

This fact sheet answers the most frequently asked health questions (FAQs) about vanadium. For more information, call the ATSDR Information Center at 1-800-232-4636. 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: Everyone is exposed to low levels of vanadium in air, water, and food; however, most people are exposed mainly from food. Breathing high levels of vanadium may cause lung irritation, chest pain, coughing, and other effects. Vanadium has been found in at least 319 of 1,699 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is vanadium?

Vanadium is a compound that occurs in nature as a white-to-gray metal, and is often found as crystals. Pure vanadium has no smell. It usually combines with other elements such as oxygen, sodium, sulfur, or chloride. Vanadium and vanadium compounds can be found in the earth's crust and in rocks, some iron ores, and crude petroleum deposits.

Vanadium is mostly combined with other metals to make special metal mixtures called alloys. Vanadium in the form of vanadium oxide is a component in special kinds of steel that is used for automobile parts, springs, and ball bearings. Most of the vanadium used in the United States is used to make steel. Vanadium oxide is a yellow-orange powder, dark-gray flakes, or yellow crystals. Vanadium is also mixed with iron to make important parts for aircraft engines.

Small amounts of vanadium are used in making rubber, plastics, ceramics, and other chemicals.

What happens to vanadium when it enters the environment?

- Vanadium mainly enters the environment from natural sources and from the burning of fuel oils.
- It stays in the air, water, and soil for a long time.
- It does not dissolve well in water.

- It combines with other elements and particles.
- Vanadium binds strongly to soil and sediments.
- Low levels have been found in plants, but it is not likely to build up in the tissues of animals.

How might I be exposed to vanadium?

- Eating foods containing vanadium, higher levels are found in seafoods.
- Breathing air near an industry that burns fuel oil or coal; these industries release vanadium oxide into the air.
- Working in industries that process it or make products containing it.
- Breathing contaminated air or drinking contaminated water near waste sites or landfills containing vanadium.
- Vanadium is not readily absorbed by the body from the stomach, gut, or contact with the skin.

How can vanadium affect my health?

Exposure to high levels of vanadium in air can result in lung damage.

Nausea, mild diarrhea, and stomach cramps have been reported in people ingesting vanadium. A number of effects have been found in animals ingesting vanadium including decreases in the number of red blood cells,

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increased blood pressure, and mild neurological effects. The amounts of vanadium given in these animal studies that resulted in harmful effects are much higher than those likely to occur in the environment.

How likely is vanadium to cause cancer?

The International Agency for Research on Cancer (IARC) has classified vanadium pentoxide as possibly carcinogenic to humans based on evidence of lung cancer in exposed mice.

The Department of Health and Human Services (DHHS), IARC, and EPA have not classified vanadium as to its human carcinogenicity.

How can vanadium affect children?

The health effects in children are expected to be similar to the effects seen in adults.

Studies in animals exposed during pregnancy have shown that vanadium can cause decreases in growth and increases in the occurrence of birth defects. These effects are usually observed at levels which cause effects in the mother.

How can families reduce the risk of exposure to vanadium?

Vanadium is present in some supplements and vitamins. Consult with your doctor before taking supplements containing vanadium to determine if they are appropriate for you. Supplements should be kept out of reach of children.

Vanadium is a component of tobacco smoke. Avoid smoking in enclosed spaces like inside the home or car in order to limit exposure to children and other family members.

Is there a medical test to determine whether I've been exposed to vanadium?

There are medical tests available to measure levels of vanadium in urine and blood. These tests cannot determine if harmful health effects will occur from the exposure to vanadium.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 0.5 milligrams per cubic meter (0.5 mg/m³) for vanadium pentoxide dust and 0.1 mg/m³ for vanadium pentoxide fumes in workplace air for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2009. Toxicological Profile for Vanadium. (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 and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-62, Atlanta, GA 30333. Phone: 1-800-232-4636, 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.

