

MASS.

MA13-2:

R245/2/

Zinc Ox.



Commonwealth of Massachusetts

RECOMMENDED SAFE PRACTICES BULLETIN

ZINC OXIDE FUME

Synonyms: Zinc white; Chinese white;
flowers of zinc

CAS Number: 1314-13-2

Chemical Formula: OZn

Date Completed: 7/88

HAZARD SUMMARY

- Exposure to zinc oxide fume occurs by inhalation.
- Zinc oxide fume can cause a flu-like illness called metal-fume fever.

GENERAL DESCRIPTION

Zinc oxide fumes are white fumes formed when zinc compounds are exposed to high temperatures.

HEALTH HAZARD INFORMATION

Exposure to freshly-formed zinc oxide fume occurs by inhalation.

ACUTE (short-term) HEALTH EFFECTS

Breathing zinc oxide fumes can cause "metal-fume fever", which is a flu-like illness. It begins within hours of exposure and lasts for approximately 24 hours. Symptoms of metal-fume fever are thirst, metallic taste, headache, dry throat, cough, shortness of breath, joint and muscle achiness, fevers to 102°F or more, chills and sweats, upset stomach, nausea, fatigue, and chest pain. If there are repeated exposures to zinc oxide fumes throughout the work week, obvious symptoms will less readily occur. Upon re-exposure after a few days away from work the symptoms will reappear.

Table of Contents

- p1. Acute Health Effects
- p2. Chronic Health Effects
- p2. Emergency Information
- p3. Protective Measures
- p4. Storage and Reactivity Information
- p4. Physical and Chemical Data
- p5. Definitions

Department of Labor and Industries - Division of Occupational Hygiene
1001 Watertown Street, West Newton, MA 02165

CHRONIC (long-term) HEALTH EFFECTS

There are no known chronic health effects from zinc oxide fume.

Cancer Hazard: Information is not currently available to determine whether zinc oxide fume is a carcinogen.

Reproductive Hazard: Data are inadequate to determine reproductive effects of zinc oxide fume.

OCCUPATIONAL EXPOSURE LIMITS

Most OSHA exposure limits are based on recommendations made by the ACGIH. Other recommendations made by NIOSH may be more protective of human health. Many chemicals have not been studied for long-term effects. Because of individual susceptibility, a small percentage of workers exposed to this substance at or below any of the recommended limits may experience some ill effects.

OSHA: The legal airborne exposure limit is 5 mg/m^3 , averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is 5 mg/m^3 , averaged over a 10-hour workshift. The short-term exposure limit, not to be exceeded during any 15-minute period, is 15 mg/m^3 .

ACGIH: The recommended airborne exposure limit is 5 mg/m^3 , averaged over an 8-hour workshift. The short-term exposure limit, not to be exceeded any 15-minute period, is 10 mg/m^3 .

MEDICAL MONITORING

There are no specific medical tests for assessing zinc oxide exposure. However, a pre-employment and periodic medical history and physical exam should be performed on all workers exposed to zinc oxide fume. All exposed workers with symptoms of a flu-like illness should be medically evaluated.

EMERGENCY INFORMATION

FIRST AID

Inhalation: Remove worker from exposure. If breathing stops, perform artificial respiration.

Eve Contact: Flush eyes with running water for at least fifteen minutes, occasionally lifting upper and lower lids. Seek medical attention if irritation persists.

Skin Contact: Remove contaminated clothing. Wash skin with soap and water.

FIRE AND EXPLOSION

NFPA Rating: NA

Flash Point: NA

Extinguishing Media: Dry chemical, carbon dioxide,
water spray, alcohol foam

Flammable Limits: NA

Fire and Explosion Hazards: When zinc metal is heated or burned, zinc oxide fume is produced.

Respiratory Protection: Self-contained breathing apparatus with full facepiece operated in a pressure-demand or other positive-pressure mode.

Protective Equipment: Heavy gloves and protective clothing, safety goggles and face shield.

Firefighting Procedures: Use water in flooding amounts as a fog. Cool containers with flooding amounts of water. Use water to absorb vapors. Keep upwind.

SPILL, LEAK AND DISPOSAL PROCEDURES

Restrict persons not wearing protective equipment from the area of the leak until cleanup is complete. Ventilate the area.

