

This fact sheet answers the most frequently asked health questions (FAQs) about synthetic vitreous fibers. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Synthetic vitreous fibers are manmade fibrous materials used for thermal and sound insulating purposes. Short-term exposure can cause reversible skin, eye, and lung irritation. Workers from factories making synthetic vitreous fibers used in home insulation showed no increased rates of lung problems. Some refractory ceramic fiber workers showed changes in their chest x-rays, but these changes are not associated with breathing problems. There is no clear association between exposure to synthetic vitreous fibers and cancer in humans. Synthetic vitreous fibers have not been detected in any of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are synthetic vitreous fibers?

Synthetic vitreous fibers are a group of fibrous, inorganic materials that contain aluminum or calcium silicates, and are made from rock or stone, clay, slag, or glass. They do not occur naturally in the environment, but are used widely for thermal and sound insulating purposes and to reinforce other materials. There are three categories of synthetic vitreous fibers: 1) glass fibers (fiberglass), including glass wool and continuous filament glass, 2) mineral wool, which contains stone wool and slag wool, and 3) refractory ceramic fibers.

Insulation that is used in homes and buildings is composed of synthetic vitreous fibers. Refractory ceramic fibers are not widely used for building insulation. They are used to insulate furnaces, in replacement of asbestos.

What happens to synthetic vitreous fibers when they enter the environment?

- Synthetic vitreous fibers can enter the air, water, and soil from the manufacture, use, and disposal of fiber-containing materials.
- They are generally not broken down to other compounds in the environment and remain virtually unchanged over long periods of time. They can eventually be broken down if the water or soil is very acidic or very alkaline.
- Most fibers suspended in air from insulation materials settle quickly, but some smaller diameter fibers may remain

suspended and be carried some distance by wind before settling.

- Synthetic vitreous fibers do not move through soil.

How might I be exposed to synthetic vitreous fibers?

- When insulation materials containing synthetic vitreous fibers are disturbed, fibers can be suspended in the air and breathed in.
- When installing or removing home insulation, fibers can come in contact with the eyes and skin.
- Workers who install or remove insulation or who are involved in building maintenance or repair are expected to have the highest levels of exposure to synthetic vitreous fibers.

How can synthetic vitreous fibers affect my health?

When synthetic vitreous fibers are suspended in air they can cause irritation of the eyes, the nose and throat, and parts of the lung. When these fibers contact the skin, they may also cause irritation. These effects are reversible and disappear shortly after exposure stops.

Animal studies show that repeatedly breathing dusty air containing a lot of synthetic vitreous fibers can lead to inflammation and fibrosis of the lung. Pulmonary inflammation is part of a natural defense system to clear the lung of deposited particles. If exposure stops, most

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deposited fibers are eventually cleared, and pulmonary inflammation stops. However, if pulmonary inflammation continues over a long period of time, a slow build up of scar tissue may occur in the lungs and in the membrane encasing the lungs called the pleura. This effect is called pulmonary fibrosis or pleural fibrosis. Glass fibers commonly used in home insulation materials did not cause fibrosis in animals, but refractory ceramic fibers did.

You are unlikely to develop long-term pulmonary inflammation or pulmonary fibrosis from synthetic vitreous fibers, unless you are exposed to very dusty conditions daily for many years. Studies of workers from factories that make synthetic vitreous fibers used in home insulation materials did not find abnormal numbers of cases of long-term pulmonary inflammation, breathing problems, or changes in chest x-rays. Some workers who made refractory ceramic fibers showed changes in chest x-rays that are called pleural plaques, but their ability to breathe was normal. Pleural plaques are small areas of very mildly scarred pleural tissue.

How likely are synthetic vitreous fibers to cause cancer?

You are unlikely to develop cancer from breathing in air with small amounts of synthetic vitreous fibers. Studies of workers from factories that make synthetic vitreous fibers have not found increased rates of lung cancer or cancer of the pleura, called mesothelioma. Animals exposed for life to air containing refractory ceramic fibers showed increased rates of lung cancer and mesothelioma, but animals exposed to insulation glass wools and stone wools did not.

The International Agency for Research on Cancer (IARC) determined that insulation glass wool, stone wool, and slag wool, and continuous filament glass are not classifiable as to carcinogenicity to humans because of the inadequate evidence of carcinogenicity in humans and the relatively low biopersistence of these materials. IARC determined that refractory ceramic fibers are possibly carcinogenic to humans because of their relatively high biopersistence and the findings of cancer in animals that repeatedly breathed in high levels of refractory ceramic fibers. The EPA has classified refractory ceramic fibers as a probable human carcinogen.

How can synthetic vitreous fibers affect children?

There are no unique exposure pathways to synthetic

vitreous fibers for children. It is likely that children exposed to these types of fibers will experience the same effects as adults, such as eye, skin, and upper respiratory tract irritation.

There are no studies that examined whether exposure to synthetic vitreous fibers affect the developments of the fetus, infants, or young children.

How can families reduce the risk of exposure to synthetic vitreous fibers?

Insulating material in attics or walls is the most common source of synthetic vitreous fibers in a home. Avoid disturbing or contacting these materials.

If you install your own insulation, wear protective clothing, respiratory protection, and eye protection, and follow recommendations provided by the manufacturer for installing this material.

If you are exposed to these fibers at work, you may carry fibers home on your skin, clothes, or tools. You can avoid this by showering, and changing clothing before leaving work. Your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to synthetic vitreous fibers?

There are currently no tests specific for synthetic vitreous fibers. A chest x-ray is a common method to determine if you have certain conditions, such as pleural plaques, lung or pleural fibrosis, or mesotheliomas.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 5 milligrams of synthetic vitreous fibers as inert or nuisance dust per cubic meter (5 mg/m³) of air for the respirable fraction and 15 mg/m³ for total dust. The voluntary limit for fiberglass and mineral wool is 1 fiber per cubic centimeter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Synthetic Vitreous Fibers (Draft for Public Comment). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

