# SAFETY DATA SHEET

Updated on 11/11/2024

## 1. Material Identification

**Product Name** : Toluene
**Catalog Number** : io-3117
**CAS Number** : 108-88-3
**Identified uses** : Laboratory chemicals, manufacture of chemical compounds
**Company** : Ionz

**>> R&D Use only**

## 2. Hazards Identification

### GHS Classification:

Flammable liquid ( category 2 )
Acute toxicity, oral (Category 3)
Acute toxicity, dermal (Category 3)
Acute toxicity, inhalation (Category 3)
Specific target organ toxicity, single exposure (Category 1)

**Note**

>> Pictograms displayed are for > 99.9% (8313 of 8321) of reports that indicate hazard statements. This chemical does not meet GHS hazard criteria for < 0.1% (8 of 8321) of reports.

**Pictogram(s)**

**GHS Hazard Statements**

>> H225 (98.3%): Highly Flammable liquid and vapor [Danger Flammable liquids]

>> H304 (99.8%): May be fatal if swallowed and enters airways [Danger Aspiration hazard]

>> H315 (98.3%): Causes skin irritation [Warning Skin corrosion/irritation]

>> H336 (98.2%): May cause drowsiness or dizziness [Warning Specific target organ toxicity, single exposure; Narcotic effects]

>> H361 (95.5%): Suspected of damaging fertility or the unborn child [Warning Reproductive toxicity]

>> H373 (98.2%): May causes damage to organs through prolonged or repeated exposure [Warning Specific target organ toxicity, repeated exposure]

>> H412 (11.2%): Harmful to aquatic life with long lasting effects [Hazardous to the aquatic environment, long-term hazard]

**Precautionary Statement Codes**

>> P203, P210, P233, P240, P241, P242, P243, P260, P261, P264, P271, P273, P280, P301+P316, P302+P352, P303+P361+P353, P304+P340, P318, P319, P321, P331, P332+P317, P362+P364, P370+P378, P403+P233, P403+P235, P405, and P501

**NFPA 704 Diamond**


**NFPA Health Rating**

>> 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

**NFPA Fire Rating**

>> 3 - Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions.

**NFPA Instability Rating**

>> 0 - Materials that in themselves are normally stable, even under fire conditions.

### Health Hazards:

>> Vapors irritate eyes and upper respiratory tract; cause dizziness, headache, anesthesia, respiratory arrest. Liquid irritates eyes and causes drying of skin. If aspirated, causes coughing, gagging, distress, and rapidly developing pulmonary edema. If ingested causes vomiting, griping, diarrhea, depressed respiration. (USCG, 1999)

**ERG 2024, Guide 130 (Toluene)**

>> May cause toxic effects if inhaled or absorbed through skin.

>> Inhalation or contact with material may irritate or burn skin and eyes.

>> Fire will produce irritating, corrosive and/or toxic gases.

>> Vapors may cause dizziness or asphyxiation, especially when in closed or confined areas.

>> Runoff from fire control or dilution water may cause environmental contamination.

>> Behavior in Fire: Vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back. (USCG, 1999)

**ERG 2024, Guide 130 (Toluene)**

>> HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.

>> Vapors may form explosive mixtures with air.

>> Vapors may travel to source of ignition and flash back.

>> Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks, etc.).

>> Vapor explosion hazard indoors, outdoors or in sewers.

>> Those substances designated with a (P) may polymerize explosively when heated or involved in a fire.

>> Runoff to sewer may create fire or explosion hazard.

>> Containers may explode when heated.

>> Many liquids will float on water.

>> Highly flammable. Vapour/air mixtures are explosive. Risk of fire and explosion on contact with strong oxidants.

## 3. Composition/Information On Ingredients

**Chemical name** : Toluene
**CAS Number** : 108-88-3
**Molecular Formula** : C7H8
**Molecular Weight** : 92.1400 g/mol

## 4. First Aid Measures

### First Aid:

>> EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

>> SKIN: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment.

>> INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.

>> INGESTION: DO NOT INDUCE VOMITING. If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY call a hospital or poison control center. Be prepared to transport the victim to a hospital if advised by a physician. If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital. (NTP, 1992)

**ERG 2024, Guide 130 (Toluene)**

>> General First Aid:

>> Call 911 or emergency medical service.

>> Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and avoid contamination.

>> Move victim to fresh air if it can be done safely.

>> Administer oxygen if breathing is difficult.

>> If victim is not breathing:

>> DO NOT perform mouth-to-mouth resuscitation; the victim may have ingestedor inhaled the substance.

>> If equipped and pulse detected, wash face and mouth, then give artificial respiration using a proper respiratory medical device (bag-valve mask, pocket mask equipped with a one-way valve or other device).

>> If no pulse detected or no respiratory medical device available, provide continuouscompressions. Conduct a pulse check every two minutes or monitor for any signs of spontaneous respirations.

>> Remove and isolate contaminated clothing and shoes.

>> For minor skin contact, avoid spreading material on unaffected skin.

>> In case of contact with substance, remove immediately by flushing skin or eyes with running water for at least 20 minutes.

>> For severe burns, immediate medical attention is required.

>> Effects of exposure (inhalation, ingestion, or skin contact) to substance may be delayed.

>> Keep victim calm and warm.

>> Keep victim under observation.

>> For further assistance, contact your local Poison Control Center.

>> Note: Basic Life Support (BLS) and Advanced Life Support (ALS) should be done by trained professionals.

>> Specific First Aid:

>> Wash skin with soap and water.

>> In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.

## First Aid Measures

### Inhalation First Aid

>> Fresh air, rest. Refer immediately for medical attention.

### Skin First Aid

>> First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. Rinse and then wash skin with water and soap. Refer for medical attention .

### Eye First Aid

>> First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

### Ingestion First Aid

>> Rinse mouth. Give nothing to drink. Do NOT induce vomiting. Refer immediately for medical attention.

