

This fact sheet answers the most frequently asked health questions (FAQs) about hydraulic fluids. 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. 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.

**HIGHLIGHTS: Exposure to hydraulic fluids occurs mainly in the workplace. Drinking certain types of hydraulic fluids can cause death in humans, and swallowing or inhaling certain types of hydraulic fluids has caused nerve damage in animals. Contact with some types of hydraulic fluids can irritate your skin or eyes. These substances have been found in at least 10 of the 1,428 National Priorities List sites identified by the Environmental Protection Agency (EPA).**

## What are hydraulic fluids?

(Pronounced hi-drô/lik flôô'îdz)

Hydraulic fluids are a large group of liquids made of many kinds of chemicals. They are used in automobile automatic transmissions, brakes, and power steering; fork lift trucks; tractors; bulldozers; industrial machinery; and airplanes. The three most common types of hydraulic fluids are mineral oil, organophosphate ester, and polyalphaolefin. Some of the trade names for hydraulic fluids include Durad®, Fyrquel®, Skydrol®, Houghton-Safe®, Pydraul®, Reofos®, Reolube®, and Quintolubric®. (Use of trade names is for identification only and does not imply endorsement by the Agency for Toxic Substances and Disease Registry, the Public Health Service, or the U.S. Department of Health and Human Services.)

Some hydraulic fluids have a bland, oily smell and others have no smell; some will burn and some will not burn. Certain hydraulic fluids are produced from crude oil and others are manufactured.

## What happens to hydraulic fluids when they enter the environment?

- Hydraulic fluids can enter the environment from spills, leaks in machines that use them, or from storage areas and waste sites.

- If spilled on soil, some of the ingredients in hydraulic fluids will stay on top and others will sink into the groundwater.
- In water, some hydraulic fluids' ingredients will transfer to the bottom and can stay there for more than a year.
- Certain chemicals in hydraulic fluids may break down in air, soil, or water, but how much breaks down isn't known.
- Fish may contain some hydraulic fluids if they live in contaminated water.

## How might I be exposed to hydraulic fluids?

- Touching or swallowing hydraulic fluids.
- Breathing hydraulic fluids in the air near machines where hydraulic fluids are used.
- Touching contaminated water or soil near hazardous waste sites or industrial manufacturing facilities that use or make hydraulic fluids.

## How can hydraulic fluids affect my health?

Little is known about how hydraulic fluids can affect your health. Since hydraulic fluids are actually mixtures of chemicals, some of the effects seen may be caused by additives in the hydraulic fluids.

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

In people, the effects of breathing air with high levels of hydraulic fluids are not known. Drinking large amounts of some types of hydraulic fluids can cause pneumonia, intestinal bleeding, or death in humans. Weakness of the hands was seen in a worker who touched a lot of hydraulic fluids.

Rabbits that inhaled very high levels of one type of hydraulic fluid had trouble breathing, congested lungs, and became drowsy. The nervous systems of animals that swallowed or inhaled other hydraulic fluids were affected immediately with tremors, diarrhea, sweating, breathing difficulty, and sometimes several weeks later with weakness of the limbs, or paralysis. The immediate effects are caused because hydraulic fluids stop the action of certain enzymes, called cholinesterases, in the body. There are no reports of people swallowing or breathing the types of hydraulic fluids that cause these effects. When certain types of hydraulic fluids were put into the eyes of animals or allowed to touch the skin of people or animals for short periods of time, redness and swelling occurred. It is not known whether hydraulic fluids can cause birth defects or reproductive effects.

### How likely are hydraulic fluids to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified hydraulic fluids as to their carcinogenicity.

### Is there a medical test to show whether I've been exposed to hydraulic fluids?

Hydraulic fluids can't be measured in blood, urine, or feces, but certain chemicals in the hydraulic fluids can be measured. Some of the hydraulic fluids stop the activity of certain enzymes, called cholinesterases, in blood and this activity can be measured. However, many other chemicals also cause this effect. This test isn't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

### Has the federal government made recommendations to protect human health?

There are no federal government recommendations to protect humans from the health effects of the major hydraulic fluids. However, mineral oil, the major chemical ingredient of one type of hydraulic fluid, is part of the petroleum distillate class of chemicals and there are regulations for these chemicals.

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 2,000 milligram per cubic meter (mg/m<sup>3</sup>) petroleum distillates for an 8-hour workday, 40-hour workweek. The National Institute for Occupational Safety and Health (NIOSH) recommends an exposure limit of 350 mg/m<sup>3</sup> petroleum distillates for a 10-hour workday, 40-hour workweek.

### Glossary

Additive: Substance added to another in small amounts to improve its properties.

CAS: Chemical Abstracts Service.

Carcinogenicity: Ability to cause cancer.

Petroleum Distillate: A chemical fraction of petroleum.

### References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Hydraulic Fluids 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 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.

