REF (ATSDR 1999)

ToxFAQs™ for

2,4- & 2,6-Dinitrotoluene

CAS#
2,4-Dinitrotoluene 121-14-2
2,6-Dinitrotoluene 606-20-2

June 1999

This fact sheet answers the most frequently asked health questions about 2,4- and 2,6-dinitrotoluene. For more information, you may 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: 2,4- and 2,6-Dinitrotoluene are used in a number of industries. Exposure to high levels may affect the nervous system and the blood. Both are known to cause cancer in laboratory animals. These substances have been found in at least 69 (2,4-DNT) and 53 (2,6-DNT) of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are 2,4- and 2,6-dinitrotoluene?
(Pronounced 2,4- and 2,6-di ni'tro tol'u-een)

Both 2,4-DNT and 2,6-DNT are pale yellow solids with a slight odor. They are two of the six forms of the chemical called dinitrotoluene (DNT).

DNT is not a natural substance. It is made by mixing toluene with nitric acid. DNT is usually used to make flexible polyurethane foams used in the bedding and furniture industries. DNT is also used to produce explosives, ammunition, and dyes. It is also used in the air bags of automobiles.

What happens to 2,4- and 2,6-dinitrotoluene when they enter the environment?

- DNT has been found in the soil, surface and ground water, and air.
- It has been found at hazardous waste sites that contain buried ammunition wastes.
- DNT does not usually evaporate; it is found mostly in the air of manufacturing plants.
- DNT does not stay in the environment because it is broken down by sunlight and by bacteria.
- In water, DNT tends to be more stable and less likely to break down.
- DNT can be transferred to plants by root uptake from contaminated water or soil.

How might I be exposed to 2,4- and 2,6-dinitrotoluene?

- Most people will not be exposed to 2,4- and 2,6-DNT.
- Breathing contaminated air near manufacturing plants.
- Drinking contaminated water or eating contaminated food.
- Breathing air near a hazardous waste site that contains buried ammunition wastes.

How can 2,4- and 2,6-dinitrotoluene affect my health?

Workers who have been exposed to 2,4-DNT showed a higher than normal death rate from heart disease. However, these workers were exposed to other chemical as well. 2,4- and 2,6-DNT may also affect the nervous system and the blood of exposed workers.

One study showed that male workers exposed to DNT had reduced sperm counts, but other studies did not confirm this finding.

Animals exposed to high levels of DNT had lowered number of sperm and reduced fertility. Animals also showed a reduction in red blood cells, nervous system disorders, and liver and kidney damage.

How likely are 2,4- and 2,6-dinitrotoluene to cause cancer?

In animal studies, both 2,4- and 2,6-DNT caused liver cancer in rats. There are no studies on the effects of 2,4- and 2,6-DNT on people. The International Agency for Research on Cancer (IARC) has determined that 2,4- and 2,6-DNT are possible human carcinogens.

How does 2,4- and 2,6-dinitrotoluene affect children?

It is unlikely that children would be exposed to 2,4- and 2,6-DNT unless they live near a manufacturing plant or a waste site that contains these compounds. Children are at risk of exposure if DNT has leached into a community's drinking water supply from a nearby hazardous waste site,

since they drink more fluids in proportion to their body weight than adults. Children playing in DNT-contaminated surface water might be more exposed than adults, because of their larger skin area in proportion to their body weight.

The health effects of DNT on children have not been studied. It is not known if DNT affects children differently than adults, or what long-term effects might appear in adults exposed as children.

How can families reduce the risk of exposure to 2,4- and 2,6-dinitrotoluene?

If your doctor finds that you have been exposed to significant amounts of 2,4- or 2,6-DNT, ask if children may also be exposed. When necessary your doctor may need to ask your state Department of Public Health to investigate.

Is there a medical test to show whether I've been exposed to 2,4- and 2,6-dinitrotoluene?

Both 2,4- and 2,6-DNT and the chemicals they change into in the body can be measured in the blood and urine. The urine must be collected within 24 hours of exposure. These tests cannot show how much 2,4- or 2,6-DNT a person has been exposed to. They are not usually available in a doctor's office, but they can be performed in special laboratories.

Has the federal government made recommendations to protect human health?

EPA requires that spills or accidental releases of more than 1,000 pounds of DNT be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) requires that total DNT (all forms) in workplace air should not exceed 1.5 mg per cubic meter (1.5 mg/m^3) for an 8-hour workday, 40-hour workweek. The National Institute of Occupational Safety and Health (NIOSH) recommends a workplace limit of 1.5 mg/m^3. This is the average concentration for a 10-hour day over a 40-hour workweek.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 1998. Toxicological profile for 2,4- and 2,6-dinitrotoluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

Where can I get more information?

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.

For more information, contact:

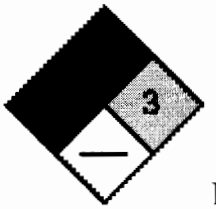
Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop E-29
Atlanta, GA 30333
Phone: 1-888-422-8737
FAX: (404)498-0057

External safety and chemistry information (please see our disclaimer):

2,4-Dinitrotoluene
$C_7H_6N_2O_4$

Stereo Image
MDL Molfile

Search ChemFinder



NFPA Label Key

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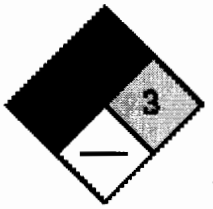
2,6-Dinitrotoluene
$C_7H_6N_2O_4$

Stereo Image
MDL Molfile

Search ChemFinder



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