

This fact sheet answers the most frequently asked health questions (FAQs) about white phosphorus. 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's 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: White phosphorus is a waxy solid which burns easily and is used in chemical manufacturing and smoke munitions. Exposure to white phosphorus may cause burns and irritation, liver, kidney, heart, lung, or bone damage, and death. White phosphorus has been found in at least 77 of the 1,416 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is white phosphorus?

(Pronounced hwīt fōs'fēr-əs)

White phosphorus is a colorless, white, or yellow waxy solid with a garlic-like odor. It does not occur naturally, but is manufactured from phosphate rocks.

White phosphorus reacts rapidly with oxygen, easily catching fire at temperatures 10 to 15 degrees above room temperature.

White phosphorus is used by the military in various types of ammunition, and to produce smoke for concealing troop movements and identifying targets.

It is also used by industry to produce phosphoric acid and other chemicals for use in fertilizers, food additives, and cleaning compounds. Small amounts of white phosphorus were used in the past in pesticides and fireworks.

What happens to white phosphorus when it enters the environment?

- ❑ White phosphorus can enter the environment when it is made, used in manufacturing or by the military, or accidentally spilled during transport and storage.

- ❑ It can be found in the water and bottom sediment of rivers and lakes near facilities that make or use it.
- ❑ In the air, white phosphorus reacts rapidly with oxygen to produce relatively harmless chemicals within minutes.
- ❑ In water, white phosphorus reacts with oxygen within hours or days.
- ❑ In water with low oxygen, white phosphorus may degrade to a highly toxic compound called phosphine, which eventually evaporates to the air and is changed to less harmful chemicals.
- ❑ White phosphorus can build up slightly in the bodies of fish that live in contaminated lakes or streams.
- ❑ In soil, white phosphorus may stick to particles and be changed within a few days to less harmful compounds.
- ❑ In deep soil or sediments with little oxygen, white phosphorus may remain unchanged for many years.

How might I be exposed to white phosphorus?

- ❑ Breathing contaminated air near a facility that is using white phosphorus.
- ❑ Eating contaminated fish or game birds from sites containing white phosphorus.
- ❑ Drinking or swimming in water that has been contaminated with white phosphorus.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

- Touching soil contaminated with white phosphorus.
- If you work in industries that use or manufacture white phosphorus or munitions containing white phosphorus.

How can white phosphorus affect my health?

Little information is available about the health effects that may be caused by white phosphorus. Most of what is known about the effects of breathing white phosphorus is from studies of workers. Most of what is known about the effects of eating white phosphorus is from reports of people eating rat poison or fireworks that contained it.

Breathing white phosphorus for short periods may cause coughing and irritation of the throat and lungs. Breathing white phosphorus for long periods may cause a condition known as "phossy jaw" which involves poor wound healing of the mouth and breakdown of the jaw bone.

Eating or drinking small amounts of white phosphorus may cause liver, heart, or kidney damage, vomiting, stomach cramps, drowsiness, or death. We do not know what the effects are from eating or drinking very small amounts of white phosphorus-containing substances over long periods of time. Skin contact with burning white phosphorus may burn skin or cause liver, heart, and kidney damage.

We do not know whether or not white phosphorus can affect the ability to have children or cause birth defects in people.

How likely is white phosphorus to cause cancer?

The EPA has determined that white phosphorus is not classifiable as to its carcinogenicity in humans. There are no studies available in people or animals that suggest white phosphorus causes cancer.

Is there a medical test to show whether I've been exposed to white phosphorus?

There is no medical test that shows if you have been ex-

posed to white phosphorus. However, the above health effects may lead your doctor to suspect that you have been exposed, if you have a history of exposure.

Has the federal government made recommendations to protect human health?

The EPA has listed white phosphorus as a Hazardous Air Pollutant. The EPA requires that spills or accidental releases into the environment of 1 pound or more of white phosphorus be reported to the EPA.

The National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), and the American Conference of Governmental Industrial Hygienists (ACGIH) have all set the inhalation exposure limit for white phosphorus in the workplace during an 8-hour workday at 0.1 milligram of white phosphorus per cubic meter of air (0.1 mg/m³).

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Evaporate: To change into a vapor or gas.

Milligram (mg): One thousandth of a gram.

Sediment: Mud and debris that have settled to the bottom of a body of water.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for White Phosphorous produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

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 E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. 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.

