

1. Material Identification

Product Name : N,N-Dimethylaniline

Catalog Number : io-2240

CAS Number : 121-69-7

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)

Pictogram(s)



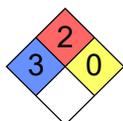
GHS Hazard Statements

- >> H252 (58.9%): Self-heating in large quantities; may catch fire [Warning Self-heating substances and mixtures]
- >> H317 (58.9%): May cause an allergic skin reaction [Warning Sensitization, Skin]
- >> H318 (77.3%): Causes serious eye damage [Danger Serious eye damage/eye irritation]
- >> H400 (98.77%): Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard]
- >> H410 (100%): Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

- >> P235, P261, P264+P265, P272, P273, P280, P302+P352, P305+P354+P338, P317, P321, P333+P317, P362+P364, P391, P407, P410, P413, P420, and P501

NFPA 704 Diamond



NFPA Health Rating

- >> 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

NFPA Fire Rating

- >> 2 - Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air.

NFPA Instability Rating

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

Health Hazards:

>> Excerpt from ERG Guide 153 [Substances – Toxic and/or Corrosive (Combustible)]:

>> TOXIC and/or CORROSIVE; inhalation, ingestion or skin contact with material may cause severe injury or death. Methyl bromoacetate (UN2643) is an eye irritant/lachrymator (causes flow of tears). Contact with molten substance may cause severe burns to skin and eyes. Avoid any skin contact. Fire may produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may be corrosive and/or toxic and cause environmental contamination. (ERG, 2024)

ERG 2024, Guide 153 (N,N-Dimethylaniline)

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>> Excerpt from ERG Guide 153 [Substances – Toxic and/or Corrosive (Combustible)]:

>> Combustible material: may burn but does not ignite readily. When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards. Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Corrosives in contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Runoff may pollute waterways. Substance may be transported in a molten form. (ERG, 2024)

ERG 2024, Guide 153 (N,N-Dimethylaniline)

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>> When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.

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

>> Corrosives in contact with metals may evolve flammable hydrogen gas.

>> Containers may explode when heated.

>> Runoff may pollute waterways.

>> Substance may be transported in a molten form.

>> Combustible. Gives off irritating or toxic fumes (or gases) in a fire. Above 62 °C explosive vapour/air mixtures may be formed.

3. Composition/Information On Ingredients

Chemical name : N,N-Dimethylaniline

CAS Number : 121-69-7

Molecular Formula : C8H11N

Molecular Weight : 121.1800 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. IMMEDIATELY call a hospital or poison control center even if no

symptoms (such as redness or irritation) develop. IMMEDIATELY transport the victim to a hospital for treatment after washing the affected areas.

- >> INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. IMMEDIATELY call a physician and be prepared to transport the victim to a hospital even if no symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop. 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.
- >> OTHER: Since this chemical is a known or suspected carcinogen you should contact a physician for advice regarding the possible long term health effects and potential recommendation for medical monitoring. Recommendations from the physician will depend upon the specific compound, its chemical, physical and toxicity properties, the exposure level, length of exposure, and the route of exposure. (NTP, 1992)

ERG 2024, Guide 153 (N,N-Dimethylaniline)

- >> 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 ingested or 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 continuous compressions. 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:
 - >> For corrosives, in case of contact, immediately flush skin or eyes with running water for at least 30 minutes. Additional flushing may be required.
 - >> Removal of solidified molten material from skin requires medical assistance.
 - >> In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping paper and/or the "ERAP" section.

First Aid Measures

Inhalation First Aid

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

Skin First Aid

- >> Remove contaminated clothes. Rinse skin with plenty of water or shower.

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 a slurry of activated charcoal in water to drink. Rest. Refer for medical attention .

5. Fire Fighting Measures

- >> Excerpt from ERG Guide 153 [Substances – Toxic and/or Corrosive (Combustible)]:
- >> SMALL FIRE: Dry chemical, CO2 or water spray.
- >> LARGE FIRE: Dry chemical, CO2, alcohol-resistant foam or water spray. If it can be done safely, move undamaged containers away from the area around the fire. Dike runoff from fire control for later disposal.
- >> FIRE INVOLVING TANKS, RAIL TANK CARS OR HIGHWAY TANKS: Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles. Do not get water inside containers. 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. (ERG, 2024)
- >> Use water spray, powder, foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.

