

Occupational Health Guideline for Soapstone

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: $3\text{MgO}\cdot 4\text{SiO}_2\cdot \text{H}_2\text{O}$
- Synonyms: Massive talc; steatite
- Appearance and odor: Slippery solid with no odor. (Soapstone contains less than 10% tremolite and less than 1% crystalline silica).

PERMISSIBLE EXPOSURE LIMIT (PEL)

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

HEALTH HAZARD INFORMATION

• Routes of exposure

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

• Effects of overexposure

Exposure to soapstone may cause scarring of the lungs. Shortness of breath, cough, enlargement of the ends of the fingers and heart failure may occur with this condition. Workers exposed to soapstone have been found to have an increased amount of cancer of the lungs and pleura.

• 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 soapstone.

• Recommended medical surveillance

The following medical procedures should be made available to each employee who is exposed to soapstone 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: Soapstone contains fibrous talc which can cause pneumoconiosis and lung cancer. Surveillance of the lungs is indicated.

—FVC and FEV (1 sec): Soapstone contains fibrous talc which 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

Soapstone dust contains varying percentages of fibrous talc, which causes fibrotic pneumoconiosis and an increased incidence of cancer of the lungs and pleura. In the development of talc pneumoconiosis or talcosis, the subject initially is symptom-free, but cough and dyspnea develop as the disease progresses; cyanosis, digital clubbing, and cor pulmonale occur in advanced cases. The disease progresses slowly, even in the absence of continued exposure; occasionally, the disease may progress rapidly, with death occurring within a few years of a very heavy exposure. In an epidemiologic study of 260 workers with 15 or more years of exposure to commercial talc dust containing talc, tremolite, anthophyllite, carbonate dusts, and a small amount of free silica, the mortality rate from cancer of the lungs and pleura was four times greater than expected; in addition, a major cause of death among these workers was cor pulmonale, a result of the pneumoconiosis.

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.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

CHEMICAL AND PHYSICAL PROPERTIES

• Physical data

1. Formula weight: 379.2
2. Boiling point (760 mm Hg): Not applicable
3. Specific gravity (water = 1): 2.7–2.8
4. Vapor density (air = 1 at boiling point of soapstone): Not applicable
5. Melting point: Not applicable
6. Vapor pressure at 20 C (68 F): Essentially zero
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

According to the *Documentation of TLV's*, "soapstone does not have a precise mineralogic connotation. Many rocks of variable composition are sometimes so designated. Massive talc is sometimes called soapstone or steatite. The terms are not synonymous, and some forms of soapstone have as little as 50% talc." Grant states that "talc employed in fulling of cloth is said to have caused conjunctival inflammation resulting in symblepharon, severe enough to require surgery in some instances."

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

Operation	Controls
Liberation from mining, quarrying, and blasting of soapstone	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use in manufacture of acid-proof coverings in floors, tables, sinks, etc.; use in switch-board panels for high electrical resistance; use in Kraft process of pulp manufacture; use in fume cupboards and fireless cookers; use in crayons for marking cloth, metal, and glass	General dilution ventilation; local exhaust ventilation; personal protective equipment

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 soapstone 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.

• Breathing

If a person breathes in large amounts of soapstone, 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. Under-

stand 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 hazardous amounts of soapstone are spilled or released, 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 secured sanitary landfill.

- Waste disposal method:

Soapstone may be disposed of in a secured sanitary landfill.

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RESPIRATORY PROTECTION FOR SOAPSTONE

Condition	Minimum Respiratory Protection* Required Above 20 mppcf
Particulate Concentration	
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 full facepiece and a high efficiency particulate filter.
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.