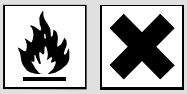
Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
	**Flammable material; avoid heat and sources of ignition.** **May react violently and/or evolve heat upon exposure to heat, shock, and friction.** **Harmful compound, minimize exposure.** **Irritating to skin, eyes, and the respiratory system.** **Light sensitive material.**	

Section I. Chemical Product and Company Identification

Chemical Name: **Di-tert-butyl Azodicarboxylate**
(20% in Toluene)

Catalog Number: D3544

Synonym: 1,2-Diazenedicarboxylic acid, 1,2-bis(1,1-dimethylethyl) ester (CA INDEX NAME);
Azodicarboxylic Acid Di-tert-butyl Ester

Chemical Formula: $C_{10}H_{18}N_2O_4$ (Di-tert-butyl Azodicarboxylate)
C_7H_8 (Toluene)

CAS Number: 870-50-8
108-88-3 (Toluene)

Supplier: TCI America
9211 N. Harborgate St.
Portland OR
1-800-423-8616

In case of Emergency Call: **Chemtrec®**
(800) 424-9300 (U.S.)
(703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
Di-tert-butyl Azodicarboxylate (20% in Toluene)	870-50-8 108-88-3 (Toluene)	Not available.	Not available.	(Toluene) Rat LD_{50} (oral) 636 mg/kg Rabbit LD_{50} (dermal) 14100 uL/kg Rat LD_{50} (inhalation) 49 gm/m^3/4H

Section III. Hazards Identification

Acute Health Effects

Harmful if ingested or inhaled. Minimize exposure to this material. Severe overexposure can result in injury or death.
Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Chronic Health Effects

CARCINOGENIC EFFECTS : Not available.
MUTAGENIC EFFECTS : Not available.
TERATOGENIC EFFECTS : Not available.
DEVELOPMENTAL TOXICITY: Reproductive effects. (Toluene)
Rat TCLo Inhalation 800 mg/m3 for 6 hours, female 14-20 days of pregnancy
TOXIC EFFECTS:
Effects on Embryo or Fetus - Fetotoxicity
Effects on Newborn - Behavioral
Mouse TCLo Inhalation 400 ppm for 7 hours, female 7-16 days of pregnancy
TOXIC EFFECTS:
Specific Developmental Abnormalities - Musculoskeletal system
Effects on Newborn - Biochemical and metabolic
Mouse TDLo Oral 9 gm/kg, female 6-15 days of pregnancy
TOXIC EFFECTS:
Effects on Embryo or Fetus - Fetal death
Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.

Section IV. First Aid Measures

Eye Contact

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact

In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Inhalation

If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve.

Ingestion

INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

Continued on Next Page **Emergency phone number (800) 424-9300**

Section V. Fire and Explosion Data

Flammability	Flammable.	Auto-Ignition	480°C (896°F) (Toluene)
Flash Points	5°C (41°F). (Toluene)	Flammable Limits	LOWER: 1.1% UPPER: 7.1% (Toluene)
Combustion Products	These products are toxic carbon oxides (CO, CO_2), nitrogen oxides (NO, NO_2).		
Fire Hazards	Not available.		
Explosion Hazards	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.		
Fire Fighting Media and Instructions	Flammable liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Consult with local fire authorities before attempting large scale fire-fighting operations.		

Section VI. Accidental Release Measures

Spill Cleanup Instructions	Flammable material. Heat and shock sensitive material. Harmful material. Irritating material. Light sensitive material. Keep away from heat. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal.

Section VII. Handling and Storage

Handling and Storage Information	FLAMMABLE. HEAT AND SHOCK SENSITIVE. HARMFUL. IRRITANT. LIGHT SENSITIVE. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. Do not breathe gas/fumes/ vapor/spray. Always store away from incompatible compounds such as oxidizing agents, alkalis (bases).

Section VIII. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. Be sure to use a MSHA/NIOSH approved respirator or equivalent. 
Exposure Limits	Not available.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid. (Clear, light yellow ~ reddish-yellow.)	Solubility	Insoluble in water. (Di-tert-butyl Azodicarboxylate) Very slightly soluble in water. Miscible with alcohol, chloroform, ether, acetone, glacial acetic acid, carbon disulfide. (Toluene)
Specific Gravity	0.87 (water=1) (Toluene)		
Molecular Weight	230.26 (Di-tert-butyl Azodicarboxylate) 92.14 (Toluene)	Partition Coefficient	LOG P_{ow}: 2.69 (Toluene)
Boiling Point	110°C (230°F) (Toluene)	Vapor Pressure	3.8 kPa (@ 25°C) (Toluene)
Melting Point	89 to 92°C (192.2 to 197.6°F) (Di-tert-butyl Azodicarboxylate) -93°C (Toluene)	Vapor Density	3.1 (Air = 1) (Toluene)
Refractive Index	1.496 - 1.498 (Toluene)	Volatility	Not available.
Critical Temperature	Not available.	Odor	Not available.
Viscosity	0.778 cP (@ 0°C) (Toluene)	Taste	Not available.

Section X. Stability and Reactivity Data

Stability	This material is stable if stored under proper conditions. (See Section VII for instructions)
Conditions of Instability	Avoid excessive heat and light.
Incompatibilities	Reactive with oxidizing agents, alkalis (bases), alochols.

