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Asbestos

1332-21-4

Hazard Summary

Asbestos has been used in building materials, paper products, plastics, and c
Exposure mainly occurs in indoor air where it may be released from these m
Effects on the lung are a major health concern from asbestos, as chronic (lo
exposure to asbestos in humans via inhalation can result in a lung disease te
asbestosis. Asbestosis is characterized by shortness of breath and cough an
severe impairment of respiratory function. Cancer is also a major concern f
exposure, as inhalation exposure can cause lung cancer and mesothelioma (
the thin membranes lining the abdominal cavity and surrounding internal or
possibly gastrointestinal cancers in humans. EPA has classified asbestos as
known human carcinogen.

Please Note: The main sources of information for this fact sheet are EPA's Integra
Information System (IRIS), which contains information on the carcinogenic effect
including the unit cancer risk for inhalation exposure, and the Agency for Toxic S
Disease Registry's (ATSDR's) *Toxicological Profile for Asbestos*.

Uses

- The main uses of asbestos are in building materials, paper products, asbesto
products, friction products, textiles, packings and gaskets, and asbestos-rein
(1)
- Asbestos use in the United States is currently decreasing. (1)

Sources and Potential Exposure

- Airborne exposure to asbestos may occur through the erosion of natural dep
asbestos-bearing rocks, from a variety of asbestos-related industries, or fron
brakes on cars and trucks. The concentrations in outdoor air are highly vari
- Asbestos has been detected in indoor air, where it is released from a variety
materials such as insulation and ceiling and floor tiles. It is only released, h
these building materials are damaged or disintegrate. Typical concentration
range from 1 to 200 nanograms per cubic meter (ng/m^3) (0.000001 to 0.002
cubic meter (mg/m^3)). (1)

- Asbestos may be released to water from a number of sources, including eros deposits, corrosion from asbestos-cement pipes, and disintegration of asbest materials with subsequent transport into sewers. (1)

Assessing Personal Exposure

- It is possible to test for the presence of asbestos fibers in urine, feces, or mu addition, a chest X-ray, although it cannot detect the asbestos fibers themsel early signs of lung disease caused by asbestos. (1)

Health Hazard Information

Acute Effects:

- No studies were located on the acute (short-term) toxicity of asbestos in ani humans. (1-4)

Chronic Effects (Noncancer):

- Chronic inhalation exposure to asbestos in humans can lead to a lung diseas asbestosis, which is a diffuse fibrous scarring of the lungs. Symptoms of asb shortness of breath, difficulty in breathing, and coughing. Asbestosis is a pr disease, i.e., the severity of symptoms tends to increase with time, even afte has stopped. In severe cases, this disease can lead to death, due to impairme respiratory function. (1,2)
- Other effects from asbestos exposure via inhalation in humans include pulm hypertension and immunological effects. (1,2)
- Feeding studies in animals exposed to high doses of asbestos have not detec evidence of adverse toxic effects. (1,2)
- EPA has not established a Reference Concentration (RfC) or a Reference D asbestos. (5)

Reproductive/Developmental Effects:

- No studies were located on the developmental or reproductive effects of asb animals or humans via inhalation. (1,2,3)
- Birth defects were not noted in the offspring of animals exposed to asbestos during pregnancy. (1)
- No effects on fertility were observed in animals exposed to asbestos in the d breeding, pregnancy, and lactation. (1)

Cancer Risk:

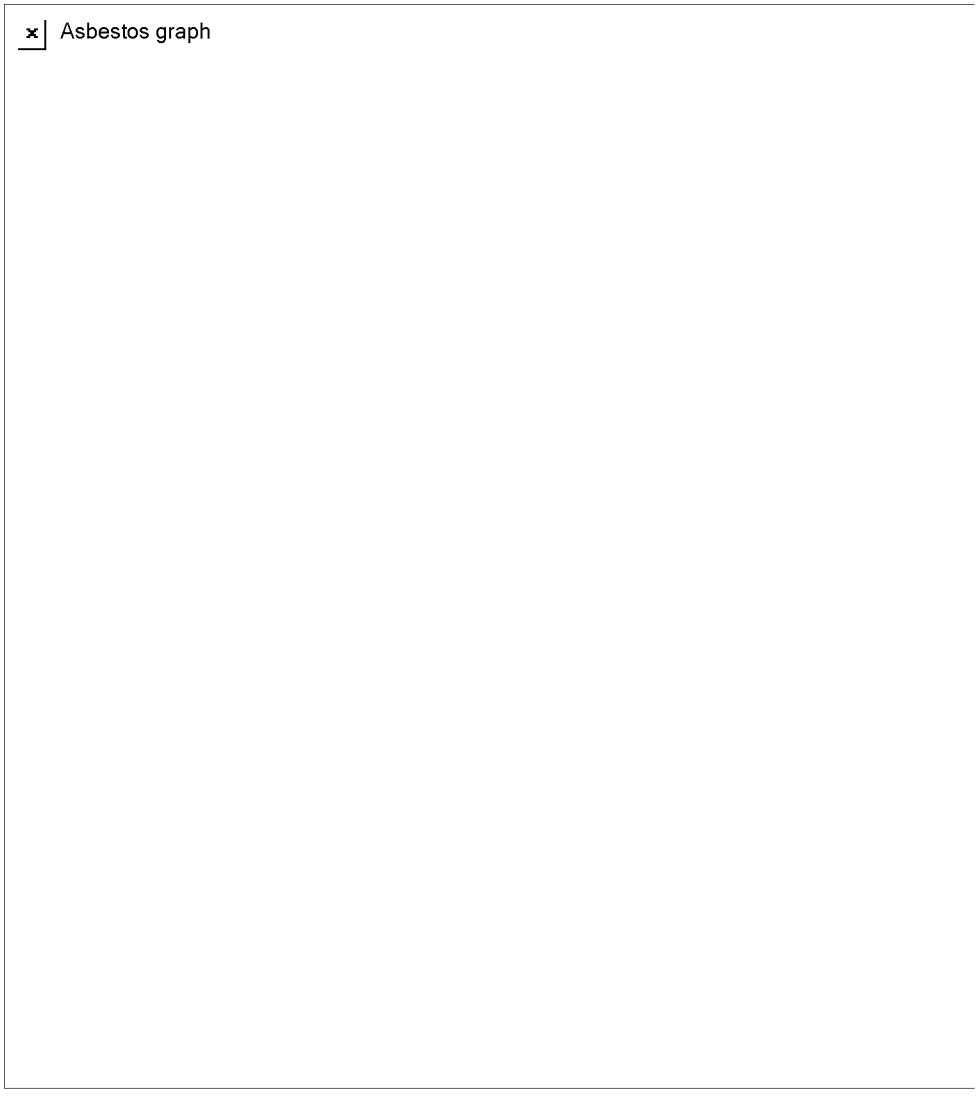
- A large number of occupational studies have reported that exposure to asbes inhalation can cause lung cancer and mesothelioma (a rare cancer of the me the abdominal cavity and surrounding internal organs). (1,2,3)
- Individuals who smoke and are also exposed to asbestos have a greater than increased risk of developing lung cancer. (1)
- Several occupational studies have reported an increase in gastrointestinal ca inhalation exposure to asbestos and subsequent oral ingestion. (1,2)

