

MATERIAL SAFETY DATA SHEET

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MSDS-0163
GT Series with Red Safety Liquid
REV DATE: 12/22/92
SUPERSEDES: 10/25/84

SECTION 1 - IDENTIFICATION

PRODUCT (TRADE) NAME: Glass Thermometers with Red Safety Liquid
CHEMICAL FAMILY: Toluene

SUPPLIER: OMEGA ENGINEERING INC.
PO BOX 4047
STAMFORD, CT 06907
TELEPHONE: (203) 359-1660

SECTION 2 - SUBSTANCE IDENTIFICATION

Substance: Toluene **CAS-Number:** 108-88-3

Trade Names/Synonyms:

Benzene, Methyl-; Methylbenzene; Toluol; Methylbenzol; Phenylmethane;
Methacide; STCC 4909305; RCRA U220; UN 1294; T290; T289; T330; T324;
T324S; T324SK; T323; T313; T290SK; T291; T313SK; C7H8

Chemical Family: Hydrocarbon, Aromatic
Molecular Formula: C₆H₅-C-H₃
Molecular Weight: 92.14
Cercla Ratings (Scale 0-3): Health=3 Fire=3 Reactivity=0 Persistence=1
NFPA Ratings (Scale 0-4): Health=2 Fire=3 Reactivity=0

SECTION 3-COMPONENTS AND CONTAMINANTS

Component: Toluene **Percent:** 100.0
CAS# 108-88-3
Other Contaminants: None
Exposure Limits:
100 PPM (377 mg/m³) OSHA TWA; 150 PPM (565 mg/m³) OSHA STEL
50 PPM (188 mg/m³) ACGIH TWA (Skin)
100 PPM (377 mg/m³) NIOSH Recommended TWA;
150 PPM (565 mg/m³) NIOSH Recommended STEL
100 PPM (377 mg/m³) DFG MAK TWA;
500 PPM (1885 mg/m³) DFG MAK 30 minute peak, average value, 2 times/shift

Measurement Method: Charcoal Tube; Carbon Disulfide; Gas
Chromatography with Flame Ionization Detection; (NIOSH Vol. III # 1500,
Hydrocarbons).

1000 Pounds Cercla Section 103 Reportable Quantity

Subject to SARA Section 313 Annual Toxic Chemical Release Reporting subject
to California Proposition 65 Cancer and/or Reproductive Toxicity Warning and
Release Requirements- (January 1, 1991).

**OSHA limits adopted January 19, 1989 are subject to the decision of the 11th
Circuit Court of Appeals
(AFL-CIO V. OSHA) as of July 7, 1992.**

SECTION 4 - PHYSICAL DATA

Description: Clear, colorless liquid with an aromatic odor.

Boiling Point: 231 °F (111 °C) **Melting Point:** -139 °F (-95 °C)

Specific Gravity: 0.8669 **Volatility:** 100% **Vapor Pressure:** 22 mmHg
@ 20 °C

Evaporation Rate: (Butyl Acetate=1) 2.24 **Solubility in Water:** 0.05% @ 20 °C

Odor Threshold: 10-15 PPM **Vapor Density:** 3.14

Solvent Solubility: Soluble in Alcohol, Ether, Benzene, Ligroin, Acetone,
Chloroform, Glacial Acetic Acid, Carbon Disulfide.

SECTION 5- FIRE AND EXPLOSION DATA

Fire And Explosion Hazard:
Dangerous fire hazard when exposed to heat or flame.

Vapors are heavier than air and may travel a considerable distance to a source
of ignition and flash back.

Vapor-air mixtures are explosive.

Due to low electroconductivity of the substance, flow or agitation may generate
electrostatic charges resulting in sparks with possible ignition.

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Flash Point: 40 °F (4 °C) (CC)

Upper Explosive Limit: 7.1%

Lower Explosive Limit: 1.2%

Autoignition Temp.: 896 °F (480 °C)

Flammability Class (OSHA): IB

Firefighting Media:

Dry chemical, carbon dioxide, water spray or regular foam (1990 Emergency Response Guidebook, DOT P 5800.5).

For larger fires, use water spray, fog or regular foam (1990 Emergency Response Guidebook, DOT P 5800.5).

Firefighting:

Move container from fire area if you can do it without risk. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire (1990 Emergency Response Guidebook, DOT P 5800.5, Guide Page 27).

Extinguish only if flow can be stopped; use water in flooding quantities as fog, solid streams may spread fire. Cool containers with flooding amounts of water, apply from as far a distance as possible. Avoid breathing toxic vapors, keep upwind.

Water may be ineffective (NFPA 325M, Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1991).