## 5. Fire Fighting Measures

>> Poisonous gases may be produced in fire.

>> Excerpt from ERG Guide 130 [Flammable Liquids (Water-Immiscible / Noxious)]:

>> CAUTION: The majority of these products have a very low flash point. Use of water spray when fighting fire may be inefficient.

>> SMALL FIRE: Dry chemical, CO2, water spray or regular foam. If regular foam is ineffective or unavailable, use alcohol-resistant foam.

>> LARGE FIRE: Water spray, fog or regular foam. If regular foam is ineffective or unavailable, use alcohol-resistant foam. Avoid aiming straight or solid streams directly onto the product. If it can be done safely, move undamaged containers away from the area around the fire.

>> FIRE INVOLVING TANKS, RAIL TANK CARS OR HIGHWAY TANKS: Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks in direct contact with flames. For massive fire, use unmanned master stream devices or monitor nozzles; if this is impossible, withdraw from area and let fire burn. (ERG, 2024)

>> Use foam, powder, carbon dioxide, water spray. In case of fire: keep drums, etc., cool by spraying with water.

## 6. Accidental Release Measures

### Isolation and Evacuation:

Isolation and evacuation measures to take when a large amount of this chemical is accidentally released in an emergency.

>> Excerpt from ERG Guide 130 [Flammable Liquids (Water-Immiscible / Noxious)]:

>> IMMEDIATE PRECAUTIONARY MEASURE: Isolate spill or leak area for at least 50 meters (150 feet) in all directions.

>> LARGE SPILL: Consider initial downwind evacuation for at least 300 meters (1000 feet).

>> FIRE: If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2024)

**Evacuation: ERG 2024, Guide 130 (Toluene)**

>> Immediate precautionary measure

>> Isolate spill or leak area for at least 50 meters (150 feet) in all directions.

>> Large Spill

>> Consider initial downwind evacuation for at least 300 meters (1000 feet).

>> Fire

>> If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

### Spillage Disposal:

Methods for containment and safety measures to protect workers dealing with a spillage of this chemical.

>> Evacuate danger area! Consult an expert! Personal protection: chemical protection suit and self-contained breathing apparatus. Ventilation. Remove all ignition sources. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

**Accidental Release Measures**

**Public Safety: ERG 2024, Guide 130 (Toluene)**

>> CALL 911. Then call emergency response telephone number on shipping paper. If shipping paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.

>> Keep unauthorized personnel away.

>> Stay upwind, uphill and/or upstream.

>> Ventilate closed spaces before entering, but only if properly trained and equipped.

**Spill or Leak: ERG 2024, Guide 130 (Toluene)**

>> ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.

>> All equipment used when handling the product must be grounded.

>> Do not touch or walk through spilled material.

>> Stop leak if you can do it without risk.

>> Prevent entry into waterways, sewers, basements or confined areas.

>> A vapor-suppressing foam may be used to reduce vapors.

>> Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

>> Use clean, non-sparking tools to collect absorbed material.

>> Large Spill

>> Dike far ahead of liquid spill for later disposal.

>> Water spray may reduce vapor, but may not prevent ignition in closed spaces.

## 7. Handling And Storage

### Safe Storage:

>> Well closed. Fireproof. Separated from strong oxidants. Store in an area without drain or sewer access. Store only in original container.

### Storage Conditions:

>> Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Handle and store under inert gas.

## 8. Exposure Control/ Personal Protection

**REL-TWA (Time Weighted Average)**

>> 100 ppm (375 mg/m³)

**REL-STEL (Short Term Exposure Limit)**

>> 150 ppm (560 mg/m³)

>> TWA 100 ppm (375 mg/m3) ST 150 ppm (560 mg/m3)

>> 200.0 [ppm], Ceiling(OSHA) = 300 ppm(500 ppm for 10-min peak per 8-hr shift)

**PEL-TWA (8-Hour Time Weighted Average)**

>> 200 ppm

**PEL-C (Ceiling)**

>> 300 ppm; 500 ppm (Peak) [10 min maximum in an 8 hr shift]

>> 20.0 [ppm]

>> 20 ppm as TWA; (OTO); A4 (not classifiable as a human carcinogen); BEI issued.

**TLV-TWA (Time Weighted Average)**

>> 20 ppm [2006]

**EU-OEL**

>> 192 mg/m

**Emergency Response: ERG 2024, Guide 130 (Toluene)**

>> CAUTION: The majority of these products have a very low flash point. Use of water spray when fighting fire may be inefficient.

>> Small Fire

>> Dry chemical, CO2, water spray or regular foam. If regular foam is ineffective or unavailable, use alcohol-resistant foam.

>> Large Fire

>> Water spray, fog or regular foam. If regular foam is ineffective or unavailable, use alcohol-resistant foam.

>> Avoid aiming straight or solid streams directly onto the product.

>> If it can be done safely, move undamaged containers away from the area around the fire.

>> Fire Involving Tanks, Rail Tank Cars or Highway Tanks

>> Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles.

>> Cool containers with flooding quantities of water until well after fire is out.

>> Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

>> ALWAYS stay away from tanks in direct contact with flames.

>> For massive fire, use unmanned master stream devices or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

>> ERPG-1: 50 ppm - one hour exposure limit: 1 = mild transient health effects or objectionable odor [AIHA]

>> ERPG-2: 300 ppm - one hour exposure limit: 2 = impaired ability to take protective action [AIHA]

>> ERPG-3: 1,000 ppm - one hour exposure limit: 3 = life threatening health effects [AIHA]

## Inhalation Risk:

>> A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20 °C.

## Effects of Short Term Exposure:

>> The substance is irritating to the skin. The substance is mildly irritating to the eyes. The substance may cause effects on the central nervous system. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure at high levels could cause cardiac dysrhythmia and unconsciousness.