- Long- and intermediate-range asbestos fibers (>5 micrometers (µm)) appear carcinogenic than short fibers (<5 µm). (1)
- Several epidemiological studies have found an association between asbestos water and cancer of the esophagus, stomach, and intestines; however confou and the short followup time relative to the long latent period for tumor form difficult to interpret the results. (1,5)
- A series of large-scale lifetime feeding studies in animals reported that inter asbestos fibers increased the incidence of a benign tumor of the large intesti while short-range asbestos fibers showed no significant increase in tumor in
- EPA considers asbestos to be a human carcinogen (cancer-causing agent) ar in EPA's Group A. (5)
- EPA uses mathematical models, based on human and animal studies, to esti probability of a person developing cancer from breathing air containing a sp concentration of a chemical. EPA calculated an inhalation unit risk estimate (fibers/cm^3)$^{-1}$. EPA estimates that, if an individual were to continuously bre containing asbestos at an average of 0.000004 fibers/cm^3 over his or her ent that person would theoretically have no more than a one-in-a-million increa developing cancer as a direct result of breathing air containing this chemica EPA estimates that breathing air containing 0.00004 fibers/cm^3 would resul than a one-in-a-hundred thousand increased chance of developing cancer, ar containing 0.0004 fibers/cm^3 would result in not greater than a one-in-ten-th increased chance of developing cancer. (5)

Physical Properties

- Asbestos is the name applied to a group of six different minerals that occur environment. (1)
- The most common mineral type is white, but others may be blue, gray, or br
- These minerals are made up of long, thin fibers that are somewhat similar to
- Asbestos is neither volatile nor soluble; however, small fibers may occur in both air and water. (1)

Health Data from Inhalation Exposure



ACGIH TLV--American Conference of Governmental and Industrial Hygi
limit value expressed as a time-weighted average; the concentration of a sub
most workers can be exposed without adverse effects.
NIOSH REL--National Institute of Occupational Safety and Health's recom
exposure limit; NIOSH-recommended exposure limit for an 8- or 10-h time-
average exposure and/or ceiling.
OSHA PEL--Occupational Safety and Health Administration's permissible
expressed as a time-weighted average; the concentration of a substance to w
workers can be exposed without adverse effect averaged over a normal 8-h
40-h workweek.

The health and regulatory values cited in this factsheet were obtained in Decembe

[a] Health numbers are toxicological numbers from animal testing or risk assessmen
developed by EPA.

[b] Regulatory numbers are values that have been incorporated in Government regul
advisory numbers are nonregulatory values provided by the Government or other
advice. OSHA numbers are regulatory, whereas NIOSH and ACGIH numbers are

References

1. Agency for Toxic Substances and Disease Registry (ATSDR). *Toxicologica Asbestos* (Draft). U.S. Public Health Service, U.S. Department of Health an Services, Atlanta, GA. 1995.
2. E.J. Calabrese and E.M. Kenyon. *Air Toxics and Risk Assessment*. Lewis Pu Chelsea, MI. 1991.
3. U.S. Department of Health and Human Services. Hazardous Substances Dat online database). National Toxicology Information Program, National Libra Bethesda, MD. 1993.
4. U.S. Department of Health and Human Services. Registry of Toxic Effects Substances (RTECS, online database). National Toxicology Information Pr Library of Medicine, Bethesda, MD. 1993.
5. U.S. Environmental Protection Agency. *Integrated Risk Information System Asbestos*. National Center for Environmental Assessment, Office of Researc Development, Washington, DC. 1999
6. National Institute for Occupational Safety and Health (NIOSH). *Pocket Gui Hazards*. U.S. Department of Health and Human Services, Public Health Se for Disease Control and Prevention. Cincinnati, OH. 1997.
7. Occupational Safety and Health Administration (OSHA). Occupational Saf Standards, Toxic and Hazardous Substances. *Code of Federal Regulations.* 1910.1001. 1998.
8. American Conference of Governmental Industrial Hygienists (ACGIH). *19 BEIs. Threshold Limit Values for Chemical Substances and Physical Agents Exposure Indices.* Cincinnati, OH. 1999.

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