



## FACT SHEET

# ASBESTOS-CONTAMINATED VERMICULITE

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### Overview

In response to reports it received about adverse human health impacts associated with exposure to asbestos-contaminated vermiculite, the Environmental Protection Agency (EPA) conducted a series of tests to evaluate the extent and nature of the risk. The results of this investigation indicate that the potential exposure to asbestos from some vermiculite products poses only a minimal health risk to consumers, although workers may face more serious risks.

### What is vermiculite and where does it come from?

Vermiculite is produced from ore mined throughout the world. In the United States, mines are located in Montana, South Carolina, and Virginia. When heated, the ore expands into a light, rather fluffy material, that is fire resistant, chemically inert, absorbent, light weight, and odorless. The absorbent properties of the expanded vermiculite make it useful in lawn and garden, agricultural, and horticultural products. Other common uses are as thermal and sound insulation, construction material, insulation material, and for lightweight, absorbent packaging material.

### Where does the asbestos come from and why is it a health concern?

Vermiculite ores often contain a range of other minerals including, in some cases, asbestos. Asbestos is not a major contaminant, and only a few ore deposits have been found to contain more than trace amounts of asbestos minerals. However, exposure to airborne asbestos particles has been linked to respiratory ailments including cancer, and EPA is concerned about the increased risk to consumers and workers from use of asbestos-contaminated vermiculite products.

### What has EPA done to assess the risk?

To evaluate the risk posed by compounds such as asbestos, EPA needs to determine if the contaminant is present in certain products and also whether people come in contact with sufficient quantities to cause harm. For asbestos, this means that airborne fibers need to be inhaled and lodged into the lungs. EPA began its investigation by purchasing and testing a number of vermiculite products available in garden stores across the country. Only 15 percent (8/54) of these products contained



enough asbestos to allow EPA to quantify the percentage of asbestos reliably. Further analysis of the likelihood of the asbestos becoming airborne, during routine use of these products, indicated that this potential exposure poses a minimal health risk to consumers. Vermiculite products may, however, present more serious risks in a work setting where the frequency and duration of exposures are likely to be significantly greater. EPA has provided the report of its investigation, *Sampling and Analysis of Consumer Garden Products That Contain Vermiculite*, to the Occupational Safety and Health Administration (OSHA) to assist that Office in evaluating the hazards to workers from exposure to certain vermiculite products.

### **What Can Consumers Do?**

To further reduce the low risk associated with the occasional use of vermiculite products during gardening activities, EPA recommends that consumers can do the following:

- Use vermiculite outdoors or in a well-ventilated area.
- Keep vermiculite damp while using it to reduce the amount of dust created.
- Avoid bringing dust from vermiculite use into the home on clothing.
- Use premixed potting soil, which usually contains more moisture and less vermiculite than a pure vermiculite product, and is less likely to generate dust.
- Use other soil additives such as peat, sawdust, perlite, or bark.

### **For More Information**

- Contact EPA's Toxic Substances Control Act (TSCA) Assistance Information Service, 202-554-1404, for additional information or to obtain a copy of the vermiculite survey report identified above.
  - Go to EPA's Asbestos website at [www.epa.gov/asbestos](http://www.epa.gov/asbestos). The vermiculite garden product survey report also will be posted there.
  - For more information on risks to workers, contact the OSHA Public Affairs Office, 202-693-1999, or visit the OSHA website at [www.osha.gov](http://www.osha.gov).
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## **OFFICE OF POLLUTION PREVENTION AND TOXICS**

### **FACT SHEET / Q&A: ASBESTOS-CONTAINING VERMICULITE**

The mining of vermiculite in Libby, Montana began in 1919. Even before 1963, when W.R. Grace & Company acquired the mine, there were concerns about asbestos exposure from the mine. Since then, other federal and state agencies including OSHA and NIOSH have studied asbestos exposure at the mine. Since the 1970s, EPA has been involved in the issue of asbestos contamination in vermiculite, including the material mined in Libby by W.R. Grace. In the early 1980s, the Office of Toxic Substances (OTS) conducted reviews of vermiculite to determine if it should be included in the then upcoming Asbestos Ban and Phase-out Rule (ABPO). Today, Superfund is involved at Libby due to concerns over asbestos contamination in the local communities from the mining, milling, and transport operations. The Office of Pollution Prevention and Toxics (OPPT) (formerly OTS) has been asked about the history of our decisions concerning vermiculite, the outcome of the ABPO Rule, and whether there is a concern over vermiculite today.