## Effects of Long Term Exposure:

>> The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the central nervous system. Exposure to the substance may increase noise-induced hearing loss. Animal tests show that this substance possibly causes toxicity to human reproduction or development. May cause colour vision impairment.

**Fire Prevention**

>> NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools. NO contact with strong oxidizing agents.

**Exposure Prevention**

>> AVOID ALL CONTACT!

**Inhalation Prevention**

>> Use ventilation, local exhaust or breathing protection.

**Skin Prevention**

>> Protective gloves.

**Eye Prevention**

>> Wear safety goggles.

**Ingestion Prevention**

>> Do not eat, drink, or smoke during work.

**Exposure Control and Personal Protection**

**Protective Clothing: ERG 2024, Guide 130 (Toluene)**

>> Wear positive pressure self-contained breathing apparatus (SCBA).

>> Structural firefighters' protective clothing provides thermal protection but only limited chemical protection.

**Exposure Summary**

>> Biological Exposure Indices (BEI) [ACGIH] - o-Cresol in urine = 0.3 mg/g creatinine (end of shift); Toluene in blood = 0.02 mg/L (prior to last shift of workweek); Toluene in urine = 0.03 mg/L (end of shift); [ACGIH]

**RD50 (Exposure concentration producing a 50% respiratory rate decrease)**

>> 5300.0 [mmHg]

**Maximum Allowable Concentration (MAK)**

>> 50.0 [ppm]

## 9. Physical And Chemical Properties

**Molecular Weight:**

>> 92.14

**Exact Mass:**

>> 92.062600255

**Physical Description:**

>> Toluene appears as a clear colorless liquid with a characteristic aromatic odor. Flash point 40 °F. Less dense than water (7.2 lb / gal) and insoluble in water. Hence floats on water. Vapors heavier than air. May be toxic by inhalation, ingestion or skin contact. Used in aviation and automotive fuels, as a solvent, and to make other chemicals.

>> COLOURLESS LIQUID WITH CHARACTERISTIC ODOUR.

**Color/Form:**

>> Colorless liquid

**Odor:**

>> Sweet, pungent, benzene-like odor

**Boiling Point:**

>> 231.1 °F at 760 mmHg (NTP, 1992)

>> 111 °C

**Melting Point:**

>> -139 °F (NTP, 1992)

>> -95 °C

**Flash Point:**

>> 40 °F (NTP, 1992)

>> 4 °C c.c.

**Solubility:**

>> less than 1 mg/mL at 64 °F (NTP, 1992)

>> Solubility in water: none

**Density:**

>> 0.867 at 68 °F (USCG, 1999) - Less dense than water; will float

>> Relative density (water = 1): 0.87

**Vapor Density:**

>> 3.14 (NTP, 1992) - Heavier than air; will sink (Relative to Air)

>> Relative vapor density (air = 1): 3.1

**Vapor Pressure:**

>> 10 mmHg at 43.5 °F ; 20 mmHg at 65.1 °F; 40 mmHg at 89.2 °F (NTP, 1992)

>> Vapor pressure, kPa at 25 °C: 3.8

**LogP:**

>> 2.69

**LogS:**

The base-10 logarithm of the aqueous solubility of this compound.

**Stability/Shelf Life:**

>> Stable under recommended storage conditions.

**Autoignition Temperature:**

>> 896 °F (USCG, 1999)

>> 480 °C

**Decomposition:**

>> Can react vigorously with oxidizing materials.

**Viscosity:**

>> 1.165 mPa-s at -25 °C; 0.778 mPa-s at 0 °C; 0.560 mPa-s at 25 °C; 0.424 mPa-s at 50 °C; 0.333 mPa-s at 75 °C; 0.270 mPa-s at 100 °C

>> 0.68 $mm^2/s$ at 20 °C

**Corrosivity:**

The ability of a chemical to damage or destroy other substances when it comes into contact.

>> Noncorrosive liquid.

**Heat of Combustion:**

>> 3910.3 KJ/mol

**Heat of Vaporization:**

>> 38.01 KJ/mol at 25 °C

**Surface Tension:**

>> 29.46 mN/m at 10 °C; 27.73 mN/m at 25 °C; 24.85 mN/m at 50 °C; 21.98 mN/m at 75 °C; 19.10 mN/m at 100 °C

**Ionization Potential:**

>> 8.82 eV

**Odor Threshold:**

>> Odor Threshold Low: 0.16 [mmHg]

>> Odor Threshold High: 37.0 [mmHg]

>> Detection odor threshold from AIHA (mean = 1.6 ppm)

**Refractive Index:**

>> Index of refraction: 1.4967 @ 20 °C/D

## 10. Stability And Reactivity

>> Highly flammable. Insoluble in water.

**CSL No**

>> CSL00194

**Reactants/Reagents**

>> Nitrous oxide + Nitric oxide + Sodium + Hydrogen + Sodium formate + Toluene

**Warning Message**

>> "A safety letter from Merck & Co. chemists titled “Nitric Oxide at High Pressure” (C&EN, Jan. 30, page 6) described two explosions during depressurization of a reaction between NO and methanol under basic conditions. The products in a model system with sodium methoxide were described as nitrous oxide and formic acid, presumably as sodium formate. A potential danger in this system should be pointed out: Sodium formate undergoes thermal decomposition to give hydrogen gas (J. Am. Chem. Soc.,DOI: 10.1021/ja02245a004), which explodes spontaneously in the presence of nitrous oxide above critical limits (J. Am. Chem. Soc., DOI: 10.1021/ja01179a036), even in the absence of a catalyst or source of ignition. The presence of hydrogen and nitrous oxide above a reaction mixture was undoubtedly the cause of an explosion and fire in my laboratory in 1981 during workup of a reaction between sodium and nitric oxide. The major

