



PUBLIC HEALTH STATEMENT

STODDARD SOLVENT

CAS#: 8052-41-3

Division of Toxicology

June 1995

This Public Health Statement is the summary chapter from the Toxicological Profile for Stoddard Solvent. It is one in a series of Public Health Statements about hazardous substances and their health effects. A shorter version, the ToxFAQs™, is also available. This information is important 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. For more information, call the ATSDR Information Center at 1-888-422-8737.

This Statement was prepared to give you information about Stoddard solvent and to emphasize the human health effects that may result from exposure to it.

The Environmental Protection Agency (EPA) has identified 1,397 sites on its "National Priorities List" (NPL). Stoddard solvent has been found in at least seven of these sites. However, we do not know how many of the 1,397 NPL sites have been evaluated for Stoddard solvent. As EPA evaluates more sites, the number of sites at which Stoddard solvent is found may change. This information is important for you to know because Stoddard solvent may cause harmful health effects and because these sites are potential or actual sources of human exposure to Stoddard solvent.

When a chemical is released from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment as a chemical emission. This emission, which is also called a release, does not always lead to exposure. You can be exposed to a chemical only when you

come into contact with the chemical. You may be exposed to it in the environment by breathing, eating, or drinking substances containing the chemical or by skin contact with it.

If you are exposed to a hazardous chemical such as Stoddard solvent, several factors will determine whether harmful health effects will occur and what the type and severity of those health effects will be. These factors include the dose (how much), the duration (how long), the route or pathway by which you are exposed (breathing, eating, drinking, or skin contact), the other chemicals to which you are exposed, and your individual characteristics such as age, sex, nutritional status, family traits, life-style, and state of health.

1.1 WHAT IS STODDARD SOLVENT?

Stoddard solvent is a widely used, man-made organic solvent that comes from the refining of crude oil. It is a petroleum mixture made from distilled alkanes, cycloalkanes (naphthenes), and aromatic compounds. The chemicals in Stoddard solvent are similar to those in white spirits, which are also discussed in this profile. Stoddard solvent is commonly referred to as dry cleaning safety solvent, naphtha safety solvent, petroleum solvent, PD-680, varnoline, and spotting naphtha. It also goes by the registered trade names Teksolve S and Varsol 1. Stoddard solvent is used as a paint thinner, as a solvent in some types of photocopier toners, in some types of printing inks, in some adhesives, as a dry cleaning solvent, and as a general cleaner and degreaser. It is produced and used as a colorless, flammable liquid but will turn into a vapor (gas) at temperatures ranging from 150–200°C. Stoddard solvent smells and tastes like

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kerosene. You can smell it when the level in the air is about 0.34 parts of Stoddard solvent in a million parts of air (ppm) or 2 milligrams of Stoddard solvent per cubic meter of air (mg/m³).

1.2 WHAT HAPPENS TO STODDARD SOLVENT WHEN IT ENTERS THE ENVIRONMENT?

Stoddard solvent is a mixture of many chemicals. Some of these evaporate into the air when Stoddard solvent spills onto soils or surface waters. These chemicals may be broken down by sunlight or by other chemicals in the air. Also, some of these chemicals may sorb (attach) to organic matter. Stoddard solvent itself does not dissolve well in water, but some of the chemicals in it do dissolve when it spills on surface water or when it leaks from underground storage tanks. Some of the chemicals in Stoddard solvent can attach to particles in soil or water and, in water, may sink down to the sediment. In water, soil, or sediment, microorganisms may break down the chemicals (a process known as biodegradation). Although some of the chemicals that make up Stoddard solvent can attach to organic matter in the soil, if a large amount of Stoddard solvent contaminates the soil, it will move through the soil into groundwater. It is not known whether Stoddard solvent will accumulate in plants or animals living in contaminated soil or water, or in animals eating contaminated plants or sediments. However, some of the chemicals that make up the Stoddard solvent mixture might accumulate in these situations, depending upon the type of chemical. Generally, smaller alkanes do not tend to bioaccumulate, while aromatics and larger alkanes, including some cycloalkanes, tend to bioaccumulate.

1.3 HOW MIGHT I BE EXPOSED TO STODDARD SOLVENT?

You are most likely to be exposed to Stoddard solvent if you use a product, such as paint or a paint thinner, that contains it and the vapors get in your lungs or eyes. If you work in an industry that uses or produces dry cleaning fluid, paints, coatings, waxes, or equipment cleaning fluid with Stoddard solvent in it, you may breathe in some of the components of Stoddard solvent that evaporate into the air. You may be exposed to Stoddard solvent if you breathe air that contains Stoddard solvent after it has entered the atmosphere from a dry cleaning plant or spilled or leaked onto soils or surface water. When it is spilled, the different components that make up Stoddard solvent will react differently in the different media of the environment (for example, in soil, water, or air). So, if you become exposed, you are no longer being exposed to a single compound called Stoddard solvent but rather to its components. You would only breathe the components that evaporate into the air. If Stoddard solvent has contaminated groundwater, you may be exposed if you drink this water or use it for bathing or washing. If you use products that contain Stoddard solvent and do not wear protective clothing, you may be exposed if it gets on your skin.