SECTION 6 - TRANSPORTATION DATA

Department of Transportation Hazard Classification 49-CFR 172.101:
Flammable Liquid

Department of Transportation Labeling Requirements 49-CFR 172.101 and Subpart E:
Flammable Liquid

Department of Transportation Packaging Requirements: 49-CFR 173.119
Exceptions: 49-CFR 173.118

Final Rule on Hazardous Materials Regulations (HMR, 49-CFR Parts 171-180), Docket Numbers HM-181, HM-181A, HM-181B, HM-181C, HM-181D, and HM-204.

Effective Date October 1, 1991. However, compliance with the regulations is authorized on and after January 1, 1991. (55 FR 52402, 12/21/90)

Except for explosives, inhalation hazards, and infectious substances, the effective date for hazard communication requirements is extended to October 1, 1993. (56 FR 47158, 09/18/91)

U.S. Department of Transportation Shipping Name-ID Number, 49 CFR 172.101: Toluene-UN 1294

U.S. Department of Transportation Hazard Class or Division, 49 CFR 172.101:
3 - Flammable Liquid

U.S. Department of Transportation Packing Group, 49 CFR 172.101: PG II

U.S. Department of Transportation Labeling Requirements, 49 CFR 172.101 and Subpart E:
Flammable Liquid

U.S. Department of Transportation Packaging Authorizations:
Exceptions: 49 CFR 173.150
Non-bulk Packaging: 49 CFR 173.202
Bulk Packaging: 49 CFR 173.242

U.S. Department of Transportation Quantity Limitations 49 CFR 172.101:
Passenger Aircraft or Railcar: 5 L
Cargo Aircraft Only: 60 L

SECTION 7 - TOXICITY

Irritation Data: 300 PPM eye-human; 870 UG eye-rabbit mild; 2 mg/24 hours eye-rabbit severe; 100 mg/30 seconds rinsed eye-rabbit mild; 435 mg skin-rabbit mild; 500 mg skin-rabbit moderate; 20mg/24 hours skin-rabbit moderate.

Toxicity data: 200 PPM inhalation-human TCLO; 100 PPM inhalation-man TCLO; >26,700 PPM/1 hour inhalation-rat LC50; 400 PPM/24 hours inhalation-mouse LC50; 55,000 PPM/40 minutes inhalation-rabbit LCLO; 1600 PPM inhala-

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tion-guinea pig LCLO; 12,124 mg/kg skin-rabbit LD50; 50 mg/kg oral-human LDLO; 636 mg/kg oral-rat LD50; 2250 mg/kg subcutaneous-mouse LD50; 1960 mg/kg intravenous-rat LD50; 130 mg/kg intravenous-rabbit LDLO; 500 mg/kg intraperitoneal-guinea pig LD50; 1332 mg/kg intraperitoneal-rat LD50; 59 mg/kg intraperitoneal-mouse LD50; 1750 mg/kg intraperitoneal-mammal LDLO; 6900 mg/kg unreported-rat LD50; 2000 mg/kg unreported-mouse LD50; mutagenic data (RTECS); reproductive effects data (RTECS).

Carcinogen Status: Human inadequate evidence, animal inadequate evidence (IARC Group-3).

Local Effects: Irritant - inhalation, skin, eye.

Acute Toxicity Level: Moderately toxic by ingestion; slightly toxic by inhalation and dermal absorption.

Target Effects: Central nervous system depressant; neurotoxin. Poisoning may also affect the heart, liver, kidneys, and blood.

Additional Data: Stimulants such as epinephrine may induce ventricular fibrillation. Alcohol may enhance the toxic effects. The metabolism of other solvents may be inhibited resulting in a potentiation of toxic effects of those chemicals. Uptake is directly proportional to the amount of body fat. Blood levels may be cumulative when exposure is extended.

SECTION 8 HEALTH EFFECTS AND FIRST AID

INHALATION:

Irritant/Narcotic/Neurotoxin

2000 PPM immediately dangerous to life or health.

Acute exposure - Odor detection may be insufficient for warning due to olfactory fatigue. Exposure to 100 PPM may cause irritation. 200-600 PPM for up to 8 hours caused fatigue, weakness, confusion, headache, nausea, impaired coordination and reaction time, paresthesias of the skin, euphoria, dizziness, and dilated pupils. 800 PPM cause rapid irritation, nasal mucous secretion, metallic taste, drowsiness, and impaired balance. Aftereffects including nervousness, muscular fatigue, and insomnia lasted for several days. A worker found unconscious after exposure to high vapor concentration for 18 hours developed hepatic and renal damage with myoglobinuria. Recovery was complete within 6 months. Hematologic effects occur rarely with exposure to high concentrations. Death may be due to respiratory failure or ventricular fibrillation.

Chronic exposure - Prolonged or repeated exposure may cause mucous membrane irritation, vomiting, insomnia, nosebleeds, chest pains, euphoria, headache, vertigo, nausea, anorexia, momentary loss of memory, loss of coordination and impairment of reaction time, tinnitus, impaired speech, vision, and/or hearing, alcohol intolerance, and petechiae and abnormal bleeding. Bone marrow hypoplasia and leukopenia have been reported occasionally, but may be due to benzene contamination.