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 153 [Substances – Toxic and/or Corrosive (Combustible)]:
- >> IMMEDIATE PRECAUTIONARY MEASURE: Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- >> SPILL: Increase the immediate precautionary measure distance, in the downwind direction, as necessary.
- >> 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 153 (N,N-Dimethylaniline)

- >> Immediate precautionary measure
- >> Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- >> Spill
- >> For non-highlighted materials: increase the immediate precautionary measure distance, in the downwind direction, as necessary.
- >> 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.

- >> Personal protection: chemical protection suit. Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable metal or glass 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 153 (N,N-Dimethylaniline)

- >> 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 153 (N,N-Dimethylaniline)

- >> ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.
- >> Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- >> Stop leak if you can do it without risk.
- >> Prevent entry into waterways, sewers, basements or confined areas.
- >> Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- >> DO NOT GET WATER INSIDE CONTAINERS.

7. Handling And Storage

Safe Storage:

- >> Separated from strong oxidants and food and feedstuffs. Ventilation along the floor.

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.

8. Exposure Control/ Personal Protection

REL-TWA (Time Weighted Average)

- >> 5 ppm (25 mg/m³)

REL-STEL (Short Term Exposure Limit)

- >> 10 ppm (50 mg/m³)
- >> TWA 5 ppm (25 mg/m³) ST 10 ppm (50 mg/m³) [skin]
- >> 5.0 [ppm]

PEL-TWA (8-Hour Time Weighted Average)

- >> 5 ppm (25 mg/m³)
- >> 5.0 [ppm]

TLV-STEL

- >> 10.0 [ppm]
- >> 5 ppm as TWA; 10 ppm as STEL; (skin); A4 (not classifiable as a human carcinogen); BEI issued.

TLV-TWA (Time Weighted Average)

- >> 5 ppm [1990]

TLV-STEL (Short Term Exposure Limit)

- >> 10 ppm [1990]

MAK (Maximale Arbeitsplatz Konzentration)

- >> 25 mg/m

Emergency Response: ERG 2024, Guide 153 (N,N-Dimethylaniline)

- >> Small Fire
- >> Dry chemical, CO₂ or water spray.
- >> Large Fire

- >> Dry chemical, CO₂, alcohol-resistant foam or water spray.
- >> If it can be done safely, move undamaged containers away from the area around the fire.
- >> Dike runoff from fire control for later disposal.
- >> Fire Involving Tanks, Rail Tank Cars or Highway Tanks
- >> Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles.
- >> Do not get water inside containers.
- >> 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.

Inhalation Risk:

- >> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20 °C.

Effects of Short Term Exposure:

- >> If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the blood. This may result in the formation of methaemoglobin. Exposure far above the OEL could cause lowering of consciousness. The effects may be delayed. Medical observation is indicated.

Effects of Long Term Exposure:

- >> Repeated or prolonged contact with skin may cause dermatitis.

Fire Prevention

- >> NO open flames. NO contact with oxidizing agents. Above 62 °C use a closed system and ventilation.

Inhalation Prevention

- >> Use ventilation, local exhaust or breathing protection.

Skin Prevention

- >> Protective gloves. Protective clothing.

Eye Prevention

- >> Wear face shield or eye protection in combination with breathing protection.

Ingestion Prevention

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

Exposure Control and Personal Protection

Protective Clothing: ERG 2024, Guide 153 (N,N-Dimethylaniline)

- >> Wear positive pressure self-contained breathing apparatus (SCBA).
- >> Wear chemical protective clothing that is specifically recommended by the manufacturer when there is NO RISK OF FIRE.
- >> Structural firefighters' protective clothing provides thermal protection but only limited chemical protection.

Exposure Summary

- >> Biological Exposure Indices (BEI) [ACGIH] - Methemoglobin in blood = 1.5% of hemoglobin during or at end of shift. [ACGIH]

Maximum Allowable Concentration (MAK)

- >> 5.0 [ppm]

9. Physical And Chemical Properties

Molecular Weight:

- >> 121.18

Exact Mass:

- >> 121.089149355

Physical Description:

>> N,n-dimethylaniline appears as a yellow to brown colored oily liquid with a fishlike odor. Less dense than water and insoluble in water. Flash point 150 °F. Toxic by ingestion, inhalation, and skin absorption. Used to make dyes and as a solvent.

>> YELLOW OILY LIQUID WITH CHARACTERISTIC ODOUR. TURNS BROWN ON EXPOSURE TO AIR.