Humans may be exposed to Stoddard solvent near hazardous waste sites, but it is not known how many are being exposed. It is unclear what routes of exposure are most significant at hazardous waste sites. It is likely that you might be exposed to Stoddard solvent near a hazardous waste site by breathing it in the air. Although some compounds in Stoddard solvent evaporate quickly, you may be

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continually exposed near hazardous waste sites if the material is leaking from buried or above-ground drums or is slowly moving through the soil and seeping through the walls of the basement of a building. If Stoddard solvent is buried in leaky drums at hazardous waste sites, you may also be exposed if you touch contaminated soil or if you drink contaminated groundwater.

1.4 HOW CAN STODDARD SOLVENT ENTER AND LEAVE MY BODY?

Stoddard solvent can enter your body if you breathe air containing it. When you breathe in Stoddard solvent, it can quickly enter your bloodstream. The chemical components that make up Stoddard solvent will then be absorbed by different tissues in your body. It may also enter the brain, and a large portion may be stored in body fat. Stoddard solvent can also enter your body if you come into contact with water that is contaminated with it. However, we do not know where the components of Stoddard solvent go once in the body after contact with your skin or after drinking contaminated groundwater. Animal studies have shown that these components can enter tissues and the brain, as is the case with Stoddard solvent when it is breathed in, but no human studies have been located to verify this. Components of white spirits have been found, however, in human blood and body fat after people breathed it. We also do not know exactly how the mixture or its components leave the body and how quickly this happens. Some components or breakdown products probably leave in the breath and urine within a few days after exposure.

1.5 HOW CAN STODDARD SOLVENT AFFECT MY HEALTH?

Most of the information on how Stoddard solvent affects human health comes from studies where exposure is through breathing, with fewer studies available on exposure to the eyes and skin. When Stoddard solvent is in the air, it can cause eye, skin, or throat irritation. If you were to breathe in air containing Stoddard solvent, it could affect your nervous system and might cause dizziness or headaches. Another way that it can affect your nervous system is by causing a prolonged reaction time. There are few studies of the long-term effects of exposure to Stoddard solvent alone in humans. In experiments with rats, cats, and dogs (to suggest what may happen in humans), seizures were reported after they breathed in large amounts for several hours. Stoddard solvent can also cause bronchitis in guinea pigs when they breathe it. However, Stoddard solvent has not had these effects in the few known cases of human exposure.

Studies with rats show that Stoddard solvent may also cause kidney damage, but only in males. This is because of its interaction with a protein that male rats produce but which is not found in female rats. Humans do not produce this protein either, so it is unlikely that people would experience kidney damage. For the following effects in humans or animals, either there were no studies or the available studies did not associate the effect with exposure to Stoddard solvent: birth defects, reproductive effects (infertility), and immunological or lymphoreticular effects.

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Very few studies have been located that study the carcinogenic (cancer-causing) effects of Stoddard

solvent in humans and animals. Stoddard solvent has not been classified by the Department of Health and Human Services (DHHS), EPA, or the International Agency for Research on Cancer (IARC) (or by any other national or international agencies) for carcinogenic effects in any exposure situation.

Little is known about the health effects of Stoddard solvent in humans or animals when it is ingested (swallowed); no studies have been found.

1.6 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO STODDARD SOLVENT?

There is no routinely used test to show whether you have been exposed to Stoddard solvent. However, Stoddard solvent is a mixture of many chemicals, and for most of them there are analytical methods to determine whether exposure has occurred. These chemicals can be detected in your breath, blood, urine, and fat. However, the tests cannot tell you if you have been exposed to the specific mixture of chemicals found in Stoddard solvent. These methods also cannot tell you whether you will have any health effects. It is unclear how long after exposure to Stoddard solvent a test would be useful. Because Stoddard solvent can be stored in fat, any resulting health effects may continue for a few days after exposure.

1.7 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The government has developed regulations and guidelines for Stoddard solvent that are designed to protect the public from potential harmful health effects. Several states have set their own regulations or guidelines for Stoddard solvent concentrations in water and in ambient (surrounding) air. The Occupational Safety and Health Administration (OSHA) regulates levels of hazardous material in the workplace. The maximum allowable amount of Stoddard solvent in workroom air during an 8-hour workday, 40-hour workweek, is 2,900 mg/m³ or 500 ppm. The National Institute for Occupational Safety and Health (NIOSH) recommends a limit of 350 mg/m³ or 60 ppm for workroom air for an 8-hour exposure.

The Department of Transportation has identified Stoddard solvent as a hazardous substance and regulates its packaging, shipping, and transportation. Some states have transportation regulations for Stoddard solvent.

1.8 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns, please contact your community or state health or environmental quality department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop F-32
Atlanta, GA 30333

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Information line and technical assistance:

Phone: 888-422-8737
FAX: (770)-488-4178

ATSDR can also tell you the location of occupational and environmental health clinics. These clinics specialize in recognizing, evaluating, and treating illnesses resulting from exposure to hazardous substances.

To order toxicological profiles, contact:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Phone: 800-553-6847 or 703-605-6000

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for Stoddard solvent. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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www.atsdr.cdc.gov/

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