product of the reaction is cis-sodium hyponitrite, which decomposes immediately in water to form sodium hydroxide and nitrous oxide. The employee, a biology major who was badly burned, had carried out the reaction a number of times without incident. This time he tried twice and failed to disperse about 30 g of sodium in toluene and, without consulting me, decided to continue the reaction. The explosion occurred as he was attempting to destroy the unreacted sodium, a lump too large to remove from the flask, by dropwise addition of water. Most of the sodium had reacted at the time of the explosion, and there was no indication of mechanical failure. At the time, I was unaware of the extreme incompatibility of the two gases, and the accident was extremely puzzling. The reaction mixture was close to room temperature and was stirred rapidly while the headspace was flushed with a stream of nitrogen. When I arrived at the laboratory a few minutes after the accident, nitrogen was still flowing from the burned-off end of the plastic tubing. Since that time, I noticed a reference to the “hydrogen explosion” in the ancient chemical literature as a way to identify nitrous oxide." (reprint of the full-text)

**GHS Category**

>> Explosive

**Reaction Scale**

>> Medium (up to 100g)

**DOI Link**

>> 10.1021/cen-09013-letters

**Reference Source**

>> Literature Reference

**Modified Date**

>> 10/15/2022

**Create Date**

>> 10/14/2022

## 11. Toxicological Information

**Toxicity Summary:**

>> IDENTIFICATION AND USE: Toluene is a colorless liquid. It is not registered for current pesticide use in the U.S., but approved pesticide uses may change periodically and so federal, state and local authorities must be consulted for currently approved uses. Toluene is a component of gasoline, paints, inks, lacquers, paint thinners, adhesives, fingernail polish, cleaning agents, and rubber. BTX (a mixture of benzene, toluene, and xylene) is added to gasoline to improve octane ratings. Toluene is used to produce benzene, trinitrotoluene (TNT), nylon, plastics, and polyurethanes. It is also used in production of drugs of abuse. Toluene is a favorite of solvent abusers, who intentionally inhale high concentrations to achieve a euphoric effect. HUMAN EXPOSURE AND TOXICITY: Eye and upper airway irritation occurred after a 6.5 hr exposure to an air level of 100 ppm (377 mg/cu m) toluene, and lacrymation was seen at 500 mg/cu m. Volunteers exposed to 100 ppm (377 mg/cu m) toluene for 6 hr/day for four days suffered from subjective complaints of headache, dizziness and a sensation of intoxication. In subjects exposed to 750 mg/cu m for 8 hr, fatigue, muscular weakness, confusion, impaired coordination, enlarged pupils and accommodation disturbances were experienced; at about 3000 mg/cu m, severe fatigue, pronounced nausea, mental confusion, considerable incoordination with staggering gait and strongly affected pupillary light reflexes were observed. After exposure at the high level, muscular fatigue, nervousness and insomnia lasted for several days. Heavy accidental exposure leads to coma. Studies of women exposed to toluene have shown menstrual disturbances, principally associated with abnormal bleeding. n a case study of two adult white males who suffered from toluene intoxication cardiac arrhythmias were noted. Response seemed to be highly variable among individuals. One person exposed for 2 hr to less than 1890 ppm toluene exhibited a rapid heartbeat (sinus tachycardia), while the second person, exposed for 3 hr, exhibited a slow heartbeat (bradycardia). Severe renal tubular acidosis was observed in five pregnant women who were chronic abusers of paints containing toluene. A 27-year-old male developed cerebral and cerebellar atrophy over a period of five years of extensive glue sniffing. He also developed bilateral optic atrophy with blindness and severe sensorineural hearing loss. CYP2E1 is a versatile phase I drug-metabolizing enzyme responsible for the biotransformation of most volatile organic compounds, including toluene. Human toluene exposure increases CYP2E1 mRNA and modifies its activity in leucocytes. A study of Finnish individuals monitored in an occupational database during the years 1978 to 1983 showed that there was no increase in cancer risk with individuals exposed to toluene with average blood levels of 0.18 mg/L. Chromosome studies on peripheral blood lymphocytes of 34 rotogravure workers in Italy showed no changes when compared with the control group. Several case series have demonstrated that high exposure to toluene through sniffing during pregnancy induces a syndrome that closely resembles the fetal alcohol syndrome, with pre- and postnatal growth deficiency, microcephaly and developmental delay, typical craniofacial features including micrognathia, small palpebral fissures,