Color/Form:

>> Pale-yellow, oily liquid [Note: A solid below 36 degrees F]

Odor:

>> Amine-like odor

Boiling Point:

>> 381 °F at 760 mmHg (NTP, 1992)

>> 192-194 °C

Melting Point:

>> 36.4 °F (NTP, 1992)

>> 2.5 °C

Flash Point:

>> 145 °F (NTP, 1992)

>> 62 °C

Solubility:

>> less than 1 mg/mL at 70 °F (NTP, 1992)

>> Solubility in water: none

Density:

>> 0.9557 at 68 °F (NTP, 1992) - Less dense than water; will float

>> Relative density (water = 1): 0.96

Vapor Density:

>> 4.17 (NTP, 1992) - Heavier than air; will sink (Relative to Air)

>> Relative vapor density (air = 1): 4.2

Vapor Pressure:

>> 1 mmHg at 85.1 °F (NTP, 1992)

>> Vapor pressure, Pa at 20 °C: 67

LogP:

>> log Kow = 2.31

>> 2.3

Stability/Shelf Life:

>> Stable under recommended storage conditions.

Autoignition Temperature:

>> 700 °F (NTP, 1992)

>> 371 °C

Decomposition:

>> When heated to decomposition it emits highly toxic fumes of aniline and NOx.

Viscosity:

>> 1.300 mPa.s at 25 °C

Heat of Vaporization:

>> 52.83 kJ/mol at 25 °C

Surface Tension:

>> 35.52 mN/m at 25 °C

Ionization Potential:

>> 7.14 eV

Ionization Efficiency:

The ratio of the number of ions formed to the number of electrons or photons used in an ionization process.

Ionization mode

>> Positive

logI_E

>> 3.43

pH

>> 2.7

Instrument

>> Agilent XCT

Ion source

>> Electrospray ionization

Additive

>> formic acid (5.3nM)

Organic modifier

>> MeCN (80%)

Reference

>> DOI:10.1007/s13361-016-1563-1

Odor Threshold:

>> Odor Threshold Low: 0.001 [mmHg]

>> Odor Threshold High: 0.2 [mmHg]

>> Odor threshold from AIHA

Refractive Index:

>> Index of refraction: 1.5582 at 20 °C/D

Dissociation Constants:

>> pK_a = 5.07 at 25 °C

10. Stability And Reactivity

>> Insoluble in water.

11. Toxicological Information

Toxicity Summary:

>> IDENTIFICATION AND USE: N,N-Dimethylaniline is a pale-yellow, oily liquid with amine-like odor that solidifies below 36 degrees F. It is used as a solvent; an intermediate in the manufacture of vanillin, methyl violet, other dyes, and Michler's ketone; as a reagent; as a catalytic hardener in certain fiberglass resins; and as an acid scavenger or acceptor in the manufacture of semisynthetic penicillins and cephalosporins. HUMAN EXPOSURE AND TOXICITY: N,N-Dimethylaniline has been reported to be quantitatively less toxic than aniline but produces a very similar effect notably, methemoglobinemia. The human lethal oral dose is 50 mg/kg. Short-term exposure: contact may irritate or burn the eyes, and may irritate the nose and throat. It can be absorbed through the skin, thereby increasing exposure. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonia. The chemical may affect the blood, resulting in formation of methemoglobin. Symptoms of anoxia, cyanosis, weakness, dizziness, ataxia. Symptoms may be delayed. Long term exposure: repeated or prolonged contact with skin may cause dermatitis. While this chemical has not been identified as a reproductive hazard, there are some evidence that women working with aniline, a related

