

# Occupational Health Guideline for Mica

## INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

## SUBSTANCE IDENTIFICATION

- Formula: Muscovite (most important) is:  $K_2Al_4(Al_2Si_4O_{20})(OH)_4$  (typical)
- Synonyms: Muscovite; amber mica; roscoelite; lepidolite; phlogopite; biotite; zinnwaldite; fluorophlogopite
- Appearance and odor: Colorless, odorless flakes or sheets containing less than 1% quartz (free crystalline silica).

## PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for mica is 20 million particles of mica per cubic foot of air (mppcf) averaged over an eight-hour work shift.

## HEALTH HAZARD INFORMATION

### • Routes of exposure

Mica can affect the body if it is inhaled.

### • Effects of overexposure

Exposure to mica dust over a period of years may cause scarring of the lungs. The symptoms which may occur with this condition are cough, shortness of breath, weakness, and weight loss.

### • Reporting signs and symptoms

A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to mica.

### • Recommended medical surveillance

The following medical procedures should be made available to each employee who is exposed to mica at potentially hazardous levels:

#### 1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Examination of the respiratory system should be stressed.

—14" x 17" chest roentgenogram: Mica causes human lung damage. Surveillance of the lungs is indicated.

—FVC and FEV (1 sec): Mica causes pneumoconiosis. Persons with impaired pulmonary function may be at increased risk from exposure. Periodic surveillance is indicated.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis.

### • Summary of toxicology

Mica dust causes pneumoconiosis. In a study of 57 workers exposed to mica dust, 5 of the 6 workers exposed more than 10 years to concentrations in excess of 25 mppcf had pneumoconiosis. The most characteristic finding by chest x-ray was fine granulation of uneven density; there was a tendency to a coalescence of shadows in some cases. The symptoms most frequently reported were chronic cough and dyspnea; complaints of weakness and weight loss were less frequent.

## CHEMICAL AND PHYSICAL PROPERTIES

### • Physical data

1. Formula weight (muscovite): 797
2. Boiling point (760 mm Hg): Not applicable
3. Specific gravity (water = 1): 2.6–3.2
4. Vapor density (air = 1 at boiling point of mica): Not applicable
5. Melting point: Not applicable
6. Vapor pressure at 20 C (68 F): Essentially zero

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These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

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Public Health Service Centers for Disease Control  
National Institute for Occupational Safety and Health

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Occupational Safety and Health Administration

7. Solubility in water, g/100 g water at 20 C (68 F):

Insoluble

8. Evaporation rate (butyl acetate = 1): Not applicable

• **Reactivity**

1. Conditions contributing to instability: None
2. Incompatibilities: None
3. Hazardous decomposition products: None
4. Special precautions: None

• **Flammability**

1. Not combustible

• **Warning properties**

Mica is not known to be an eye irritant.

## MONITORING AND MEASUREMENT PROCEDURES

• **General**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

• **Method**

At the time of publication of this guideline, no measurement method for mica had been published by NIOSH.

## RESPIRATORS

• Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.

• In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

## COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to mica may occur and control methods which may be effective in each case:

### Operation

Liberation from open and underground mining operations

Use in manufacture of electrical insulation for low thermal conductivity and high dielectric strength

Use in manufacture of asphalt shingles and roll roofing

Use in manufacture of paint, wall paper, and bituminized cardboard

Use in manufacture of molded rubber products; plastics; special greases; absorbent of well drilling muds

Use in fabrication of windows and diaphragms

### Controls

General dilution ventilation; local exhaust ventilation; dust collection; process enclosure; personal protective equipment; wet drilling

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Process enclosure

## EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

• **Eye Exposure**

If mica gets into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. Get medical attention immediately. Contact lenses should not be worn when working with this chemical.

• **Breathing**

If a person breathes in large amounts of mica, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

• **Rescue**

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency

rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

## **SPILL AND DISPOSAL PROCEDURES**

- Persons not wearing protective equipment and clothing should be restricted from areas of spills or releases until cleanup has been completed.

- If mica is spilled or released in hazardous concentrations, the following steps should be taken:

1. Ventilate area of spill or release.
2. Collect spilled material in the most convenient and safe manner for reclamation or for disposal in a sanitary landfill.

- Waste disposal method:

Mica may be disposed of in a sanitary landfill.

## **REFERENCES**

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## RESPIRATORY PROTECTION FOR MICA

<b>Condition</b>	<b>Minimum Respiratory Protection* Required Above 20 mppcf</b>
<b>Particulate Concentration</b>	
100 mppcf or less	Any dust respirator.
200 mppcf or less	Any dust respirator, except single-use or quarter-mask respirator. Any fume respirator or high efficiency particulate filter respirator. Any supplied-air respirator. Any self-contained breathing apparatus.
1000 mppcf or less	A high efficiency particulate filter respirator with a full facepiece. Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
10,000 mppcf or less	A powered air-purifying respirator with a high efficiency particulate filter. A Type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode.
Greater than 10,000 mppcf or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.  A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

\*Only NIOSH-approved or MSHA-approved equipment should be used.