

2,4,6-TRINITROTOLUENE (TNT)

What is 2,4,6-trinitrotoluene?

2,4,6-trinitrotoluene, also called TNT, is a man-made compound. The odorless, yellow solid is used in explosives. In the United States, TNT is primarily made at military sites.

Where can TNT be found and how is it used?

TNT is an explosive used by the military in artillery shells, grenades, and airborne bombs. TNT may be found in old artillery shells that wash up or are dredged up on beaches. Industries use TNT to make dye and photography chemicals.

How can people be exposed to TNT?

You could be exposed to TNT through:

- **Breathing** vapor or dust containing TNT. This might happen if your work involves TNT.
- **Drinking** water polluted with TNT. This could happen if you drink water polluted by a waste site containing TNT.
- **Eating** fruits and vegetables grown in soil containing TNT.
- **Touching** soil that contacted TNT. You can also touch it if you work with TNT.
- **Eye contact** by touching the eyes with hands contaminated with TNT or getting TNT-contaminated dust in them.

How does TNT work?

When you breathe in air or drink water with TNT in it, the chemical enters your body quickly and completely. If TNT touches the skin, the body absorbs it more slowly. Regardless of the type of exposure, TNT travels through the bloodstream to the organs. In the liver, it breaks down and changes into several different substances. Not all of the substances have been identified, so it is not known if they are harmful. Most of the substances travel through the blood to the kidneys and leave the body in urine. Animal studies show that most TNT leaves the body within 24 hours.

How can TNT affect my health?

Historically, explosives workers had many harmful health effects, including blood disorders and liver problems. However, at the time those exposures occurred, the workplace level of TNT was allowed to be much higher than it is today.

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When people have skin contact with TNT for a long time, they may develop an allergic skin reaction with itching and irritation, or cataracts in their eyes. There is no information to show if TNT causes birth defects.

Animals that breathed or were fed TNT also had blood disorders and liver problems. Male animals exposed to high levels of TNT had serious reproductive problems. Animals fed TNT for 15 to 364 days may have enlarged spleens. They also may have harmful effects on the immune system. It is unclear if TNT causes cancer in humans. Rats that ate TNT for long periods developed urinary bladder tumors. Therefore, TNT is classified as a possible cancer-causing agent in humans.

How is TNT poisoning treated?

There is no treatment for TNT poisoning. Doctors can treat the symptoms.

What should I do if exposed to TNT?

- **If TNT gets on your skin**, remove clothes quickly. Wash skin with large amounts of soap and water right away.
- **If TNT gets in your eyes**, wash them with water for at least 15 minutes.
- **If you drink or eat anything containing TNT**, call the Poison Control Center Hotline at 1-800-222-1222 and go to the doctor.
- **If you breathe TNT**, immediately move away from the source of exposure. Get medical help quickly. Give rescue breathing and mouth-to-mouth resuscitation.

What factors limit use or exposure to TNT?

Military and industrial workplaces that manufacture or store TNT should have safe work environments. Employers should provide a source of fresh air and a ventilation system. Employees should wear protective clothing and breathing protection devices. Do not bring work clothes home. If you live where soil or water contacted TNT, avoid contact with the soil. Drink water bottled from another water source.

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

Tests can show TNT or its breakdown products in blood or urine. The color of urine changes to a deep amber or a deep red. Medical providers cannot tell if harmful effects will occur as a result of exposure.

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Technical information for TNT

CAS Number: 118-96-7

Chemical Formula: $C_7H_5N_3O_6$

Carcinogenicity (EPA): Group C - possible human carcinogen.

MCL (Drinking Water): There is no MCL for TNT.

OSHA Standards: 1.5 mg/m³.

NIOSH Standards: 0.5 mg/m³. IDLH: 500 mg/m³

Resources

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. *Toxicological profile for 2,4,6-trinitrotoluene (TNT)*. Atlanta, GA: U.S. Department of Health and Human Services. <https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=677&tid=125>

American Conference of Governmental Industrial Hygienists (ACGIH). 2003. *Guide to Occupational Exposure Values*. Cincinnati, OH.

NIOSH Pocket Guide to Chemical Hazards. 2003. Atlanta, GA: U.S. Department of Health and Human Services.