In 1978, EPA received from O. H. Scott, Inc. a TSCA section 8(e) notice of substantial risk on the health effects of vermiculite on its workers. This notice initiated OTS's (now OPPT) review of vermiculite exposure. In 1982, the Midwest Research Institute (MRI) produced a report for OTS titled: "Collection, Analysis and Characterization of Vermiculite Samples for Fiber Content and Asbestos Contamination", which showed that milled and screened vermiculite from W.R. Grace's Libby mine contained between 4-7% asbestos by weight. The report also concluded, using methodologies and assumptions available at the time, that this material contained less than 1% respirable asbestos fibers. At the time, 1% total asbestos by weight was the level of quantification and was used as the level of concern for asbestos containing materials. Due to the fact that there were products on the market with 80-90% asbestos, OTS decided not to pursue vermiculite as a priority. In 1985, Versar, Inc. conducted an exposure assessment for OTS of asbestos contaminated vermiculite using the data from the 1982 MRI report. The assessment included occupational, consumer and general population estimates which have raised concerns about risk levels. No risk calculations were included in the report.

Currently OPPT and EPA regional offices are updating lists of producers, processors and exfoliators of vermiculite; updating the history of the Libby mine and various government agencies involvements; conducting a literature search on vermiculite and other ores containing asbestos; and determining current asbestos levels of asbestos containing materials in the environment through additional sampling and analysis. This effort includes vermiculite products and construction materials. These efforts will allow us to test the assumptions made in the 1980's using today's scientific methodologies. In addition, EPA's regional office in Denver is sampling homes, schools, and ambient air in Libby as well as offering health/exposure screening for the residents to assess current conditions.

## Conclusions

1) Following an additional review of the information concerning vermiculite, OPPT believes that its 1979-1986 review process was logical and complete and consistent with the methodologies available at the time. The 1983 decision not to pursue asbestos-contaminated vermiculite product was based on a finding of 4-7% asbestos content in beneficiated ore and calculation of <1% respirable fiber content in products. Priority was given to commercial and industrial asbestos products which had fiber content as high as 80-90%.

2) The 1986 proposed Asbestos Ban and Phase-out (ABPO) rule did not include products where asbestos in products was <1% or mining operations where asbestos was a contaminant. Many commenters wrote comments supporting the proposal because processed ores contained respirable fibers at no greater than low parts per million (ppm) levels. Based on the 1982 MRI report and methods available at the time, EPA estimated that products produced from Libby vermiculite contained less than 1% respirable asbestos fibers.

3) In 1991, the U.S. Court of Appeals in New Orleans remanded the ABPO rule and as a result, it did not go into effect. However, this remand would not have affected the Libby situation, or U.S. vermiculite production. Even without the remand, there would have been no impact.

4) The 1982 and 1985 reports document the releases of asbestos from Libby mining, milling and transportation. Since vermiculite has been mined in Libby since the 1920s, it is likely there has been significant environmental build-up of asbestos in the area, especially the mining and milling areas.

5) Current risk assessments for consumer use of vermiculite products show reasonably low risk for products with <1% asbestos. Data shows that asbestos content in vermiculite products from other mines is lower than that of the Libby mine which closed in 1990. Therefore, it is unlikely that today's vermiculite products pose a consumer risk. Future and ongoing sample analysis will confirm or deny this assumption.

6) Risks to the general public, and Libby residents appear to be due to past environmental releases from mining, milling and transport of vermiculite ore. More definitive ambient data are needed and collection is underway. It is known that asbestos fibers accumulate in indoor environments, and re-entrainment of indoor fibers can multiply indoor ambient levels 50-fold (Sebastien, 1979).

# Vermiculite

## What is it?

Vermiculite is the mineralogical name given to hydrated laminar magnesium-aluminum-iron-silicate which resembles mica in appearance. All vermiculite ores contain a range of other minerals that were formed along with the vermiculite in the rock. Vermiculite ores from some sources have been found to contain asbestos minerals but asbestos is not intrinsic to vermiculite and only a few ore bodies have been found to contain more than tiny trace amounts.

Vermiculite mines are surface operations where ore is separated from other minerals, and then screened or classified into several basic particle sizes.

