-1.		Notes:		Notes:		Notes:	
Health factors: See NIH-NLM PubChem.		IDLH	500 mg/m ³				
Carcinogenic classifications: EPA-D, TLV-A4		Notes:					
AIHA emergency response planning guidelines - ERPG-1/ERPG-2/ERPG-3:							

Additional Resources and Literature References
NOAA: CAMEO Chemicals - Manganese
NIOSH: Pocket Guide to Chemical Hazards - Manganese compounds and fume (as Mn)
Literature References
<ul style="list-style-type: none"> ▪ ACGIH: <i>Documentation of the Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs) - Manganese</i> [7439-96-5], elemental and inorganic compounds, as Mn. See annual publication for most recent information. ▪ EPA: Hazard Summary - Manganese ▪ ATSDR: Toxicological Profile for Manganese. 2012. ▪ California Occupational Safety & Health Standards Board: Initial and Final Statement of Reasons. February 3, 2001. ▪ EPA: Integrated Risk Information System for Manganese (CASRN 7439-96-5). 1988. ▪ Hobbesland, A., Kjuus, H. and Thelle, D.S.: Mortality from nonmalignant respiratory diseases among male workers in Norwegian ferroalloy plants. <i>Scand. J. Work Environ. Health</i> 23(5): 342-350, 1997. ▪ Laohaudomchok, W. et al. Neuropsychological effects of low-level manganese exposure in welders. <i>Neurotoxicology</i>. 32(2): 171-179, 2011. ▪ NIOSH: <i>Occupational Health Guideline for Manganese</i>. 1978. ▪ Racette, B.A., McGee-Minnich, L, Moerlein, S.M., Mink, J.W., Videen, T.O. and Perlmutter, J.S.: Welding-related parkinsonism: clinical features, treatment, and pathophysiology. <i>Neurology</i> 56(1): 8-13, 2001. ▪ Roels, H., R. Lauwerys, J.P. Buchet et al.: Epidemiological survey among workers exposed to manganese: Effects on lung, central nervous system, and some biological indices. <i>Am. J. Ind. Med.</i> 11: 307-327, 1987. ▪ Roels, H.A., P. Ghyselen, J.P. Buchet, E. Ceulemans, and R.R. Lauwerys: Assessment of the permissible exposure level to manganese in workers exposed to manganese dioxide dust. <i>Br. J. Ind. Med.</i> 49: 25-34, 1992. ▪ Wergeland, E. and Iversen, B.G.: Deaths from pneumonia after welding. <i>Scand. J. Work Environ. Health</i> 27(5): 353, 2001.

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UNITED STATES DEPARTMENT OF LABOR

Occupational Safety & Health Administration
 200 Constitution Ave NW
 Washington, DC 20210
 ☎ 800-321-6742 (OSHA)
 TTY
 www.OSHA.gov

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