Respiratory Protection: Supplied-air respirator with a full facepiece operated in the positive-pressure mode, or with a full facepiece, hood or helmet in the continuous-flow mode; or a self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive-pressure mode.

Protective Equipment: Wear protective clothing, gloves and dust-proof goggles and face shield.

EMERGENCY INFORMATION SOURCES

CHEMTREC: (800) 424-9300

Poison Information Center: (800) 682-9211; 232-2120 (Boston area only)

PROTECTIVE MEASURES

ENGINEERING CONTROLS

Engineering controls are better than personal protective equipment. Engineering controls may include local exhaust ventilation, enclosure of the process, general dilution ventilation and others. However, for some jobs (such as outside work, confined space entry, non-routine maintenance, emergencies, and jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

RESPIRATORY PROTECTION

Only respirators that have been approved by NIOSH or MSHA for exposures to zinc oxide fume should be used. Such equipment should only be used if the employer has a written program that takes into account air concentrations of the contaminant, and includes respirator fit testing, regular training, maintenance, inspection, cleaning, and evaluation. Improper use of respirators can be dangerous.

PROTECTIVE EQUIPMENT

Eve Protection: Wear dust-proof goggles and face shield during welding, heating operations or other potential exposure to zinc oxide fume.

Clothing: Wear protective clothing and gloves.

STORAGE AND REACTIVITY INFORMATION

REACTIVITY

Stable under normal temperatures and pressures.

INCOMPATIBILITIES

Avoid contact with chlorinated rubber, magnesium, linseed oil.

HAZARDOUS DECOMPOSITION PRODUCTS

Thermal decomposition releases acrid and toxic fumes of zinc oxide.

STORAGE

Not applicable.

PHYSICAL AND CHEMICAL DATA

Boiling Point: NA	Molecular Weight: 81
Melting Point: over 1800°C (3272°F)	Solubility in Water: Insoluble
Vapor Pressure: NA	Evaporation Rate: NA
Specific Gravity (water=1): 5.6 (solid)	Vapor Density: NA

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits for exposure to workplace chemicals.

Action level is the amount of a chemical in the air above which OSHA-specified medical and air monitoring must be done.

A carcinogen is a substance that causes cancer.

The C.A.S. number is assigned by the Chemical Abstracts Service to identify a specific chemical.

The flash point is the temperature at which a liquid or solid gives off enough vapor to form a flammable mixture with air.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of how much of a chemical is in the air.

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A mutagen is a substance that causes a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

ppm means parts of a substance per million parts of air. It is a measure of how much gas or vapor is in the air.

A teratogen is a substance that causes birth defects by damaging the fetus.

The vapor pressure is a measure of how easily a liquid or a solid gives off vapors. A higher vapor pressure indicates a higher concentration of the substance in the air, and therefore increases the amount of it breathed in.

WHERE TO GO FOR ADDITIONAL INFORMATION

The following information is available from the Massachusetts Department of Labor and Industries.

RIGHT TO KNOW INFORMATION

The Right to Know Program can answer questions about particular chemicals, training, labeling, and other Right to Know matters. Violations of the Right to Know Law should be reported to the nearest office of the Department of Labor and Industries.

PUBLIC PRESENTATIONS

Presentations and educational programs on occupational health or the Right to Know Law can be given for labor unions, trade associations and other groups.

OCCUPATIONAL HEALTH AND SAFETY SERVICES

Upon receipt of a complaint, an inspection may be conducted at your workplace. An inspection may include a walk-through, air monitoring, and evaluation of existing conditions and controls. Complaints about workplace health and safety conditions may be reported to any office of the Department of Labor and Industries. Such complaints are maintained strictly confidential. In addition, employers may obtain free technical assistance in complying with OSHA standards and the Massachusetts Right to Know Law.

MEDICAL EVALUATION

The Division of Occupational Hygiene has the names of various occupational health services and occupational physicians who are board-certified. This information is available upon request.

MASSACHUSETTS DEPARTMENT OF LABOR AND INDUSTRIES

Division of Occupational Hygiene

West Newton (617) 969-7177

Division of Industrial Safety

Boston (617) 727-3460
Lawrence (617) 681-7798

New Bedford (617) 997-8263
Springfield (413) 734-1421

Worcester (617) 752-6504
Pittsfield (413) 445-4214