



Cadmium Exposure from Welding and Allied Processes

INTRODUCTION

Fumes are poisonous and can kill.

Overexposure can cause death. Some fume and dust from welding processes (including brazing, soldering, and thermal spraying) contain cadmium or cadmium oxide compounds. The specific form and concentration of cadmium present in the fume and dust are dependent on the composition of the filler metal, base metals, metal coatings, atmosphere, flux, and the welding process.

ACUTE (SHORT TERM) EFFECTS OF OVEREXPOSURE TO CADMIUM

- Cadmium produces more severe health effects compared to most fume and dust from other metals.
- Inhalation exposure to high concentrations of cadmium can cause symptoms such as nausea, headaches, dizziness, nervousness, lung complications, and death.

CHRONIC (LONG TERM) EFFECTS OF EXPOSURE TO CADMIUM

- Long term exposures or exposure to higher concentrations of cadmium oxide fume and dust causes health effects,

kidney failure, and can lead to respiratory disease and death.

- Inhalation of cadmium by smokers can accelerate the development of respiratory diseases.
- There is evidence that long term exposure to cadmium can cause lung cancer. OSHA has defined cadmium as a carcinogen with no further categorization.

OVERALL EVALUATION

- Overexposure to cadmium can cause death.
- Cadmium is carcinogenic to humans (IARC Group 1).

HOW TO PROTECT AGAINST OVEREXPOSURE

- Comply with OSHA regulations for cadmium.
- Identify composition of all base metals, coatings, and consumables; substitute non-cadmium containing materials wherever possible.

- Read and follow the Safety Data Sheets (SDSs) for cadmium containing products.
- Do not breathe fumes and gases. Avoid even brief exposure to high concentrations.
- Keep your head out of the fumes.
- Use enough ventilation, exhaust at the arc, or both, to keep fumes and gases from your breathing zone and the general area.
- Use industrial hygiene exposure assessments to determine exposure levels and the need for corrective measures—air supplied respirators may be required.
- Do not eat, drink, or smoke to avoid ingestion through hand to mouth activity in areas containing cadmium fume or dust.
- Remove PPE and wash your hands after leaving the work area to avoid ingestion through hand to mouth activity such as eating, drinking, or smoking.

INFORMATION SOURCES

ACGIH, *Documentation of the Threshold Limit Values and Biological Exposure Indices, and Guide to Occupational Exposure Values*, American Conference of Governmental Industrial Hygienists, <www.acgih.org>.

ATSDR, *Toxicological Profile for Cadmium—1998*, Agency for Toxic

Substances and Disease Registry, <www.astdr.cdc.gov>.

AWS, *Fumes and Gases in the Welding Environment*, American Welding Society, <www.aws.org>.

Environmental Protection Agency (EPA). Integrated Risk Information System (IRIS) database; <www.epa.gov/iris>.

IARC *Supplement 7 and Vols. 43–61 (1990), Monographs on the Evaluation of Carcinogenic Risk to Humans—Cadmium and Cadmium Compounds*, International Agency for Research on Cancer, <www.iarc.fr>.

IPCS, *Environmental Health Criteria 134—Cadmium*, International Programme on Chemical Safety, <www.inchem.org>.

NIOSH *Registry of Toxic Effects of Chemical Substances, and IDLHs*, National Institute for Occupational Safety and Health, <www.cdc.gov/niosh>.

NTIS, National Technical Information Service <www.ntis.gov>.

OECD *Risk Reduction Monograph No. 5: Cadmium—1994*, Organization for Economic Cooperation and Development, Environmental Health and Safety Division, <www.oecd.org>.

OSHA, *Title 29 Labor, Part 1910.1027 Cadmium*, Occupational Safety and Health Administration, Code of Federal Regulations (CFR), <www.osha.gov>.

The following references include the specific precautionary methods used to

protect against exposure to fumes and gases:

ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*, American Welding Society, <www.aws.org>.

ICdA, *Using Cadmium Safely*, International Cadmium Association, <www.cadmium.org>.

MSHA, *Title 30 Mineral Resources, Parts 1-199*, Mine Safety and Health Administration, Code Of Federal Regulations (CFR), <www.msha.gov>.

NIOSH Publication No. 78–138, *Safety and Health in Arc Welding and Gas Welding and Cutting*,: National Institute for Occupational Safety and Health, <www.cdc.gov/niosh>.

OSHA *Title 29 Labor, Part 1910*, Occupational Safety and Health Administration, Code of Federal Regulations (CFR), <www.osha.gov>.