DUPONT

MATERIAL SAFETY DATA SHEET

MATERIAL IDENTIFICATION

O-TOLUIDINE

MSDS NUMBER : DU000271

Revision Date : 04-Oct-90
Date Printed : 04-Oct-90

MANUFACTURER/DISTRIBUTOR

Du Pont
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS

PRODUCT INFORMATION	: 1-(800)441-7515
TRANSPORT EMERGENCY	: 1-(800)424-9300
MEDICAL EMERGENCY	: 1-(800)441-3637

GRADE : TECHNICAL; S-2 TECHNICAL
CHEMICAL FAMILY : AROMATIC AMINE

TRADE NAMES / SYNONYMS

O-AMINOTOLUENE
2-AMINOTOLUENE
O-METHYLANILINE
2-METHYLANILINE
O-METHYLBENZENAMINE
2-METHYLBENZENAMINE
2-METHYLPHENYLAMINE
2-TOLUIDINE
O-TOLYLAMINE

CAS NAME : BENZENAMINE, 2-METHYL-
CAS NUMBER : 95-53-4
FORMULA : CH3C6H4NH2
MOLECULAR WEIGHT : 107.15
TSCA INVENTORY STATUS : Reported/Included
NFPA RATINGS : Health: 3 Flammability: 2 Reactivity: 0
NPCA-HMIS RATINGS : Health: 2 Flammability: 2 Reactivity: 0
Personal Protection rating to be supplied by user depending on use conditions.

COMPONENTS

Material	CAS Number	%
*O-TOLUIDINE	95-53-4	99.5
P-TOLUIDINE	106-49-0	0.5

* Regulated as a toxic chemical under section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

PHYSICAL DATA

Boiling Point	: 200 deg C (392 deg F) at 760 mm Hg.
Vapor Pressure	: 0.26 mm Hg at 25 deg C (77 deg F)
	: 0.66 mm Hg at 38 deg C (100 deg F)
Vapor Density	: 3.7 (Air = 1.0)
Freezing Point	: -16 deg C (3 deg F)
Evaporation Rate	: (Butyl Acetate = 1.0) Less than 1
Water Solubility	: 1.5 WT % at 25 deg C
pH	: 8.0 (Water extract)
Odor	: Aromatic amine
Form	: Oily liquid
Color	: Pale yellow (straw color)
Specific Gravity	: 1.0 at 20 deg C

HAZARDOUS REACTIVITY

Instability	: Stable at normal temperatures and storage conditions.
Incompatibility	: Incompatible with oxidizing agents; reacts vigorously with acids.
Decomposition	: Decomposes if overheated; may release hazardous nitrogen oxide gases.
Polymerization	: Polymerization will not occur.

FIRE AND EXPLOSION DATA

Flash [redacted]	: 85 deg C (185 deg F)
Method	: SFCC
Flammable Limits In Air, % by Volume	
[redacted]	: 1.5
Autoignition	: 482 deg C (900 deg F)

Actual AIT's can be affected by the concentration of vapors and oxygen, vapor/air contact time, pressure, volume, catalytic impurities, etc. Process conditions should be analyzed to determine if the AIT's may be higher or lower.

(FIRE AND EXPLOSION DATA - Continued)

FIRE AND EXPLOSION HAZARDS
OSHA Class III A Combustible Liquid.

Follow appropriate National Fire Protection Association (NFPA) codes.

EXTINGUISHING MEDIA
Small fires: Dry chemical, carbon dioxide (CO2).
Large fires: Water spray, fog, or foam.

SPECIAL FIRE FIGHTING INSTRUCTIONS
Evacuate personnel to a safe area. Keep personnel removed & upwind of fire. Cool tank/container with water spray.

Fight fire from maximum distance. If smoke and fumes cannot be avoided, wear chemical-proof suit with hood and breathing air supply. Run-off from fire may cause pollution.

HEALTH HAZARD INFORMATION

Causes eye burns. Causes skin irritation. Harmful if inhaled, swallowed, or absorbed through skin; reduces blood's oxygen carrying capacity. Symptoms may be delayed. May cause cancer based on tests with laboratory animals.