and ear anomalies. ANIMAL STUDIES: Rats were studied to assess the effects of acute binge-like toluene inhalations (15 or 30 min; ~5,000 ppm) on tasks that examine locomotion, exploration, balance, gait, and neurological functioning for adolescent (1 month), young adult (2-3 months), adult (5-6 months), and older adult (10-12 months) rats. Both motor and neurological functions were impaired following acute toluene inhalation at all ages. However, only the duration to recover from deficits in motor functions differed among age groups, with adolescent and young adult rats requiring notably longer recovery times than older rats. When 0.25, 0.5, or 2.0 mL toluene were applied to 0.7% of the total body surface of guinea pigs, none of the animals died, but reduced body-weight gain occurred. Inhalation of 1400 to 2000 ppm toluene by male rats, 8 hours/day for as little as 3 days resulted in reversible, high-frequency hearing loss. Subcutaneous injection of 50 and 500 mg/kg once a day for 10 days caused decreased sperm counts and serum testosterone in male rats. Rats were dosed with 1.3 g/kg toluene subcutaneously during either week 2 (8-15 days) or week 3 (14-20 days) of pregnancy and evaluated for malformations, development of the skeleton, prenatal growth of the brain and liver, postnatal growth, and behavioral effects. The only toluene-induced change was low birth weight and was found in the rats dosed in the third week of pregnancy. Rabbits exposed 24 hours/day at 1000 mg/cu m (265 ppm) from day 6 to 15 of pregnancy showed increased spontaneous abortions. Mice exposed 24 hours/day at 1000 mg/cu m (265 ppm) on days 6 to 15 of pregnancy and rats exposed to 2400 mg/cu m (636 ppm) on days 7 to 15 of pregnancy showed growth and skeletal retardation. Mice exposed 24 hours/day at 133 ppm toluene on days 6 to 13 of pregnancy and rats exposed 24 hours/day at 399 ppm on days 1 to 8 of pregnancy and on days 9 to 14 of pregnancy showed fetal growth retardation and an increase in skeletal anomalies. There was maternal mortality in these groups. Mice exposed 6 hours/day at 100 ppm toluene during days 1 to 17 of pregnancy showed no significant differences in number of implantation sites, number of fetuses, or mean fetal body weight when compared with control. When toluene was applied to shaved interscapular skin of male mice 3 times per week for 4 weeks, followed by a secondary treatment of 3 times per week for up to 112 weeks, no tumors were observed. Groups of 60 male and female mice that were exposed 6.5 hours/day, 5 days/week for 2 years via inhalation at inhaled 0, 120, 600, or 1200 ppm toluene showed no biologically relevant increases for any non-neoplastic or neoplastic tissue changes. When groups of 60 rats of each sex were exposed via inhalation 6.5 hours/day, 5 days/week for 2 years to atmospheres containing 0, 600, or 1200 ppm toluene, nephropathy occurred in nearly all of the rats. The olfactory and respiratory epithelia showed signs of degeneration with nasal inflammation and metaplasia of the olfactory epithelium (principally in the females). No treatment-related neoplasms occurred in the male rats. and the few scattered tumors found in the females were considered not associated with toluene inhalation. Toluene did not induce gene mutations in Salmonella typhimiurium strain TA98, TA100, TA1535, or TA1537 with or without exogenous metabolic activation. In the mouse lymphoma assay, toluene gave an equivocal response with and without exogenous metabolic activation. Toluene did not induce sister chromatid exchanges or chromosomal aberrations in Chinese hamster ovary cells in the presence or absence of exogenous metabolic activation. ECOTOXICITY STUDIES: The toluene contamination significantly reduced the mass of the cell wall material in the alfalfa roots. Furthermore, the toluene pollution can change the alfalfa root cell wall properties by reducing the cell wall functional groups. These functional groups are probably related to the proteins and polysaccharides in the cell wall.

**EPA Provisional Peer-Reviewed Toxicity Values:**

This section provides the EPA Provisional Peer-Reviewed Toxicity Values (PPRTVs) and links of related assessment documents.

**Chemical Substance**

>> Toluene

**Reference Dose (RfD), Subchronic**

>> 8 x 10^-1 mg/kg-day

**Reference Concentration (RfC), Subchronic**

>> 5 mg/m^3

**PPRTV Assessment**

>> PDF Document

**Last Revision**

>> 2009

**USGS Health-Based Screening Levels for Evaluating Water-Quality:**

This section provides the USGS Health-Based Screening Levels for Evaluating Water-Quality data.

**Chemical**

>> Toluene

**USGS Parameter Code**

>> 34010

**MCL (Maximum Contaminant Levels)[µg/L]**

>> 1000

**Reference**

>> Smith, C.D. and Nowell, L.H., 2024. Health-Based Screening Levels for evaluating water-quality data (3rd ed.). DOI:10.5066/F71C1TWP

**Evidence for Carcinogenicity:**

Evidence that this chemical does or may cause cancer. The information here is collected from various sources by the Hazardous Substances Data Bank (HSDB).

>> Evaluation: There is inadequate evidence for the carcinogenicity of toluene in humans. There is evidence suggesting lack of carcinogenicity of toluene in experimental animals. Overall evaluation: Toluene is not classifiable as to its carcinogenicity to humans (Group 3).

**Carcinogen Classification:**

This section provides the International Agency for Research on Cancer (IARC) Carcinogenic Classification and related monograph links. In the IARC Carcinogenic classification, chemicals are categorized into four groups: Group 1 (carcinogenic to humans), Group 2A (probably carcinogenic to humans), Group 2B (possibly carcinogenic to humans), and Group 3 (not classifiable as to its carcinogenicity to humans).

**IARC Carcinogenic Agent**

>> Toluene

**IARC Carcinogenic Classes**

>> Group 3: Not classifiable as to its carcinogenicity to humans

**IARC Monographs**

>> Volume 47: (1989) Some Organic Solvents, Resin Monomers and Related Compounds, Pigments and Occupational Exposures in Paint Manufacture and Painting

>> Volume 71: (1999) Re-evaluation of Some Organic Chemicals, Hydrazine and Hydrogen Peroxide (Part 1, Part 2, Part 3)

>> 3, not classifiable as to its carcinogenicity to humans. (L135)

