ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

TUNGSTEN

CAS # 7440-33-7

Division of Toxicology ToxFAQs™ **September 2003**

This fact sheet answers the most frequently asked health questions (FAQs) about tungsten. 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: Tungsten is a naturally occurring element. Exposure to very low levels of tungsten may occur by breathing air, eating food, or drinking water that contains tungsten. No specific health effects have been associated with exposure to tungsten in humans. Exposure to high levels of tungsten is unlikely. Tungsten has been found in at least 6 of the 1,636 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is tungsten?

Tungsten is a naturally occurring element. It occurs in rocks and minerals combined with other chemicals, but never as a pure metal. Elemental tungsten is a white to steel gray metal (depending on the purity) that can be used in pure form or mixed with other metals to make alloys. Tungsten alloys tend to be strong and flexible, resist wear, and conduct electricity well. Tungsten and its alloys are used as light bulb filaments, as part of X-ray tubes, as a catalyst to speed up chemical reactions, as a component of high-speed tools, as welding electrodes, as gyroscope wheels, in bullets, and in armor penetrators.

Chemical compounds of tungsten are used for many purposes. Cemented tungsten carbide is a hard substance used to make grinding wheels and cutting or forming tools. Other tungsten compounds are used in ceramic pigments, as fire retardant coatings for fabrics, and as color-resistant dyes for fabrics.

What happens to tungsten when it enters the environment?

❑ Tungsten minerals occur naturally in the environment.
❑ The element tungsten cannot be destroyed in nature, it can only change forms.
❑ Fine tungsten particles are released to the air by weathering. Emissions from hard metal industry also increase tungsten levels in air. Particles in the air fall out onto surface water, plant surfaces, and soil either by themselves or when it rains or snows.
❑ Water is not normally tested for tungsten. Tungsten in water comes mainly from the dissolution of tungsten from rocks and soil that water runs over and through.
❑ Tungsten in water may be in either soluble or insoluble forms. Insoluble forms can settle to the bottom where tungsten enters sediment.
❑ Disposal of coal ash, incinerator ash, and industrial waste may increase the amount of tungsten in soil. Part of tungsten in soil will remain bound and will not reach groundwater.
❑ In the environment, water-soluble tungsten compounds can change into water-insoluble tungsten compounds and vice versa.

How might I be exposed to tungsten?

❑ You can be exposed to very low levels of tungsten by breathing air, eating food, or drinking water that contains tungsten. Urban air generally contains more tungsten than rural air.
❑ Air normally contains less than 0.5 nanograms of tungsten per cubic meter (a nanogram is 1 billionth of a gram).
❑ In general, exposure to tungsten from air, drinking water, and food is expected to be very small.
❑ Occupational exposure to higher than background tungsten metal may occur if you use tungsten metal or are engaged in the machining of these metals. Occupational exposure to tungsten carbide occurs during the machining of tungsten carbide tools in the manufacturing process.

ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html

❑ Tungsten metal and metal alloys occur in consumer products such as electronics, light bulb filaments, cemented tungsten carbide grinding wheels, carbide tipped tools, and "green bullets."

How can tungsten affect my health?

Tungsten compounds have caused breathing problems and changed behavior in some animals given large amounts of tungsten compounds. However, you are not likely to be exposed to amounts of tungsten in the air you breathe or the food or water you take into your body that would be large enough to cause similar effects.

How likely is tungsten to cause cancer?

Studies to date have found no causal relationship between exposure to tungsten and cancer in humans. A limited number of cancer studies in animals did not provide any evidence of carcinogenicity for tungsten. However, tungsten has been recommended to the National Toxicology Program (NTP) for carcinogenicity testing in laboratory animals to further assess these findings. Tungsten has not been classified for carcinogenic effects by the Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), or the EPA.

How can tungsten affect children?

Children may be affected in the same way as adults. We do not know whether children differ from adults in their susceptibility to tungsten. Animal studies have shown that tungsten can pass from the maternal blood through the placenta and reach the fetus.

How can families reduce the risks of exposure to tungsten?

❑ It is very unlikely that tungsten is present in the average home or apartment at unsafe levels.
❑ Use bottled water if you have concerns about the presence of tungsten in your tap water.
❑ If you live near a hazardous waste site containing tungsten, prevent children from playing in dirt or eating dirt.
❑ If you get tungsten dust on your clothes, shower and change your clothes before leaving your job and returning home.

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

There are tests available to measure tungsten in your blood, urine, hair, saliva, and feces. These tests are not usually done in the doctor's office because they require special equipment. Elevated levels of tungsten in the feces can mean high recent tungsten exposure. Elevated levels of tungsten in the urine and/or blood can mean high tungsten consumption and/or high exposure. The average urine concentration for the U.S. population was 0.083 μg/L in 2003. Tests to measure tungsten in hair may provide information on long-term tungsten exposure.

Has the federal government made recommendations to protect human health?

For tungsten and insoluble tungsten compounds in air, the National Institute for Occupational Safety and Health (NIOSH) recommends an exposure limit of 5 mg/m^3 (average over a 10-hour period) and a short-term (15 minutes) exposure limit of 10 mg/m^3. The Occupational Safety and Health Administration (OSHA) set limits for tungsten of 5 mg/m^3 (insoluble compounds) and 1 mg/m^3 (soluble compounds) for construction and shipyard industries.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2003. Toxicological Profile for Tungsten (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.