compound, have a higher incidence of reproductive cycle disorders and abortions. There are case reports of two workers who showed symptoms very similar to aniline poisoning. One of the workers, who was exposed for only a few minutes to hot vapors from a vat containing dimethylaniline and phenol, collapsed immediately, was unconscious for 8 hours, and complained of visual disturbances, noise in the ears, and intense abdominal pain. The other worker was less severely poisoned after 7 hours of baling dimethylaniline from one container to another. The compound was not irritating when approximately 0.1 g of petrolatum containing 0.6% N,N-Dimethylaniline was applied to the backs of human subjects for 24 hours. There is inadequate evidence in humans for the carcinogenicity of N,N-dimethylaniline. ANIMAL STUDIES: When mice were injected with 65 mg/kg N,N-Dimethylaniline for 3 days, 1.8 % metHb and 2.0 % sulfhemoglobin were found in the blood 48 hours after the last dose. Rats inhaling dimethylaniline at 0.3 mg/cu m for 24 hours/day for 100 days showed significant changes in the central nervous system, blood, and liver, including changes in the correlation of muscle antagonist chronaxy, a reduced number of erythrocytes and hemoglobin, increased methemoglobin level, reticulocytosis, leukopenia, hypoproteinemia, a reduced sulfhydryl group content in the serum, and accumulation of pyruvic acid in the liver and serum. Dimethylaniline increased the coproporphyrin urinary excretion and reduced the adrenal ascorbic acid level. Dimethylaniline at 0.005 mg/cu m did not change the above parameters. In other experiments, splenomegaly was observed in rats and mice given a daily dose of up to 500 mg of N,N-dimethylaniline/kg body weight 5 days/wk for 13 wk. Microscopic examination revealed the presence of hemosiderosis and hematopoiesis in the spleens, livers, and kidneys of treated rats and mice. Bone marrow hyperplasia was noted in treated rats but not mice. N,N-Dimethylaniline was evaluated for developmental toxicity (litter size as well as the birth weight, neonatal growth, and survival of pups) in a short-term in vivo animal bioassay. Fifty pregnant mice were given 365 mg/kg/day N,N-dimethylaniline in corn oil by gavage on days 6-13 of gestation. N,N-Dimethylaniline had no toxic effect in the dams or in their offspring for the parameters assayed. N,N-dimethylaniline was found to be negative when tested for mutagenicity in the Salmonella/microsome preincubation assay in 5 Salmonella typhimurium strains (TA1535, TA1537, TA97, TA98, and TA100). The highest ineffective dose tested in any Salmonella typhimurium strain was 333,000 ug/plate. There is limited evidence in experimental animals for the carcinogenicity of N,N-dimethylaniline. Urinary metabolites of N,N-dimethylaniline produced in dogs were 4-aminophenol, 4-(methylamino)phenol, 4-(dimethylamino)phenol, 2-aminophenol, and N-methylaniline.

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 in humans for the carcinogenicity of N,N-dimethylaniline. There is limited evidence in experimental animals for the carcinogenicity of N,N-dimethylaniline. Overall evaluation: N,N-dimethylaniline 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

>> N,N-Dimethylaniline

IARC Carcinogenic Classes

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

IARC Monographs

>> Volume 57: (1993) Occupational Exposures of Hairdressers and Barbers and Personal Use of Hair Colourants; Some Hair Dyes, Cosmetic Colourants, Industrial Dyestuffs and Aromatic Amines

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

>> Abdominal pain. Blue lips, fingernails and skin. Confusion. Convulsions. Dizziness. Headache. Laboured breathing. Nausea. Unconsciousness. Vomiting. Ringing in the ears. Visual disturbances.

Skin Exposure

>> MAY BE ABSORBED! Redness.

Eye Exposure

>> Redness. Pain.

Ingestion Exposure

>> See Inhalation.

>> Anoxia symptoms: cyanosis, lassitude (weakness, exhaustion), dizziness, ataxia; methemoglobinemia

Target Organs:

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

>> Hematologic

>> Immune

>> Blood, kidneys, liver, cardiovascular system

Adverse Effects:

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

>> Methemoglobinemia - The presence of increased methemoglobin in the blood; the compound is classified as primary toxic effect.

>> ACGIH Carcinogen - Not Classifiable.

Toxicity Data:

>> LCLo (rat) = 250 mg/m³/4H

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 as 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. /Aniline and related compounds/

Human Toxicity Excerpts:

>> /HUMAN EXPOSURE STUDIES/ Approximately 0.1 g of petrolatum containing 0.6% NN-dimethylaniline was applied to a 1.5 square inch "Band-Aid" Sheer patch and applied to the backs of 5 male human subjects for 24 hours. At 24 hours the patches were removed, the area wiped with a paper towel and reactions observed. Observations were also made at 48 and 72 hours. /Not irritating/

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ Primary skin irritation on rabbits was recorded on a 10-grade ordinal series and was based upon the severest reaction that developed on the clipped skin of belly of each of five albino rabbits within 24 hours of the uncovered application of 0.01 ml undiluted sample. Grade 1 indicates no irritation, grade 6 indicates necrosis when undiluted. Skin irritation properties of N,N-dimethylaniline was estimated as grade 3.