**Health Effects:**

>> Acute exposure to cholinesterase inhibitors can cause a cholinergic crisis characterized by severe nausea/vomiting, salivation, sweating, bradycardia, hypotension, collapse, and convulsions. Increasing muscle weakness is a possibility and may result in death if respiratory muscles are involved. Accumulation of ACh at motor nerves causes overstimulation of nicotinic expression at the neuromuscular junction. When this occurs symptoms such as muscle weakness, fatigue, muscle cramps, fasciculation, and paralysis can be seen. When there is an accumulation of ACh at autonomic ganglia this causes overstimulation of nicotinic expression in the sympathetic system. Symptoms associated with this are hypertension, and hypoglycemia. Overstimulation of nicotinic acetylcholine receptors in the central nervous system, due to accumulation of ACh, results in anxiety, headache, convulsions, ataxia, depression of respiration and circulation, tremor, general weakness, and potentially coma. When there is expression of muscarinic overstimulation due to excess acetylcholine at muscarinic acetylcholine receptors symptoms of visual disturbances, tightness in chest, wheezing due to bronchoconstriction, increased bronchial secretions, increased salivation, lacrimation, sweating, peristalsis, and urination can occur. Certain reproductive effects in fertility, growth, and development for males and females have been linked specifically to organophosphate pesticide exposure. Most of the research on reproductive effects has been conducted on farmers working with pesticides and insecticdes in rural areas. In females menstrual cycle disturbances, longer pregnancies, spontaneous abortions, stillbirths, and some developmental effects in offspring have been linked to organophosphate pesticide exposure. Prenatal exposure has been linked to impaired fetal growth and development. Neurotoxic effects have also been linked to poisoning with OP pesticides causing four neurotoxic effects in humans: cholinergic syndrome, intermediate syndrome, organophosphate-induced delayed polyneuropathy (OPIDP), and chronic organophosphate-induced neuropsychiatric disorder (COPIND). These syndromes result after acute and chronic exposure to OP pesticides.

**Exposure Routes:**

>> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

>> inhalation, skin absorption, ingestion, skin and/or eye contact

**Inhalation Exposure**

>> Sore throat. Cough. Dizziness. Drowsiness. Headache. Nausea. Unconsciousness.

**Skin Exposure**

>> Redness. Dry skin.

**Eye Exposure**

>> Redness. Pain.

**Ingestion Exposure**

>> Aspiration hazard! Burning sensation. Abdominal pain. Vomiting. Further see Inhalation.

>> irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage

**Target Organs:**

Organs that are affected by exposure to this chemical. Information in this section reflects human data unless otherwise noted.

>> Cardiovascular (Heart and Blood Vessels), Developmental (effects while organs are developing), Immunological (Immune System), Neurological (Nervous System), Respiratory (From the Nose to the Lungs)

>> Nervous

>> Urinary

**Adverse Effects:**

An adverse effect is an undesired harmful effect resulting from a medical treatment or other intervention.

>> Neurotoxin - Acute solvent syndrome

>> Occupational hepatotoxin - Secondary hepatotoxins: the potential for toxic effect in the occupational setting is based on cases of poisoning by human ingestion or animal experimentation.

>> Nephrotoxin - The chemical is potentially toxic to the kidneys in the occupational setting.

>> Reproductive Toxin - A chemical that is toxic to the reproductive system, including defects in the progeny and injury to male or female reproductive function. Reproductive toxicity includes developmental effects. See Guidelines for Reproductive Toxicity Risk Assessment.

>> ACGIH Carcinogen - Not Classifiable.

**Toxicity Data:**

>> LC50 (rat) = 8000 ppm/4H

**Minimum Risk Level:**

The minimal risk level (MRL) is an estimate of the amount of a chemical a person can eat, drink, or breathe each day without a detectable risk to health

>> Acute Inhalation: 1 ppm (L134) Chronic Inhalation: 0.08 ppm (L134) Acute Oral: 0.8 mg/kg/day (L134) Intermediate Oral: 0.02 mg/kg/day (L134)

**Treatment:**

Treatment when exposed to toxin

>> If the compound has been ingested, rapid gastric lavage should be performed using 5% sodium bicarbonate. For skin contact, the skin should be washed with soap and water. If the compound has entered the eyes, they should be washed with large quantities of isotonic saline or water. In serious cases, atropine and/or pralidoxime should be administered. Anti-cholinergic drugs work to counteract the effects of excess acetylcholine and reactivate AChE. Atropine can be used as an antidote in conjunction with pralidoxime or other pyridinium oximes (such as trimedoxime or obidoxime), though the use of '-oximes' has been found to be of no benefit, or possibly harmful, in at least two meta-analyses. Atropine is a muscarinic antagonist, and thus blocks the action of acetylcholine peripherally.

**Interactions:**

>> The exposure intensity during a shift and the metabolite levels in the shift-end urine were examined in male workers exposed to either benzene (65 subjects; the benzene group), toluene (35 subjects; the toluene group), or a mixture of both (55 subjects; the mixture group). In addition, 35 non-exposed male workers (the control group) were similarly examined for urinary metabolites to define background levels. A linear relationship was established between the intensity of solvent exposure and the corresponding urinary metabolite levels (i.e. phenol, catechol and quinol from benzene, and hippuric acid and o-cresol from toluene) in each case when one of the three exposed groups was combined with the control group for calculation. Comparison of regression lines in combination with regression analysis disclosed that urinary levels of phenol and quinol (but not catechol) were lower in the mixture group than in the benzene group when the intensities of exposure to benzene were comparable, indicating that the biotransformation of benzene to phenolic compounds (excluding catechol) in man is suppressed by co-exposure to toluene. Conversely, metabolism of toluene to hippuric acid was suppressed by benzene co-exposure. Conversion of toluene to o-cresol was also reduced by benzene, but to a lesser extent. The significance of the present findings on the mutual suppression of metabolism between benzene and toluene is discussed in relation to solvent toxicology and biological monitoring of exposure to the solvents.

**Antidote and Emergency Treatment:**

>> Immediate First Aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR if necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Aromatic hydrocarbons and related compounds/

**Human Toxicity Excerpts:**

>> /HUMAN EXPOSURE STUDIES/ The solvent toluene has neurotoxic properties that are especially relevant in the working environment. Short-term exposure limits (STELs) vary from 50 ppm up to 300 ppm across countries but their acute effects remain elusive in humans. Several in vitro and in vivo studies elucidated that toluene acutely acts by perturbations of different neurotransmitter systems. More specifically visual evoked potentials (VEPs) of rats are decreased after acute toluene exposure, leading to the assumption that particularly visual attention processes might be a target of toluene in humans. Therefore a visual change detection task was applied to measure both neurobehavioral and neurophysiological effects by using electroencephalography (EEG) after a single peak exposure to 200 ppm toluene. Performance and event-related components of the EEG were examined before and after exposure in a toluene-exposed and a control group. Thirty-three young healthy volunteers participated in this study. The behavioral results of the experiment indicate that toluene impairs the rate of correct responses especially in task conditions in which an irrelevant distractor is given, while the response times did not differ between both groups. The neurophysiological findings hint toward a less efficient visual processing of behaviorally relevant stimuli and an increased distractibility by irrelevant distractors. Thus the present results are a promising starting point for further research specifically targeting visual attention after toluene exposure and the reconsideration of the presently very heterogeneous STELs.

