



Right to Know Hazardous Substance Fact Sheet

Common Name: **tert-BUTYL CHROMATE**

Synonyms: t-Butyl Chromate; Bis(tert-butyl) Chromate

Chemical Name: Chromic Acid, Bis(1,1-Dimethylethyl) Ester

Date: September 1998 Revision: July 2008

CAS Number: 1189-85-1

RTK Substance Number: 1788

DOT Number: UN 3082

Description and Use

tert-Butyl Chromate is a clear, colorless liquid. It is used in specialty chemical reactions as an organic source of *Chromium*, in making catalysts, and as a curing agent for *Urethane* foam.

Reasons for Citation

- ▶ **tert-Butyl Chromate** is on the Right to Know Hazardous Substance List because it is cited by OSHA, ACGIH, DOT, NIOSH, NTP, DEP, IRIS and EPA.
- ▶ This chemical is on the Special Health Hazard Substance List.

SEE GLOSSARY ON PAGE 5.

FIRST AID

Eye Contact

- ▶ Immediately flush with large amounts of water for at least 30 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention immediately.

Skin Contact

- ▶ Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water. Seek medical attention.

Inhalation

- ▶ Remove the person from exposure.
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE BACK PAGE

Hazard Summary

Hazard Rating	NJDOH	NFPA
HEALTH	4	-
FLAMMABILITY	1	-
REACTIVITY	1	-
CARCINOGEN POISONOUS GASES ARE PRODUCED IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **tert-Butyl Chromate** can affect you when inhaled and may be absorbed through the skin.
- ▶ **tert-Butyl Chromate** should be handled as a CARCINOGEN--WITH EXTREME CAUTION.
- ▶ Contact can severely irritate and burn the skin and eyes with possible eye damage.
- ▶ Inhaling **tert-Butyl Chromate** can irritate the nose and throat.
- ▶ Exposure may cause headache, nausea, vomiting and diarrhea.
- ▶ Inhaling **tert-Butyl Chromate** can cause a sore and/or a hole in the "bone" (septum) dividing the inner nose, sometimes with bleeding, discharge, and/or formation of a crust.
- ▶ Exposure may cause a skin allergy and an asthma-like allergy.
- ▶ **tert-Butyl Chromate** is a STRONG OXIDIZER and enhances the combustion of other substances.

Workplace Exposure Limits

OSHA: The legal airborne permissible exposure limit (PEL) is **0.1 mg/m³** (as *Chromates*), not to be exceeded at any time.

NIOSH: The recommended airborne exposure limit (REL) is **0.001 mg/m³** (as *hexavalent Chromium compounds*) averaged over a 10-hour workshift.

ACGIH: The threshold limit value (TLV) is **0.1 mg/m³**, which should not be exceeded at any time.

- ▶ **tert-Butyl Chromate** is a CARCINOGEN in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.
- ▶ The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health Hazardous Substance Fact Sheet, available on the RTK website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **tert-Butyl Chromate**:

- ▶ Contact can severely irritate and burn the skin and eyes with possible eye damage.
- ▶ Inhaling **tert-Butyl Chromate** can irritate the nose and throat.
- ▶ Exposure may cause headache, nausea, vomiting and diarrhea.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **tert-Butyl Chromate** and can last for months or years:

Cancer Hazard

- ▶ **tert-Butyl Chromate** is a CARCINOGEN in humans. There is evidence that *hexavalent Chromium* or *Chromium VI compounds* cause lung cancer in humans.
- ▶ Many scientists believe there is no safe level of exposure to a carcinogen.

Reproductive Hazard

- ▶ According to the information presently available to the New Jersey Department of Health, **tert-Butyl Chromate** has not been tested for its ability to affect reproduction.

Other Effects

- ▶ Inhaling **tert-Butyl Chromate** can cause a sore and/or a hole in the "bone" (septum) dividing the inner nose, sometimes with bleeding, discharge, and/or formation of a crust.
- ▶ **tert-Butyl Chromate** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
- ▶ **tert-Butyl Chromate** may cause an asthma-like allergy. Future exposure can cause asthma attacks with shortness of breath, wheezing, coughing, and/or chest tightness.
- ▶ Prolonged skin contact can cause burns, blisters and deep ulcers.

Medical

Medical Testing

Before first exposure, and every twelve (12) months thereafter, OSHA requires your employer to provide (for persons exposed to levels over **2.5 micrograms of hexavalent Chromium per cubic meter** of air):

- ▶ Complete work and medical history
- ▶ Thorough physical examination
- ▶ Lung function tests

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Examine your skin periodically for little bumps or blisters, the first sign of "chrome ulcers." If not treated early, these can last for years after exposure.
- ▶ Evaluation by a qualified allergist can help diagnose skin allergy.

OSHA requires your employer to provide you and your doctor with a copy of the OSHA *Chromium (VI)* Standard (29 CFR 1910.1026).

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures

- ▶ Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Specific engineering controls are required for this chemical by OSHA. Refer to the OSHA *Chromium (VI)* Standard (29 CFR 1910.1026).

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- ▶ Avoid skin contact with **tert-Butyl Chromate**. Wear personal protective equipment made from material that can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Silver Shield®/4H® for gloves and DuPont Tychem® CSM, Responder®, and TK, or the equivalent, as protective materials for clothing.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- ▶ Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- ▶ Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over **0.001 mg/m³** (as *hexavalent Chromium*), use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- ▶ Exposure to **15 mg/m³** (as *hexavalent Chromium*) is immediately dangerous to life and health. If the possibility of exposure above **15 mg/m³** exists, use a NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode equipped with an emergency escape air cylinder.