Human Toxicity Values:

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

>> ...50 mg/kg is the lethal oral dose /human data/. [Note: An oral dose of 50 mg/kg is equivalent to a 70-kg worker being exposed to 2,333 mg/cu m (463 ppm) for 30 minutes, assuming a breathing rate of 50 liters per minute and 100% absorption.]

Non-Human Toxicity Values:

>> LD50 Rat oral 1410 mg/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.

>> ... Toxicology and carcinogenesis studies were conducted by administering N,N-dimethylaniline (greater than 98% pure) in corn oil by gavage to groups of F344/N rats and B6C3F1 mice of each sex for 2 yr. ... Two yr studies were conducted by administering 0, 3 or 30 mg/kg N,N-dimethylaniline in corn oil by gavage, 5 days/wk for 103 wk, to groups of 50 rats of each sex. ... Groups of 50 mice of each sex were administered 0, 15, or 30 mg/kg on the same schedule. Body Weight and Survival in the Two-Year Studies: Mean body weights of vehicle control and dosed rats and mice were similar throughout the studies. Survival rates of all respective groups were similar after 2 years, except for the lowered survival of vehicle control female rats (vehicle control, 21/50; low dose 32/50; high dose, 36/50). This may reflect the large number (24/50) of vehicle control female rats killed when observed to be in a moribund state. Final survival for other groups was as follows: male rats--29/50; 32/50; 28/50; male mice-- 34/50; 30/50; 34/50; female mice--35/50; 39/50; 33/50. Nonneoplastic and Neoplastic Effects in the Two-Year Studies: In these 2-year studies, the spleen was the

expected site of chemical-related effects. Fatty metamorphosis and fibrosis in the spleen of high dose male rats were increased (fatty metamorphosis: vehicle control, 0/49; low dose, 1/49; high dose, 10/50; fibrosis: 5/49; 2/49; 22/50). Splenic hemosiderosis and hematopoiesis were present at an incidence greater than 85% in all groups of rats; however, the severity of the lesions was greater in dosed groups than in vehicle controls. Sarcomas of the spleen were seen in 3/50 high dose male rats, and an osteosarcoma was seen in another high dose male rat. One additional high dose male rat had a sarcoma of the thymus. Splenic sarcomas are uncommon in corn oil vehicle control male F344/N rats (NTP historical incidence 3/2,081, 0.1%), and thus, these neoplasms in high dose male rats (4/50, 8%) were considered to be chemically related. Lower incidences of mononuclear cell leukemia (which apparently originates in the spleen) were seen in dosed male and female rats than in vehicle controls (male: 13/50; 4/50; 3/50; female: 11/50; 7/50; 0/50). The incidence of squamous cell papillomas of the forestomach in high dose female mice was marginally greater than that in vehicle controls (2/50; 2/50; 8/50). No malignant forestomach neoplasms were observed. Conclusions: Under the conditions of these 2 yr gavage studies, there was some evidence of carcinogenic activity of N,N-dimethylaniline for male F344/N rats, as indicated by the increased incidences of sarcomas or osteosarcomas (combined) of the spleen. There was no evidence of carcinogenic activity of N,N-dimethylaniline for female F344/N rats given 3 or 30 mg/kg body weight by gavage for 2 yr. There was no evidence of carcinogenic activity of N,N-dimethylaniline for male B6C3F1 mice given 15 or 30 mg/kg body weight by gavage for 2 yr. There was equivocal evidence of carcinogenic activity of N,N-dimethylaniline for female B6C3F1 mice, as indicated by an incr incidence of squamous cell papillomas of the forestomach. Both rats and mice could have tolerated doses higher than those used in these studies.

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.

>> N,N-dimethylaniline (DMA, CAS # 121-69-7) was evaluated for acute dermal toxicity in New Zealand White rabbits (2/sex/group) administered single occluded 2.0 ml applications of either DMA neat, 6 g/L DMA in 1% H2SO4, and 0.03 g/L DMA in 1% H2SO4, upon intact skin for 24 hours. The study allowed specifically for assessment of chemotoxic asphyxiation and attendant hematological changes. All treated animals survived the 7-day study and overt respiratory effects were limited to 3-day hyperpnea in 1/2 male rabbits of a 6 g/L dose. Examination of hematological parameters prior to treatment and at 24 hours afterward found no treatment-related changes in hemoglobin, hematocrit, or erythrocyte values. Methemoglobin levels, however, were found markedly elevated immediately following treatment (24 hours) in all rabbits of undiluted doses only. While these values indicated some recovery 5 days post-treatment, they were still notably higher than baseline values. Upon 7th day gross necropsy, one each of the male and female rabbits of the neat dose and 1 female of a 6.0 g/L diluted dose also exhibited bright red or mottled tan lungs. Study authors reported that gross pathology was sporadic and comparable to that in control animals (data from control animals were not provided with this submission).