**Non-Human Toxicity Excerpts:**

>> /LABORATORY ANIMALS: Acute Exposure/ Toluene is a psychoactive chemical found in many household products including adhesives and thinners. Inhalation of these vapors can cause euphoria and impairments in motor control and neurological functioning. Misuse and abuse of toluene is most common in children, which may in part be due to an age-dependent neurobehavioral sensitivity to toluene. Here we assessed the effects of acute binge-like toluene inhalations (15 or 30 min; ~5,000 ppm) on tasks that examine locomotion, exploration, balance, gait, and neurological functioning for adolescent (1 month), young adult (2-3 months), adult (5-6 months), and older adult (10-12 months) rats. Both motor and neurological functions were impaired following acute toluene inhalation at all ages. However, only the duration to recover from deficits in motor functions differed among age groups, with adolescent and young adult rats requiring notably longer recovery times than older rats. Our results are suggestive of an age-dependent vulnerability to the intoxicating effects of toluene.

**Human Toxicity Values:**

Quantitative human toxicity values (e.g., lethal dose) for this compound.

>> Ingestion of approximately 60 mL (625 mg/kg) of toluene proved fatal for a white male mental patient.

**Non-Human Toxicity Values:**

>> LD50 Rat oral 2.6 to 7.5 g/kg

**National Toxicology Program Studies:**

Reports from the National Toxicology Program, an interagency program supported by three government agencies (NIH, FDA, and CDC) within the Department of Health and Human Services. This program plays a critical role in generating, interpreting, and sharing toxicological information about chemicals of public health concerns.

>> Toluene did not induce gene mutations in Salmonella typhimiurium strain TA98, TA100, TA1535, or TA1537 with or without exogenous metabolic activation. In the mouse lymphoma assay, toluene gave an equivocal response with and without exogenous metabolic activation. Toluene did not induce sister chromatid exchanges or chromosomal aberrations in Chinese hamster ovary cells in the presence or absence of exogenous metabolic activation.

**TSCA Test Submissions:**

Under the Toxic Substances Control Act (TSCA), EPA has broad authority to issue regulations designed to require manufacturers (including importers) or processors to test chemical substances and mixtures for health and environmental effects. This section provides information on test reports submitted for this chemical under TSCA.

>> Neurotoxicity was determined in groups of rats (4 male and 4 female, strain not reported) exposed by inhalation to 0,100, or 1500 ppm toluene (purity not reported) 6 hrs/day, 5 days/week for periods up to 27 weeks. Histological sections of selected areas of the brainstem were made for the upper medulla oblongata (including dorsal and ventral cochlear and vestibular nuclei), lower metencephalon (including superior olivary nuclei, trapezoid body and ventral cochlear nuclei), upper metencephalon (including the lateral lemniscus, superior olivary nuclei, cochlear and vestibular nuclei, and inferior colliculus) and the mesencephalon-diencephalon junction (including the medial geniculate). The investigators reported that the "vast majority" of sections from animals exposed to toluene were indistinguishable from

controls. Shrunken and darkly stained neurons were observed in the corpus trapezoid of one animal exposed to 100 ppm and another exposed to 1500 ppm toluene; these were present in only one section and not in sufficient quantity to be considered a positive response by the investigators. Statistical analysis of the results was not reported.

**Populations at Special Risk:**

>> Preclude individuals from exposure to toluene who have central nervous system or liver diseases.

## 12. Ecological Information

**Resident Soil (mg/kg)**

>> 4.90e+03

**Industrial Soil (mg/kg)**

>> 4.70e+04

**Resident Air (ug/m3)**

>> 5.20e+03

**Industrial Air (ug/m3)**

>> 2.20e+04

**Tapwater (ug/L)**

>> 1.10e+03

**MCL (ug/L)**

>> 1.00e+03

**Risk-based SSL (mg/kg)**

>> 7.60e-01

**MCL-based SSL (mg/kg)**

>> 6.90e-01

**Chronic Oral Reference Dose (mg/kg-day)**

>> 8.00e-02

**Chronic Inhalation Reference Concentration (mg/m3)**

>> 5.00e+00

**Volatile**

>> Volatile

**Mutagen**

>> Mutagen

**Fraction of Contaminant Absorbed in Gastrointestinal Tract**

>> 1

**Soil Saturation Concentration (mg/kg)**

>> 8.18e+02

### ICSC Environmental Data:

>> The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. It is strongly advised not to let the chemical enter into the environment.

### Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SEDIMENT: Toluene was identified, not quantified in sediment from rivers near industrial facilities in the US(1,2). USEPA STORET DATABASE: Toluene was detected in 67 of 397 sediment samples at a median concentration of 5.0 ppb dry weight(3). Toluene was detected in 33% of the sediment samples from Lake Pontchartrain, LA at an average concentration of 0.7 ppb wet weight(4). Toluene was detected at concentrations of less than 0.1 ng/g to 1.2 ng/g in

sediment from rivers near Niigata, Japan(5). Toluene was detected in sediment of the Passaic River, NJ at concentrations of 3-250 ug/kg(6).

### Fish/Seafood Concentrations:

Concentrations of this compound in fish or seafood.