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ **tert-Butyl Chromate** may burn, but does not readily ignite.
- ▶ Use dry chemical, CO₂, water spray, alcohol-resistant foam or other foam as extinguishing agents.
- ▶ POISONOUS GASES ARE PRODUCED IN FIRE, including *Chromium Oxide fumes*.
- ▶ Use water spray to keep fire-exposed containers cool.
- ▶ **tert-Butyl Chromate** may ignite combustibles (wood, paper and oil).

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **tert-Butyl Chromate** is spilled or leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate all ignition sources.
- ▶ Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ DO NOT wash into sewer.
- ▶ It may be necessary to contain and dispose of **tert-Butyl Chromate** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **tert-Butyl Chromate** you should be trained on its proper handling and storage.

- ▶ A regulated, marked area should be established where **tert-Butyl Chromate** is handled, used or stored as required by the OSHA *Chromium (VI)* Standard (29 CFR 1910.1026).
- ▶ **tert-Butyl Chromate** is a STRONG OXIDIZER that will react violently with REDUCING AGENTS (such as LITHIUM, SODIUM, ALUMINUM and their HYDRIDES) and COMBUSTIBLES.
- ▶ *Water solutions* of **tert-Butyl Chromate** react violently with STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE).
- ▶ **tert-Butyl Chromate** is incompatible with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); ALCOHOLS; and HYDRAZINE.
- ▶ Store in tightly closed containers in a cool, well-ventilated area away from MOISTURE.
- ▶ Sources of ignition, such as smoking and open flames, are prohibited where **tert-Butyl Chromate** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.
- ▶ Use only non-sparking tools and equipment, especially when opening and closing containers of **tert-Butyl Chromate**.

Occupational Health Information Resources

The New Jersey Department of Health offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health
 Right to Know
 PO Box 368
 Trenton, NJ 08625-0368
 Phone: 609-984-2202
 Fax: 609-984-7407
 E-mail: rtk@doh.state.nj.us
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

The Right to Know Hazardous Substance Fact Sheets are not intended to be copied and sold for commercial purposes.

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGs) are established by the EPA. They describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values are intended to provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database maintained by federal EPA. The database contains information on human health effects that may result from exposure to various chemicals in the environment.

LEL or Lower Explosive Limit, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or Upper Explosive Limit is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Common Name: **tert-BUTYL CHROMATE**

Synonyms: t-Butyl Chromate; Bis(tert-butyl) Chromate

CAS No: 1189-85-1

 Molecular Formula: $C_8H_{18}CrO_4$

RTK Substance No: 1788

Description: Clear, colorless liquid

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
4 - Health 1 - Fire 1 - Reactivity DOT#: UN 3082 ERG Guide #: 171 Hazard Class: 9 (Environmentally Hazardous Material)	tert-Butyl Chromate may burn, but does not readily ignite. Use dry chemical, CO ₂ , water spray, alcohol-resistant foam or other foam as extinguishing agents. POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Chromium Oxide fumes</i> . Use water spray to keep fire-exposed containers cool. tert-Butyl Chromate may ignite combustibles (wood, paper and oil).	tert-Butyl Chromate is a STRONG OXIDIZER and will react violently with REDUCING AGENTS (such as LITHIUM, SODIUM, ALUMINUM and their HYDRIDES) and COMBUSTIBLES. <i>Water solutions of tert-Butyl Chromate</i> react violently with STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE). tert-Butyl Chromate is incompatible with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); ALCOHOLS; and HYDRAZINE.

SPILL/LEAKS
Isolation Distance:

Small Spill: 60 meters (200 feet)

Large Spill: 270 meters (900 feet)

Fire: 800 meters (1/2 mile)

Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.

DO NOT wash into sewer.

May be harmful to aquatic life.

PHYSICAL PROPERTIES

Odor Threshold:	None
Flash Point:	May burn
Vapor Density:	7.9 (air = 1)
Water Solubility:	Insoluble
Melting Point:	41°F (5°C)
Freezing Point:	23°F (-5°C)
Molecular Weight:	230.3

EXPOSURE LIMITS
OSHA: 0.1 mg/m³, Ceiling

NIOSH: 0.001 mg/m³, 10-hr TWA

ACGIH: 0.1 mg/m³, Ceiling

IDLH: 15 mg/m³

 (All of the above are for *hexavalent Chromium*)

PROTECTIVE EQUIPMENT

Gloves:	Silver Shield®/4H®
Coveralls:	DuPont Tychem® CSM, Responder®, and TK (for <i>known carcinogens</i>)
Respirator:	>0.001 mg/m ³ - Supplied air

HEALTH EFFECTS

Eyes:	Irritation and burns
Skin:	Irritation and burns
Inhalation:	Nose and throat irritation with coughing and wheezing Headache, nausea and vomiting
Chronic:	<i>Hexavalent Chromium</i> or <i>Chromium VI</i> compounds cause lung cancer in humans

FIRST AID AND DECONTAMINATION

Remove the person from exposure.
Flush eyes with large amounts of water for at least 30 minutes. Remove contact lenses if worn. Seek medical attention.
Quickly remove contaminated clothing and wash contaminated skin with large amounts of soap and water. Seek medical attention immediately.
Begin artificial respiration if breathing has stopped and CPR if necessary.
Transfer promptly to a medical facility.