When subjected to heat, vermiculite has the unusual property of exfoliating or expanding into worm-like pieces (the name vermiculite is derived from the Latin 'vermiculare' - to breed worms). This characteristic of exfoliation, the basis for commercial use of the mineral, is the result of the mechanical separation of the layers by the rapid conversion of contained water to steam. The increase in bulk volume of commercial grades is 8 to 12 times, but individual flakes may exfoliate as many as 30 times. There is a color change during expansion that is dependent upon the composition of the vermiculite and furnace temperature.

Vermiculite is found in various parts of the world. Locations of the predominant commercial mines are in Australia, Brazil, China, Kenya, South Africa, USA and Zimbabwe.

## What are its uses?

Vermiculite has been used in various industries for over 80 years. It is used in the construction, agricultural, horticultural, and industrial markets.

<b>CONSTRUCTION</b>	<b>AGRICULTURAL</b>	<b>HORTICULTURAL</b>	<b>INDUSTRIAL</b>
Acoustic finishes	Animal feed	Blocking mixes	Absorbent packing
Air setting binder Board	Anti-caking material	Hydroponics	Brake pads & brake shoes
Fire protection (internal/external)	Bulking agent	Micro-propagation	Castables
Floor & roof screeds (lightweight Insulating concrete)	Fertilizer	Potting mixes	Dispersions
Gypsum plaster	Pesticide	Rooting cuttings	Drilling muds
Loft insulation	Seed encapsulant	Seed germination	Filtration
Sound deadening compounds	Soil conditioner	Seedling wedge mix	Fireproof safes
		Sowing composts	Fixation of hazardous material
		Twin scaling bulbs	Furnaces
			Insulation blocks & shapes
			Insulation - high & low temperature
			Molten metal insulation
			Molded products
			Nuclear waste disposal
			Paints
			Perfume absorbent
			Sealants

**Below are some examples of typical binders and other materials which are often used in combination with vermiculite:**

Portland cement	Clay
Plaster (gypsum)	Potassium silicate
Bark	Fertilizers
Resins	Sodium silicate
High alumina cement	Peat

**Applications:**

Loose fill	Carriers
Lightweight aggregates	Soil conditioners
Asbestos substitutes	Density modifiers
Absorbents	Fire protection
Industrial heat insulation	

# Asbestos in Vermiculite Insulation

The U.S. Environmental Protection Agency (EPA) offices have received a large number of phone calls from citizens concerned about insulation that might contain asbestos in their homes. EPA is gathering more information about vermiculite insulation and other products containing vermiculite that may be contaminated with asbestos. If you suspect vermiculite insulation is in your home, the safest thing is to leave the material alone. If you decide to remove or must otherwise disturb the material due to a renovation project, consult with an experienced asbestos contractor. The following information provides a common-sense approach to help you find out what kind of insulation is in your home and decide what to do if you have vermiculite insulation.

## Background

Product names cannot be used to determine if your insulation might contain asbestos. All vermiculite is likely to contain small or trace amounts of asbestos. EPA believes that a number of manufacturers produced insulation from vermiculite. One mine in the United States produced over 70 percent of the world's vermiculite before the mine was closed in 1990. Vermiculite products generated from this mine were likely to have been contaminated with asbestos.

## Why is it a problem?

If disturbed, asbestos fibers in vermiculite insulation may get into the air. These fibers can be inhaled and become trapped in the lungs where they may cause diseases such as asbestosis, lung cancer, and mesothelioma. These diseases can develop many years after exposure to asbestos.

## What does it look like?

Vermiculite is a mineral that is shaped like a small nugget, and varies in color from silver-gold to gray- brown. The asbestos fibers contained in vermiculite insulation are generally too small to be seen without magnification. Only a trained technician using careful microscopic examination can see asbestos fibers.



## What should I do if I have vermiculite insulation in my home ?

Look at the insulation without disturbing it. If it appears you have vermiculite insulation in your home, we recommend the following steps:

- If possible, leave the insulation undisturbed. Asbestos particles will not become airborne if the insulation is contained. If it's sealed behind wallboards and floorboards or is isolated in an attic that is vented outside, the best approach is to keep it in place.
- If you are planning to remodel or replace vermiculite insulation, have it tested first.
  - EPA recommends using a trained and accredited professional to conduct the tests. If you decide to remove the vermiculite home insulation, use accredited, licensed asbestos removal professionals. Use of a "negative pressure enclosure" technique will prevent asbestos fibers and dust from escaping from the attic into the rest of the home. **Do not attempt to do this yourself.** You could spread asbestos fibers throughout your home, putting you and your family at risk of inhaling asbestos fibers.