Examination of workers exposed to 100-1100 PPM revealed hepatomegaly, mild macrocytosis, moderate erythropenia, and absolute lymphocytosis but no leukopenia. Other workers exposed to toluene fumes developed leukopenia and especially neutropenia. Within 6 months, they showed decreased prothrombin level and increased coagulation time. Periodontal effects were also noted.

Volunteers exposed to 200 PPM for 6 hours/day for 2 days showed a significant increase in heart rate. Cardiac sensitization may occur and may result in cardiac arrest due to ventricular fibrillation.

Repeated inhalation to the point of euphoria has caused irreversible encephalopathy with cerebellar ataxia, rhythmic limb movements, disequilibrium, bizarre behavior, emotional lability, optic atrophy, and diffuse cerebral atrophy. Other neuropsychiatric effects may include dizziness, syncope, paresthesias peripheral neuropathy, hallucinations, lethargy, and coma. Intentional sniffing can produce renal tubular defects with metabolic acidosis, electrolyte abnormalities and potassium loss. Severe muscle weakness leading to limb paralysis and cardiac arrhythmias may result from the hypokalemia; however, sensory function and tendon reflexes are not impaired. Gastrointestinal effects may include abdominal pain, nausea, vomiting, and hematemesis. Chromosome changes were observed in some workers up to two years after cessation of exposure to toluene. Women occupationally exposed to toluene and other varnish solvents have reported menstrual disorders, underweight offspring who did not nurse well, and fetal asphyxia. One case study indicated toluene apparently crossed the placenta and created cerebellar damage in an unborn infant. Dysmenorrhea has been reported in women occupationally exposed to toluene levels of 60-100 PPM. Reproductive effects have also been reported in animals.

First Aid - Remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep person warm and at rest. Treat symptomatically and supportively. Get medical attention immediately.

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SKIN CONTACT:

Irritant.

Acute Exposure - Contact with the liquid may cause irritation. Vapors may cause drying. Skin absorption does occur, but it is generally too slow to produce signs of acute systemic toxicity.

Chronic Exposure - Prolonged or repeated contact with the liquid may cause defatting of the skin with a dry fissured dermatitis. Repeated application to rabbit skin produced slight to moderate irritation and slight necrosis. Topical application of 10 gm/kg produced an increase in plasmic and lymphoid reticular cells in bone marrow of rats, while 1 gm/kg had no effect.

First Aid - Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (approximately 15-20 minutes). Get medical attention immediately.

EYE CONTACT:

Irritant.

Acute Exposure - Liquid may cause irritation and corneal burns if not promptly removed. Concentrations around 300-800 PPM may cause noticeable irritation and lacrimation. Corneal lesions and very fine vacuoles have been reported in workers exposed to a solvent containing toluene. The lesions subsided following several days of non-exposure. Similar lesions have been produced in cats following exposure to toluene.

Chronic Exposure - Repeated or prolonged contact with irritants may cause conjunctivitis.

First Aid - Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (approximately 15-20 minutes). Get medical attention immediately.

INGESTION:

Narcotic.

Acute Exposure - May cause a burning sensation in the epigastrium and abdominal spasms. Systemic effects may occur as described in acute inhalation. Aspiration of the liquid into the lungs may cause coughing, gagging, distress, acute hemorrhagic pneumonitis, and rapidly developing pulmonary edema. The approximate lethal dose in humans is 15-30 ml.

Chronic Exposure - No effects were reported in rats fed up to 590 mg/kg/day for 193 days. Administration to animals during gestation produced significant embryolethality and an increase in cleft palate in offspring.

First Aid - Extreme care must be used to prevent aspiration. Gastric lavage with a cuffed endotracheal tube in place to prevent further aspiration should be done within 15 minutes. In the absence of depression or convulsions or impaired gag reflex, emesis can also be induced using syrup of ipecac without increasing the hazard of aspiration (Dreisbach, Handbook of Poisoning, 12th Ed.). Treat symptomatically and supportively. Gastric lavage should be performed by qualified medical personnel. Get medical attention immediately.

Antidote: No specific antidote. Treat symptomatically and supportively.

SECTION 9 REACTIVITY

Reactivity:

Stable under normal temperatures and pressures.

Incompatibilities:

Allyl chloride + dichloroethyl aluminum or ethylaluminum sesquichloride: possible explosion.

Bromine trifluoride (solid): violent reaction.

1,3-dichloro-5,5-dimethyl-2,4-imidazolidinedione: explosive reaction.

Dinitrogen tetrafluoride: forms explosive mixture.

Nitric acid: vigorous reaction.

