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 Safety Data Sheet
 

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## 1. Identification

Product name	N, N-Dimethylaniline
Product code	DMA
Manufacturer name	Mitsuboshi Chemical Co., Ltd.
Address	14 Kitanoharacho, Kamigamo, Kita-ku, Kyoto, 603-8006, Japan
Contact	Development and Technical Division
Telephone number	+81-75-781-1177
Emergency telephone number	+81-75-781-1177
FAX number	+81-75-701-7227
Recommended usage	Raw materials for Basic Dyestuff (Auramine, Malachite Green, Methyl Violet, Crystal Violet, Methylene Blue), Solvent (Anthraquinone type Azineacridone, Other Intermediates), Organic Rubber Products (Vulcanization Accelerator), Gunpowder, Pharmaceuticals, Pressure-sensitive dye, Agricultural Chemicals

## 2. Hazards identification

## GHS classification

## Physical hazards

Flammable liquid	Category 4
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## Health hazards

Acute toxicity (Oral)	Category 4
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Acute toxicity (dermal)	Category 4
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Acute toxicity (inhalation : vapor)	Category 2
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Serious eye damage/eye irritation	Category 2A
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Carcinogenicity	Category 2
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Specific target organ toxicity	Category 1 (Nervous system, Blood system)
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- Single exposure	Category 3 (Narcotic effects)
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Specific target organ toxicity	Category 1 (Blood system)
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- Repeated exposure	
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## Environmental hazards

Acute aquatic hazard	Category 2
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Long-term aquatic hazard	Category 2
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## GHS label elements

## Pictograms and hazard symbol



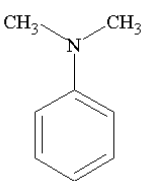
Signal word	Danger
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Hazard statements	Combustible liquid (H227) Toxic if swallowed, in contact with skin or if inhaled
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	(H301+H311+H331) Causes serious eye irritation (H319) May cause drowsiness and dizziness (H336) Suspected of causing cancer (H351) Causes damage to organs: Blood system, Nervous system (H370) Causes damage to organs through prolonged or repeated exposure: Blood system (H373) Toxic to aquatic life (H401) Toxic to aquatic life with long-lasting effects (H411)
Precautionary statement	
Prevention	Do not handle until all safety precautions have been read and understood. (P202) Keep away from heat/sparks/open flames/hot surfaces. No smoking. (P210) Avoid breathing dust/ fume/ gas/mist/ vapors/ spray. (P261) Wash hands thoroughly after handling. (P264) Do not eat, drink or smoke when using this product. (P270) Use only outdoors or in a well-ventilated area. (P271) Avoid release to the environment. (P273) Wear protective gloves/protective clothing/eye protection/face protection. (P280)
First aid measures	If swallowed: Call a Poison Center or doctor/physician if you feel unwell. (P301 + P312) Rinse mouth. (P330) If on Skin: Wash with plenty of soap and water. (P302+P352) If inhaled: Remove victims to fresh air and keep at rest in a position comfortable for breathing. (P304+P340) If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305+P351+P338) If eye irritation persists: Get medical advise/attention. (P337+P313) Take off contaminated clothing and wash before reuse. (P362) In case of fire: Use suitable extinguishing compositions for extinction. (P370 + P378) Collect spillage. (P391)
Storage	Store in a well-ventilated place. Keep container tightly closed. (P403 + P233) Keep cool. (P235) Store locked up. (P405)
Disposal	Dispose of contents/container to a specialist waste disposal contractor authorized by the prefectural governor.