12. Ecological Information

Resident Soil (mg/kg)

>> 2.60e+01

Industrial Soil (mg/kg)

>> 1.20e+02

Tapwater (ug/L)

>> 2.50e+00

MCL (ug/L)

>> 5.00e+00

Risk-based SSL (mg/kg)

>> 9.00e-04

Oral Slope Factor (mg/kg-day)-1

>> 2.70e-02

Chronic Oral Reference Dose (mg/kg-day)

>> 2.00e-03

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Soil Saturation Concentration (mg/kg)

>> 8.30e+02

ICSC Environmental Data:

>> The substance is harmful to aquatic organisms.

13. Disposal Considerations

Spillage Disposal

>> Personal protection: chemical protection suit. Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable metal or glass containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Disposal Methods

>> SRP: The most favorable course of action is to use an alternative chemical product with less inherent propensity for occupational harm/injury/toxicity or environmental contamination. Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier. Ultimate disposal of the chemical must consider: the material's impact on air quality; potential migration in soil or water; effects on animal and plant life; and conformance with environmental and public health regulations.

>> SRP: Wastewater from contaminant suppression, cleaning of protective clothing/equipment, or contaminated sites should be contained and evaluated for subject chemical or decomposition product concentrations. Concentrations shall be lower than applicable environmental discharge or disposal criteria. Alternatively, pretreatment and/or discharge to a permitted wastewater treatment facility is acceptable only after review by the governing authority and assurance that "pass through" violations will not occur. Due consideration shall be given to remediation worker exposure (inhalation, dermal and ingestion) as well as fate during treatment, transfer and disposal. If it is not practicable to manage the chemical in this fashion, it must be evaluated in accordance with EPA 40 CFR Part 261, specifically Subpart B, in order to determine the appropriate local, state and federal requirements for disposal.

>> Dimethylaniline may be disposed of: 1) by absorbing it in vermiculite, dry sand, earth or a similar material ... 2) by atomizing in a suitable combustion chamber equipped with an appropriate effluent gas cleaning device.

>> The following wastewater treatment technologies have been investigated for N,N-dimethylaniline: Concentration process: Activated carbon.

>> Product: This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. 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.

14. Transport Information

DOT

N,N-Dimethylaniline

6.1

UN Pack Group: II

Reportable Quantity of 100 lb or 45

IATA

N,N-Dimethylaniline

6.1,

UN Pack Group: II

15. Regulatory Information

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.

- >> Section 8(a) of TSCA requires manufacturers of this chemical substance to report preliminary assessment information concerned with production, exposure, and use to EPA as cited in the preamble in 51 FR 41329. Effective date: 8/4/95; Reporting date: 10/3/95.

Regulatory Information

The Australian Inventory of Industrial Chemicals

- >> Chemical: Benzenamine, N,N-dimethyl-

REACH Registered Substance

- >> Status: Active Update: 11-08-2021 <https://echa.europa.eu/registration-dossier/-/registered-dossier/5396>
- >> Status: Cease Manufacture Update: 26-03-2018 <https://echa.europa.eu/registration-dossier/-/registered-dossier/23245>

REACH Registered Substance

- >> Status: Active Update: 07-12-2022 <https://echa.europa.eu/registration-dossier/-/registered-dossier/24634>

New Zealand EPA Inventory of Chemical Status

- >> Dimethylaniline: HSNO Approval: HSROO2972 Approved with controls

16. Other Information

Toxic Combustion Products:

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

- >> Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NO_x)

Other Safety Information

Chemical Assessment

- >> IMAP assessments - Benzenamine, N,N-dimethyl-: Human health tier II assessment
- >> IMAP assessments - Benzenamine, N,N-dimethyl-: Environment tier I 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. lonz is not responsible for any damages resulting from handling or contact with the product incorrectly."