Nitric acid + sulfuric acid: violent decomposition possible.

Nitrogen tetroxide: explosive reaction.

Oxidizers (strong): fire and explosion hazard.

Plastics, rubber, and coatings: may be attacked.

Silver perchlorate: forms shock-sensitive mixture.

Sulfur dichloride: violent reaction, greatly accelerated in the presence of iron or ferric chloride.

Sulfuric acid: exothermic reaction.

Tetranitromethane: forms explosive mixture.

Uranium hexafluoride: violent reaction.

Decomposition:

Thermal decomposition may release acrid smoke and irritating fumes.

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Polymerization:

Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

SECTION10 STORAGE AND DISPOSAL

Observe all federal, state and local regulations when storing or disposing of this substance. For assistance, contact the District Director of the Environmental Protection Agency.

Storage:

Store in accordance with 29 CFR 1910.106.

Protect against physical damage. Outside or detached storage is preferable. Inside storage should be in a standard flammable liquids storage room or cabinet, separate from oxidizing materials (NFPA 49, Hazardous Chemicals Data, 1975).

Bonding and Grounding: Substances with low electroconductivity ignited by electrostatic sparks, should be stored in containers which meet the bonding and grounding guidelines specified in NFPA-77-1983, Recommended Practice on Static Electricity.

Store away from incompatible substances.

Disposal:

Disposal must be in accordance with standards applicable to Generators of Hazardous Waste, 40CFR 262, EPA Hazardous Waste Number U220.

SECTION 11 CONDITIONS TO AVOID

Avoid contact with heat, sparks, flames, or other sources of ignition. Vapors may be explosive. Avoid overheating of containers; containers may violently rupture in heat of fire. Avoid contamination of water sources.

SECTION12 SPILL AND LEAK PROCEDURES

Soil Spill:

Dig holding area such as lagoon, pond or pit for containment.

Dike flow of spilled material using soil or sandbags or foamed barriers such as polyurethane or concrete.

Use cement powder or fly ash to absorb liquid mass.

Immobilize spill with universal gelling agent.

Reduce vapor and fire hazard with appropriate foam.

Air Spill:

Knock down vapors with water spray. Keep upwind.

Water Spill:

If material dissolved, apply activated carbon. Use dredges or lifts to extract masses of pollution and precipitates. Apply universal gelling agent to immobilize trapped spill and increase efficiency of removal. Limit spill motion and dispersion with natural barriers or oil spill control booms. Use soaps, detergents, alcohols or other surface active agent to thicken spilled material. Use suction hoses to remove trapped spill material.

The California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) prohibits contaminating any known source of drinking water with substances known to cause cancer and/or reproductive toxicity.

Occupational Spill:

Shut off ignition sources. Stop leak if you can do it without risk. Use water spray to reduce vapors. For small spills, take up with sand or other absorbent material and place into containers for later disposal. For larger spills, dike far ahead of spill for later disposal. No smoking, flames or flares in hazard area. Keep unnecessary people away; isolate hazard area and restrict entry.

Reportable Quantity (RQ): 1000 pounds

The Superfund Amendments and Reauthorization Act (SARA) Section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local Emergency Planning Committee and the State Emergency Response Commission (40 CFR 355.40). If the release of this substance is reportable under Cercla Section 103, the National Response Center must be notified immediately at (800) 424-8802 or (202) 426-2675 in the Metropolitan Washington D.C. area. (40 CFR 302.6).

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SECTION13 PROTECTIVE EQUIPMENT

Ventilation:

Provide local exhaust or general dilution ventilation to meet published exposure limits. Ventilation equipment must be explosion-proof.

Respirator:

The following respirators and maximum use concentrations are recommendations by the U.S. Department of Health and Human Services, NIOSH Pocket Guide to Chemical Hazards; NIOSH Criteria Documents or by the U.S. Department of Labor, 29 CFR 1910 Subpart Z.

The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA)

Toluene:

1000 PPM-	Any chemical cartridge respirator with organic vapor cartridge(s). Any supplied-air respirator. Any powered air-purifying respirator with organic vapor cartridge(s). Any self-contained breathing apparatus.
2000 PPM-	Any supplied-air respirator operated in a continuous flow mode. Any self-contained breathing apparatus with a full facepiece. Any supplied-air respirator with a full facepiece. Any air-purifying full facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister.
Escape-q	Any air-purifying, full facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister. Any appropriate escape-type, self-contained breathing apparatus.

For firefighting and other immediately dangerous to life or health conditions:

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure demand or other positive-pressure mode.

Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Clothing:

Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.

Gloves:

Employee must wear appropriate protective gloves to prevent contact with this substance.

Eye Protection:

Employee must wear splash-proof or dust-resistant safety goggles to prevent eye contact with this substance.

Emergency Eye Wash:

Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use.

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