ANIMAL DATA:

o-Toluidine

Inhalation 4-hour LC50	:	862 ppm in rats
Skin Absorption LD50	:	3250 mg/kg in rabbits
Oral LD50	:	940 mg/kg in rats

The compound is a severe eye irritant and a mild skin irritant. Toxic effects described in animals from a single inhalation exposure included lethargy, prostration, weight loss, labored breathing, tremors and cyanosis. By ingestion, the effects included restlessness, depression, accelerated respiration, methemoglobinemia, reticulocytosis, and anemia. The effects of repeated ingestion exposures included blood changes (methemoglobinemia, reticulocytosis, erythropenia), congestion of the spleen, and bone marrow hyperplasia.

A carcinogenic response has been noted in some animals. One study suggested an association between skin absorption of o-toluidine and developmental effects in rats. However, because of the lack of detail, the developmental toxicity cannot be evaluated. Tests for reproductive effects in animals have not been performed.

In some tests, o-toluidine produced genetic damage in

(HEALTH HAZARD INFORMATION - Continued)

bacterial and mammalian cell cultures, as well as in tests on animals. In other tests, using the same procedures, no genetic damage was reported. It has not been tested for heritable genetic damage.

p-Toluidine

Inhalation 1-hour ALC	:	>0.64 mg/L in rats
Skin Absorption LD50	:	890 mg/kg in rabbits
Oral LD50	:	326 mg/kg in rats

The compound is a severe eye and skin irritant, but is not a skin sensitizer in animals. Toxic effects described in animals from single exposures by inhalation, ingestion, or skin contact include liver, kidney, and bladder effects and irritation of mucosal surfaces. No carcinogenic response has been observed in most animal studies, but a weak carcinogenic response has been observed in one study with mice. Tests in bacterial or mammalian cell cultures demonstrate no mutagenic activity.

HUMAN HEALTH EFFECTS:

Human health effects of overexposure to the product by eye or skin contact may include eye corrosion with corneal or conjunctival ulceration; or skin irritation with discomfort or rash. Evidence suggests that skin permeation can occur in amounts capable of producing systemic toxicity. By inhalation or ingestion, the effects of overexposure may include nonspecific discomfort such as nausea, headache, or weakness; abnormal kidney function as detected by laboratory tests; abnormal kidney function with bloody urine or flank pain. Higher exposures may cause methemoglobinemia (reduced oxygen carrying capacity of the blood) with headache, weakness, or cyanosis (bluish discoloration of the skin) possibly progressing to dizziness, incoordination, shortness of breath, increased pulse rate, and loss of consciousness.

Results of epidemiology studies do not show a clear association between exposure to o-toluidine and bladder cancer. An increased incidence of bladder cancer has been shown in industries where mixed exposures to dyestuffs and their intermediates are identified.

Individuals with preexisting diseases of the cardiovascular system, bone marrow, or kidneys may have increased susceptibility to the toxicity of excessive exposures.

(HEALTH HAZARD INFORMATION - Continued)

CARCINOGENICITY
The following components are listed by IARC, NTP, OSHA, or ACGIH as carcinogens. A 'P' indicates a Proposed Carcinogen.

Material	IARC	NTP	OSHA	ACGIH
O-TOLUIDINE	X	X		X
P-TOLUIDINE				X

Du Pont controls the following materials as potential carcinogens : O-TOLUIDINE.

EXPOSURE LIMITS
O-TOLUIDINE

AEL * (Du Pont): 5 ppm - 8 Hr. TWA - Skin
TLV (ACGIH) : 2 ppm, 8.8 mg/m3 (A2) - 8 Hr TWA - Skin
PEL (OSHA) : 5 ppm, 22 mg/m3 - 8 Hr TWA - Skin
Other : In its "Notice of Intent to Establish", the ACGIH gives a BEI for methemoglobin inducers of 1.5% methemoglobin in blood.

OTHER APPLICABLE EXPOSURE LIMITS
P-TOLUIDINE

AEL * (Du Pont): None Established
TLV (ACGIH) : 2 ppm - A2, 8.8 mg/m2 - A2, skin - 8 Hr TWA
PEL (OSHA) : 2 ppm, 9 mg/m3 - 8 Hr TWA, skin

* AEL is Du Pont's Acceptable Exposure Limit.

