

# Occupational Health Guideline for Talc (Non-Asbestos Form)

## 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:** No specific formula
- **Synonyms:** Hydrous magnesium silicate; steatite talc; non-fibrous talc; non-asbestiform talc
- **Appearance and odor:** Odorless solid.

## PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for talc is 20 million particles of talc per cubic foot of air (mppcf) averaged over an eight-hour work shift. The American Conference of Governmental Industrial Hygienists has issued a Notice of Intended Changes of its recommended Threshold Limit Value for talc (non-asbestos form) from 20 mppcf to 15 mppcf or 2 mg/m<sup>3</sup> respirable dust.

### • Method

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

## HEALTH HAZARD INFORMATION

### • Routes of exposure

Talc can affect the body if it is inhaled or if it comes in contact with the eyes.

### • Effects of overexposure

Repeated inhalation of non-asbestos form of talc dust might cause scarring of the lungs with shortness of breath, chronic cough, and heart failure. The non-asbestos form of talc may cause irritation of the eyes in the same manner as nuisance dusts.

### • 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 talc.

### • Recommended medical surveillance

The following medical procedures should be made available to each employee who is exposed to talc 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 lungs and cardiovascular system should be stressed.

—14" x 17" chest roentgenogram: The non-asbestos form of talc may have the potential to cause pulmonary fibrosis and cancer. Surveillance of the lungs is indicated.

—FVC and FEV (1 sec): Talc is reported to cause decreased pulmonary function. Periodic surveillance is indicated.

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

### • Summary of toxicology

The non-asbestos form of talc, also termed nonfibrous, has been reported to cause talcosis although this is controversial. It has not been proven to cause the effects produced by exposure to fibrous talc: fibrotic pneumoconiosis and an increased incidence of cancer of the lungs and pleura. In a study of 20 workers exposed for 10 to 36 years to talc described as "pure," at levels ranging from 15 to 35 mppcf, no evidence of pneumoconiosis was found. In another study which compared the pulmonary function of workers exposed to either fibrous or nonfibrous talc, it was concluded that while the fibrous form was the more pathogenic type, both talcs produced pulmonary fibrosis; no data were presented to document the types of talc involved. An epidemiologic study of 260 workers with 15 or more

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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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years of exposure to commercial talc dust containing pure talc, plus tremolite, anthophyllite, carbonate dusts, and a small amount of free silica revealed a fourfold greater than expected proportional mortality from cancer of the lungs and pleura; in addition, a major cause of death was cor pulmonale, a result of the pneumoconiosis; the effects were likely due to the asbestos-form contaminants. The role of nonfibrous talc in these disease states could not be assessed.

## CHEMICAL AND PHYSICAL PROPERTIES

- **Physical data**

1. Molecular weight: 295
2. Boiling point (760 mm Hg): Not applicable
3. Specific gravity (water = 1): 2.5–2.8
4. Vapor density (air = 1 at boiling point of talc): Not applicable
5. Melting point: 900–1000 C (1652–1832 F) (loses water)
6. Vapor pressure at 20 C (68 F): Essentially zero
7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble

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**

Talc is not reported to be a significant 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**

Sampling and analyses may be performed by collection of talc in an impinger, followed by dust counting utilizing an optical microscope. A detailed analytical method for talc may be obtained from the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161, under the title "NIOSH Analytical Methods for Set R" (order number PB 262 403).

## 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 talc may occur and control methods which may be effective in each case:

Operation	Controls
Use in cosmetic industry as face powder, body or dusting powder, soap, and toilet preparations; in pharmaceutical industry in tablets, pills, salves, and lotions	General dilution ventilation; dust collecting system; wet grinding; personal protective equipment
Liberation during mining and processing by crushing, drying, milling, and upgrading by flotation	General dilution ventilation; dust collecting system; wet grinding; personal protective equipment
Use as a filler and selective absorbent in paper industry; use in ceramics industry in high quality electronic products as insulation; use as a selective absorbent in rubber and plastics reinforcing; use in cleaning up oil spills	General dilution ventilation; personal protective equipment

## EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid proce-

dures and send for first aid or medical assistance.

#### • Eye Exposure

If the non-asbestos form of talc gets into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. If irritation is present after washing, get medical attention.

### SPILL AND DISPOSAL PROCEDURES

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

- If talc is spilled, the following steps should be taken:

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

- Waste disposal method:

Talc may be disposed of in a secured sanitary landfill.

### REFERENCES

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## RESPIRATORY PROTECTION FOR TALC (NON-ASBESTOS FORM)

Condition	Minimum Respiratory Protection* Required Above 20 mppcf
Particulate Concentration	
100 mppcf or less	Any dust and mist respirator.
200 mppcf or less	Any dust and mist 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 full facepiece and a high efficiency particulate filter. A Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode or with a full facepiece, helmet, or hood operated in 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.