- After the vermiculite insulation is removed, you may want to consider having air monitoring tests done in your attic and throughout the living areas of your home. This is to ensure that the concentration of asbestos fibers in the home is low or not present.

### **How do I find an accredited asbestos removal professional?**

An accredited asbestos inspector has undergone approved training and then taken examinations to be accredited. He or she will be able to take samples of the insulation, provide information on the results, and advise about additional tests or options to consider. Inspectors can be found in the Yellow Pages under "Asbestos Consulting and Testing" or "Asbestos Abatement." Ask the inspector to provide the name of the company that trained, accredited him or her. Call that company to confirm whether a particular inspector has had the required training and has up-to-date accreditation. If your State has licensing, confirm that the inspector's license is also current. Companies that can test the air in your home will be found under the same listings.

### **Where can I get more information?**

Information can be found on the hotline and web sites below as it becomes available. For current information on asbestos and health related information, contact EPA's TSCA Hotline at 1-202-554-1404 or visit EPA headquarters' Asbestos web site: [www.epa.gov/asbestos](http://www.epa.gov/asbestos)

Also visit the federal Agency for Toxic Substances and Disease Registry (ATSDR) website at [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov).

# Headquarters Press Release

Washington, DC

**Date Published:** 08/22/2000

**Title:** EPA STUDY SHOWS MINIMAL RISK TO CONSUMERS  
WHO USE VERMICULITE IN GARDENING

**FOR RELEASE: TUESDAY, AUG. 22, 2000**

## **EPA STUDY SHOWS MINIMAL RISK TO CONSUMERS WHO USE VERMICULITE IN GARDENING**

The U.S. Environmental Protection Agency today announced that a study of gardening uses of vermiculite shows that some products contain low levels of asbestos, but the risk to consumers is very low.

Vermiculite is a naturally occurring granular substance mined for uses in horticultural products and insulation materials. For lawn and garden uses, it is often sold straight to be mixed with soil by the consumer or in pre-mixed potting soils.

“EPA is making this information available as part of our effort to expand the public’s right to know and protect public health and the environment,” said Susan Wayland, Acting Assistant Administrator for the Office of Prevention, Pesticides, and Toxic Substances. “We tested a number of bags of straight vermiculite and pre-mixed potting soil that contained vermiculite. Low levels of asbestos were found in a handful of these bags, primarily those bags of straight vermiculite. These levels were very low and do not pose significant health risks. However, we feel it is important for consumers to be armed with this information when making their decisions.”

EPA recommends that consumers use pre-mixed potting soils, which ordinarily contain more moisture and much less vermiculite than pure vermiculite products and are therefore less likely to generate dust. EPA’s analysis indicates that these pre-mixed products pose little to no risk of exposure. Consumers may also want to purchase soil-supplementing materials other than vermiculite, such as peat, sawdust, perlite or bark although EPA does not endorse the use of any particular product. EPA also recommends that consumers who are mixing vermiculite-only products with soil, do so outdoors or in a well-ventilated area, keep the vermiculite damp during use to avoid dust, and avoid bringing dust into the home on clothing.

This investigation was conducted in two phases. Initially, 16 vermiculite products from the Seattle area were analyzed and one of these products was found to have asbestos at a level that could pose a potential for exposure. In the second phase, 38 vermiculite products from across the country were analyzed and five contained levels that could pose a potential for exposure, all five were straight vermiculite products. Seventeen of the 38 products were found to have trace amounts of asbestos.

Vermiculite can often contain a range of other minerals including, in some cases, low levels of asbestos. Asbestos can pose a risk if fibers become airborne and are inhaled into the lungs. Breathing high levels of these fibers, which are so small they float in the air unseen, can lead to an increased risk of lung cancer, mesothelioma, a cancer of the lining of the chest and the abdominal cavity, and asbestosis, a condition in which the lungs become scarred with fibrous tissue.

EPA’s report raises questions about the potential risk to workers who may use vermiculite products on a regular basis and face significantly greater exposures. EPA has shared the results of this report with Occupational Safety and Health Administration, the National Institute of Occupational Safety and Health, the Mining Safety Health Administration and the Consumer Product Safety Commission.

EPA is also developing a set of standard scientific protocols for sampling in-place vermiculite insulation in the attics and walls of people's homes to help assess the potential health risks.

To obtain a copy of the study or to find more information about asbestos visit EPA's web page at: [www.epa.gov/opptintr/asbestos](http://www.epa.gov/opptintr/asbestos) or call the TSCA Hotline at 202-554-1404.

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