SAFETY PRECAUTIONS
Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

FIRST AID

IN CASE OF CONTACT: Immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse and destroy contaminated shoes.

IF INHALED: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

IF SWALLOWED: Immediately give two glasses of water and induce vomiting. Call a physician. Never give anything by mouth to an unconscious person.

(FIRST AID - Continued)

NOTES TO PHYSICIAN

Absorption of this product into the body leads to the formation of methemoglobin which, in sufficient concentration, causes cyanosis. In case of skin absorption, symptoms may be delayed. Since reversion of methemoglobin to hemoglobin occurs spontaneously after termination of exposure, moderate degrees of cyanosis need be treated only by supportive measures such as bed rest and oxygen inhalation. Thorough cleansing of the entire contaminated area of the body including scalp and nails is of utmost importance. If cyanosis is severe, intravenous injection of methylene blue, 1 mg/kg body weight, may be of value. Cyanocobalamin (Vitamin B-12), 1 mg intramuscularly, will speed recovery. Intravenous fluids and blood transfusions may be indicated in very severe exposures.

PROTECTION INFORMATION

GENERALLY APPLICABLE CONTROL MEASURES AND PROCEDURES

Use ventilation that is adequate to keep airborne vapor concentration below the exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Have available and wear as appropriate for exposure conditions: chemical splash goggles, safety glasses (side shields preferred); face shield; butyl rubber footwear; butyl rubber pants, jacket, apron; neoprene or neoprene coated gloves (for routine work) or butyl rubber gauntlet gloves (for possible liquid contact); or flame resistant work clothing if handling material above its flashpoint; and NIOSH/MSHA approved respiratory protection. If there is potential for direct exposure, wear a chemical proof suit with hood and breathing air supply.

DISPOSAL INFORMATION

SPILL, LEAK, OR RELEASE

NOTE: Review FIRE AND EXPLOSION HAZARDS and SAFETY PRECAUTIONS before proceeding with clean up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean up.

Evacuate area and keep upwind of spill. Contain spill with sand or earth dam, soak up with sand or other noncombustible absorbant and transfer to a covered metal container for disposal. Flush area with detergent and water. Water spray may be used to control and disperse vapors. Comply with Federal, State, and local regulations on reporting releases.

The EPA Reportable Quantity is 100 lbs.

(DISPOSAL INFORMATION - Continued)

WASTE DISPOSAL

This material may be a RCRA Hazardous Waste on disposal. Comply with Federal, State, and local regulations. If approved, may be incinerated, sent to an approved hazardous material disposal area, or transferred to a disposal contractor. Very dilute solutions are biodegradable by specially acclimated bacteria.

SHIPPING INFORMATION

DOT

Proper Shipping Name : RQ, COMBUSTIBLE LIQUID N.O.S. (ORTHO-TOLUIDINE)
Hazard Class : COMBUSTIBLE LIQUID
UN/NA No. : NA 1993
DOT Placard : COMBUSTIBLE

DOT/IMO

Proper Shipping Name : ORTHO-TOLUIDINE
Hazard Class : POISON, 6.1
UN No. : 1708
DOT/IMO Label : POISON
Special Information: FLASH POINT: 185 F

Shipping Containers
Tank Car
Tank Truck
Drums

Reportable Quantity: 100 lb/45.4 kg

STORAGE CONDITIONS

Store in well ventilated area. Keep container tightly closed.

Store away from heat, sparks, and flame. Keep container upright and handle in a manner to prevent human contact.

TITLE I[redacted] CLASSIFICATIONS

Acute : Yes
Chronic : Yes
Fire : Yes
Reactivity : No
Pressure : No

(TITLE III HAZARD CLASSIFICATIONS - Continued)

LISTS:

Extremely Hazardous Substance	-No
CERCLA Hazardous Substance	-Yes
Toxic Chemical	-Yes

CANADIAN WHMIS CLASSIFICATION
B-3; D-1A; D-2A; D-2B

The State of California lists o-Toluidine and p-Toluidine as substances known to cause cancer.

ADDITIONAL INFORMATION AND REFERENCES

For further information, see DuPont "o-Toluidine, Technical" Data Sheet.

Responsibility for MSDS : W. J. Brock
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# Indicates updated section.

End of MSDS