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### 3. Composition/Information on

Ingredients	
Substance/ Mixture	Substance
Components	N, N-Dimethylaniline
Synonyms	N, N-Dimethylphenylamine Dimethylaminobenzene
Concentration	>99.0%
Chemical formula	 / C <sub>8</sub> H <sub>11</sub> N
CAS number	121-69-7

#### 4. First aid measures

If inhaled	Remove victims to fresh air and keep at rest in a position comfortable for breathing.
If on skin	Wash with plenty of soap and water.
If in eyes	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If swallowed	Call a Poison Center or doctor/physician if you feel unwell. Make the victims drink water with active carbon.
Most important symptoms and effects, both acute and delayed	Inhalation: stomachache, violet (cyanosis) lips and nails, violet (cyanosis) skin, confusion, convulsion, dizziness, headache, feeling of dyspnea, nausea, unconsciousness, vomiting, ear noise, visual deficit Skin: possibility of absorption, inflammation Eyes: inflammation, irritation Ingestion: Please refer to the "inhalation".
Special cautions for doctor	Recommend the periodical medical check in accordance with the degree of the exposure. If this substance causes intoxication, special treatment is necessary.

#### 5. Fire-fighting measures

Extinguishing Media	Water spray, Foam fire extinguisher, Powder fire extinguisher, Carbon dioxide fire extinguisher
Inappropriate fire extinguisher	Concentrated water jet
Specific hazard	Irritative or toxic fume and gases are generated in a fire.
Specific fire extinguishing method	Stop the supply of the combustible material, and extinguish the fire by appropriate fire extinguisher. Cool the neighbouring tanks and architectures by water spray to prevent the expansion of fire. Fire extinguishing activities should be done on the windward side of the fire. Prohibit the entry of non-essential personnel to the area of fire. Move the container away from the fire zone if it is not dangerous to do so.

Protective equipment and precautions for fire fighters	Wear appropriate self-contained breathing apparatus and chemical resistant protective clothing that can protect eyes and skin.
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6. Accidental release measures	
Personal precautions, protective equipment and emergency procedures:	Workers should wear appropriate protective equipment, and should avoid contact with eyes and skin and inhalation of gas. Prohibit the entry of non-essential personnel.
Environmental precautions	Prevent leaked substances from entering surface and ground water in order to avoid impact on the environment.
Containment and clean-up methods and materials	Promptly remove the all ignition sources. (Prohibit smoking and fireworks in the neighbouring area) Collect spillage to metal- or glass-made container as possible. Move the residual liquid to the safe place by asorption to sand or unreactive absorbent.
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7. Handling and storage	
Handling	
Engineering control	Carry out the measures described in “8. Exposure controls/personal protection” and wear protective equipment.
Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/ sparks /open flames/ hot surfaces. No smoking. Avoid breathing dust/ fume/ gas/mist/ vapors/ spray. Wash hands thoroughly after handling. Do not eat, drink, or smoke when using this product. Use only outdoors or in a well- ventilated area. Avoid release to the environment. Wear protective gloves/ protective clothing/ eye protection/ face protection. Wear respiratory protection. Wash contaminated clothing before reuse.
Avoidance of contact	Please refer to “10. Stability and reactivity”.
Storage	
Storage condition	Store in a well-ventilated place. Keep container tightly closed. Store locked up. Keep away from strong oxidizing reagents, food, and feed. Ventilate through floor. Store in a place that have no access to drain tube or sewer pipe.
Container and packaging materials	Use a container specified in the Fire Service Law or United Nations transportation regulations.
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8. Exposure control/ Personal protection	
Control concentration	No set
Threshold limit value	

Japan Society for Occupational Health (2017 edition)	5 ppm,25 mg/m <sup>3</sup> (skin absorption)
ACGIH (2017 edition)	TLV-TWA: 5 ppm,25 mg/m <sup>3</sup>
Facility controls	TLV-STEL: 10 ppm,50 mg/m <sup>3</sup> (Skin) In the place where the substance is stored and used, provide facilities for eye-washing and a shower for washing the entire body. Install ventilation equipment for maintaining air-polluting substances below the control concentration and threshold limit value when mist is emitted during processing at high heat.
Personnel protective equipment	
Respiratory protection	If ventilation is not enough, wear appropriate protective respiratory equipment.
Hand protection	Wear appropriate protective gloves.
Eye protection	Wear appropriate eye protection.
Skin and body protection	Wear appropriate protective clothing and face protection.