>> Flesh of fish from a petroleum contaminated harbor in Japan contained toluene at 5 ppm(1). Toluene was detected in oysters (Crassostrea virginica) from Lake Pontchartrain, LA at an average concentration of 3.4 ppb and in clams (Rangia cuneata) at concentrations of 18 and 11 ppb(2). Toluene was identified, not quantified, in boiled shrimp (Funchalia woodward) and crab (Gerion maritae)(3).

### Average Daily Intake:

The average amount of the compound taken into the body through eating, drinking, or breathing.

>> AIR INTAKE (assume median concn 11 ppb(1)) 843 ug; WATER INTAKE (assume 2 ppb(2)) 4 ug; FOOD INTAKE - insufficient data.

## 13. Disposal Considerations

**Spillage Disposal**

>> Evacuate danger area! Consult an expert! Personal protection: chemical protection suit and self-contained breathing apparatus. Ventilation. Remove all ignition sources. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

**Disposal Methods**

>> Product: Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material; Contaminated packaging: Dispose of as unused product.

>> Generators of waste (equal to or greater than 100 kg/mo) containing this contaminant, EPA hazardous waste numbers U220, and F005 must conform with USEPA regulations in storage, transportation, treatment and disposal of waste.

>> Toluene is a waste chemical stream constituent which may be subjected to ultimate disposal by controlled incineration.

>> A good candidate for liquid injection incineration at a temperature range of 650 to 1,600 °C and a residence time of 0.1 to 2 seconds. A good candidate for rotary kiln incineration at a temperature range of 820 to 1,600 °C and residence times of seconds for liquids and gases, and hours for solids. A good candidate for fluidized bed incineration at a temperature range of 450 to 980 °C and residence times of seconds for liquids and gases, and longer for solids.

>> For more Disposal Methods (Complete) data for TOLUENE (11 total), please visit the HSDB record page.

## 14. Transport Information

**DOT**

Toluene
3
UN Pack Group: II
Reportable Quantity of 1000 lb or 454 kg

**IATA**

Toluene
3,
UN Pack Group: II

## 15. Regulatory Information

## Federal Drinking Water Standards:

Federal drinking water standards (e.g. maximum containment level (MCL)) for this chemical. These standards are legally enforceable.

>> EPA 1000 ug/L

## Federal Drinking Water Guidelines:

Federal drinking water guidelines (e.g. maximum containment level (MCL)) for this chemical. In general, these guidelines are recommendations and not legally enforceable.

>> EPA 1000 ug/L

## State Drinking Water Standards:

State drinking water standards (e.g. maximum containment level (MCL)) for this chemical. These standards are legally enforceable.

>> (CA) CALIFORNIA 150 ug/L

## Clean Water Act Requirements:

The Clean Water Act (CWA) of 1972 establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under CWA, the U.S. Environmental Protection Agency (EPA) developed the Toxic Pollutant List (40 CFR Part 401.15) and the Priority Pollutant List (40 CFR Part 423, Appendix A). These lists are to be used by EPA and States to develop the Effluent Guidelines regulations and ensure water quality criteria and standards.

>> Toxic pollutant designated pursuant to section 307(a)(1) of the Federal Water Pollution Control Act and is subject to effluent limitations.

## TSCA Requirements:

This section provides information on requirements concerning this chemical under the Toxic Substances Control Act (TSCA) of 1976. TSCA provides EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. Certain substances are generally excluded from TSCA, including, among others, food, drugs, cosmetics and pesticides.

>> Pursuant to section 8(d) of TSCA, EPA promulgated a model Health and Safety Data Reporting Rule. The section 8(d) model rule requires manufacturers, importers, and processors of listed chemical substances and mixtures to submit to EPA copies and lists of unpublished health and safety studies. Toluene is included on this list. Effective date: 10/4/82; Sunset date: 10/4/92.

### Regulatory Information

#### The Australian Inventory of Industrial Chemicals

>> Chemical: Benzene, methyl-

#### California Safe Cosmetics Program (CSCP) Reportable Ingredient

>> Hazard Traits - Cardiovascular Toxicity; Developmental Toxicity; Hepatotoxicity and Digestive System Toxicity; Immunotoxicity; Nephrotoxicity and Other Toxicity to the Urinary System; Neurotoxicity; Ocular Toxicity; Ototoxicity; Respiratory Toxicity

>> Authoritative List - ATSDR Neurotoxicants; CA MCLs; CA TACs; CWA 303(c); CWA 303(d); IRIS Neurotoxicants; OEHHA RELs; Prop 65

>> Report - regardless of intended function of ingredient in the product

#### DEA Listed Chemicals

>> List II Chemical: A chemical, other than a List I chemical, specified by regulation that, in addition to legitimate uses, is used in manufacturing a controlled substance in violation of the Act.

#### REACH Registered Substance

>> Status: Active Update: 02-05-2023 https://echa.europa.eu/registration-dossier/-/registered-dossier/15538

>> Status: Cease Manufacture Update: 15-04-2018 https://echa.europa.eu/registration-dossier/-/registered-dossier/24071

#### REACH Restricted Substance

>> Restricted substance: Toluene

>> EC: 203-625-9

**New Zealand EPA Inventory of Chemical Status**

>> Benzene, methyl-: HSNO Approval: HSR001227 Approved with controls

## 16. Other Information

### Toxic Combustion Products:

Toxic products (e.g., gases and vapors) produced from the combustion of this chemical.

>> Special hazards arising from the substance or mixture: Carbon oxides

**Other Safety Information**

**Chemical Assessment**

>> IMAP assessments - Benzene, methyl-: Human health tier II assessment

"The information provided is believed to be accurate but is not comprehensive and should be used as a reference. It reflects our current knowledge and is intended for safety guidance related to the product. This document does not constitute a warranty of the product's properties. Ionz is not responsible for any damages resulting from handling or contact with the product incorrectly."