Continued on Next Page **Emergency phone number (800) 424-9300**

Section XI. Toxicological Information

RTECS Number
XS5250000 (Toluene)

Routes of Exposure
Eye Contact. Ingestion. Inhalation.

Toxicity Data
(Toluene)
Rat LD_{50} (oral) 636 mg/kg
Rabbit LD_{50} (dermal) 14100 uL/kg
Rat LD_{50} (inhalation) 49 gm/m^3/4H

Chronic Toxic Effects
CARCINOGENIC EFFECTS : Not available.
MUTAGENIC EFFECTS : Not available.
TERATOGENIC EFFECTS : Not available.
DEVELOPMENTAL TOXICITY: Reproductive effects. (Toluene)
Rat TCLo Inhalation 800 mg/m3 for 6 hours, female 14-20 days of pregnancy
TOXIC EFFECTS:
Effects on Embryo or Fetus - Fetotoxicity
Effects on Newborn - Behavioral
Mouse TCLo Inhalation 400 ppm for 7 hours, female 7-16 days of pregnancy
TOXIC EFFECTS:
Specific Developmental Abnormalities - Musculoskeletal system
Effects on Newborn - Biochemical and metabolic
Mouse TDLo Oral 9 gm/kg, female 6-15 days of pregnancy
TOXIC EFFECTS:
Effects on Embryo or Fetus - Fetal death
Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.

Acute Toxic Effects
Harmful if ingested or inhaled. Minimize exposure to this material. Severe overexposure can result in injury or death.
Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information

Ecotoxicity
Not available.

Environmental Fate
Toluene is released into the atmosphere principally from the volatilization of petroleum fuels and toluene-based solvents and thinners and from motor vehicle exhaust. Toluene's production and use as an intermediate in the production of benzoic acid, benzaldehyde, benzene, explosives, dyes and many other organic compounds may also result in its release to the environment through various waste streams. Toluene has been detected in emissions from volcanos, forest fires and crude oil. If released to air, a vapor pressure of 28.4 mm Hg at 25 deg C indicates toluene will exist solely as a vapor in the ambient atmosphere. Vapor-phase toluene will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 3 days. Toluene may also be degraded in the atmosphere by reaction with nitrate radicals and ozone molecules, but these reactions are too slow to be environmentally important. If released to soil, toluene is expected to have high to moderate mobility based upon Koc values in the range of 37-178. Volatilization from moist soil surfaces is expected to be an important fate process based upon a Henry's Law constant of 6.64X10-3 atm-cu m/mole. Toluene may volatilize from dry soil surfaces based upon its vapor pressure. Biodegradation is expected to occur rapidly in soil surfaces, with half-lives in the range of several hours to 71 days. If released into water, toluene is not expected to adsorb to suspended solids and sediment based upon a Koc of 166 measured in lake sediment. Biodegradation is expected to occur rapidly in water, with reported half-lives of 4 and 56 days in aerobic and anaerobic water, respectively. Volatilization from water surfaces is expected to be an important fate process based upon this compound's Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 1 hour and 4 days, respectively. Measured BCF values of 13 and 90 in fish suggest bioconcentration in aquatic organisms is low to moderate. Hydrolysis is not expected to be an important environmental fate process for toluene due to lack of hydrolyzable functional groups. Exposure to toluene may occur occupationally during its production or subsequent use, particularly as a solvent or in gasoline, via dermal and respiratory routes. The main route of exposure for the general population will be through inhalation from contaminated air and handling of gasoline as well as ingestion of contaminated drinking water and food, and exposure to some consumer products.

Section XIII. Disposal Considerations

Waste Disposal
Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

Section XIV. Transport Information

DOT Classification
DOT CLASS 3: Flammable liquid.

PIN Number
UN1294

Proper Shipping Name
Toluene, solution

Packing Group (PG)
II

DOT Pictograms

Continued on Next Page **Emergency phone number (800) 424-9300**

Section XV. Other Regulatory Information and Pictograms

TSCA Chemical Inventory (EPA)	(Di-tert-butyl Azodicarboxylate) This product is **NOT** on the EPA Toxic Substances Control Act (TSCA) inventory. The following notices are required by 40 CFR 720.36 (C) for those products not on the inventory list: (i) These products are supplied solely for use in research and development by or under the supervision of a technically qualified individual as defined in 40 CFR 720.0 et sec. (ii) The health risks of these products have not been fully determined. Any information that is or becomes available will be supplied on an MSDS sheet. (Toluene) This compound is **ON** the EPA Toxic Substances Control Act (TSCA) inventory list.
WHMIS Classification (Canada)	CLASS B-2: Flammable liquid with a flash point lower than 37.8℃ (100℉). On DSL. (Toluene)
EINECS Number (EEC)	212-796-9 (Di-tert-butyl Azodicarboxylate) 203-625-9 (Toluene)
EEC Risk Statements	R11- Highly flammable. R18- In use, may form flammable/explosive vapor-air mixture. R20/21/22- Harmful by inhalation, in contact with skin and if swallowed. R36/37/38- Irritating to eyes, respiratory system and skin.
Japanese Regulatory Data	ENCS No. 3-2 (Toluene)

Section XVI. Other Information

Version 1.0
Validated on 4/13/2009.
Printed 5/18/2011.

Notice to Reader