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9. Physical and chemical properties

Physical state	
Appearance	Liquid (20°C, 1atm)
color	Pale yellow or pale brown
odor	Irritating, aniline odor
pH	7.4 (GESTIS (2017))
Melting point	2.5°C(ICSC(1998))
Boiling point	193°C(HSDB (2017))
Flash point	73°C(our experimental data)
Evaporation rate (Butyl acetate= 1 )	No data
Vapor pressure	0.0244 mmHg (25°C EST) [Equivalent 3.25 Pa (25°C EST)] (SRC PhysProp (2017))
Relative vapor density(air= 1)	4.17 (HSDB (2017))
Specific gravity(density)	0.9537 g/cm <sup>3</sup> (20°C) (HSDB (2017))
Solubility	Water : 1.454 mg/L (25°C) (HSDB (2017)) Soluble in alcohol, chloroform, ether; soluble in acetone, benzene, organic solvent. (HSDB (2017))
Partition coefficient :octanol/water	2.31
Auto-ignition temperature	371°C (ICSC (J) (1998)) No data
Viscosity	1.300 mPa · s (25°C) (HSDB (2017))

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10. Stability and reactivity

Reactivity	Please refer to “Hazardous decomposition products”.
Chemical stability	Stable under normal use and storage.
Conditions to avoid	Contact with open- flame, high temperature, incompatible substances.
Incompatible substance	Oxidizer
Hazardous decomposition products	Heating causes combustion, harmful fume gas (Aniline, Nitrogen Oxide) is produced.

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## 11. Toxicological information

### Acute toxicity

#### Oral

GHS classification: category 4

From the data LD50-Rat 1,300 mg/kg (ACGIH (7th, 2001), DFGOT vol. 3 (1992)), 1,348 mg/kg (DFGOT vol. 3 (1992)), 1,410 mg/kg (ACGIH (7th, 2001), PATTY (6th, 2012)), it is set as category 4.

#### Dermal

GHS classification: category 4

There are data of LD50s- rabbit dermal 1770 mg/kg (ACGIH (7th, 2001)) and 1692 mg/kg (DFGOT vol. 3 (1992)). Both data are in the range of 1000-2000 mg/kg, it is set as category 4.

#### Inhalation(vapor)

GHS classification: category 2

There is no LC50 information, but there is a report that 40% of rats died in 4 days after single exposure to 380ppm vapor of this material, so LC50 value should be estimated to be 100-500ppm and is set as category 2. The standard vapor concentration value based on ppm is adopted, because it is lower than 90% of the saturated vapor concentration and thought there is no mist.

#### Inhalation(mist)

GHS classification: not possible

The data necessary for classification is insufficient.

### Skin corrosion/irritation

GHS classification: not classified

There is a report that there was no irritation on human patch test (HSDB (Access on May 2017)), and there was statement of "MILD" with skin application test on rabbits (BUA 91 (1992)).

### Serious eye damage/eye irritation

GHS classification: category 2A

There are reports that this material causes irritation or heat burns to human eyes, and causes moderate irritation on the administration test to rabbit eyes.

### Respiratory sensitization

GHS classification: impossible

The data necessary for classification is insufficient.

### Skin sensitization

GHS classification: impossible

The data necessary for classification is insufficient.

### Germ cell mutagenicity

GHS classification: impossible

The data necessary for classification is insufficient.

### Carcinogenicity

GHS Classification: category 2

Sarcoma of spleen in 3/50 cases of male rats and bone sarcoma in 1/50 cases of male rats were observed in carcinogenicity test by oral gavage to rats and mice for 2 years. The rate of sarcoma of spleen was higher than natural generation, and this is thought to be the effect of this material. On the other hand, increasing rate of anterior gastritis was observed in female mice in the high dose group (NTP TR360 (1989)). NTP concluded that these data as "uncertain evidence", but IARC concluded that these results could be estimated partially, and classified it as category 3 (NTP TR360 (1989)). In

addition, the EU categorized it as “Carc. 2” (ECHA CL Inventory (Access on May 2017)), whereas ACGIH classified it as A4 (ACGIH (7th, 2001)). Aniline (CAS No. 62-53-3: aniline is formed as an auxiliary metabolite in vitro culture experiment between this substance and liver microsome (HSDB (Access on May 2017)) induces splenic tumor, and it is classified as category 2 (Classification result for FY2008, Classification result for FY2009), this material is also set as category 2 in this clause.

#### Reproduction toxicity

GHS classification: impossible

In the repeated dose toxicity / reproductive developmental toxicity combined study (OECD TG 422) by oral administration using rats, reproductive effects are not observed up to 100 mg / kg / day that generic toxicity effects (effects on the blood system, etc.) are observed (Safety test results by Ministry of Economy, Trade and Industry (2011)). In addition, as a result of forced oral administration of 365 mg / kg / day of this material by pregnant mice at the organogenesis stage (pregnancy 6 to 13), 6% of the mother died, but no abnormalities were seen in the baby until 3 days after birth (IARC 57 (1993), Ministry of the Environment Risk Assessment Vol. 7: Temporary Hazard Assessment Sheet (2009)). But these are not sufficient evidences to determine that this material is “not classified”, because above tests are just screening test. It is suitable to determine “impossible” for this item.

#### Specific target organ toxicity (single exposure)

GHS classification: category 1 (nervous system, blood system), category 3 (narcotic effects)

It is stated that poisoning symptoms on human caused by this substance are headaches, cyanosis, dizziness, effort respiration, paralysis and convulsions (HSDB (Access on May 2017)). As a case of exposure due to the accident, there is a report that a worker who had exposed to high temperature steam for several minutes from a tub containing a mixture of this substance and phenol collapsed immediately and lost consciousness for 8 hours, and then complained of visual impairment, tinnitus and strong abdominal pain (ACGIH (7th, 2001)). There is also a report that a worker who took 7 hours to transfer this material between containers showed poisoning symptoms (MOE Risk Assessment Volume 7: Tentative Hazard Assessment Sheet (2009)). These two examples are similar to the poisoning symptoms of aniline.

In animal experiments, the formation of methemoglobin is observed in single oral administration of 50mg/ kg of this material to dog (ACGIH (7th, 2001),DFGOT vol. 3 (1992),BUA 91 (1992)),and in single oral administration of 48mg/ kg of this material to cat(BUA 91 (1992)), the poisoning symptoms are

cyanosis, respiratory distress and dynamic ataxia (BUA 91 (1992)). These dosages are equivalent to range of category 1 in the guidance. In addition, there is a report that guinea pigs died in weakening, shivering, continuing and clonic cramp, bradypnea in the single oral administration test of 2,000 mg/kg dosage (HSDB (Access on May 2017)).

In summary, this material can be thought to target nervous system, blood system. So, it was set as category 1 (nervous system and blood system), and as category 3(narcotic system) in this clause.

Specific target organ toxicity  
(Repeated exposure)

GHS classification: category 1 (blood system)

It was reported that the methemoglobin level of some workers reached 5.2% (number of exposed persons and exposed concentration are unascertained), on the other hand, the value of one worker of the controls (18 persons) was 2%. In addition, it was reported that increasing number of anemia (decrease of blood red cell and hemoglobin) and reticulocyte were observed in some workers. (DFGOT vol. 3 (1992), Recommendation of occupational exposure limit of Japan society for occupational health (1993)).

In animal experiments, it was reported that hyperplasia of myeloid erythroid cells and hypostasis in spleen was observed by forced oral administration of more than 1mg/kg/day in repeated administration which is in the range of category 1 of guidance value in toxicity/reproduction toxicity combined test using rats, acceleration of extramedullary hematopoiesis in spleen was observed by administration of more than 10 mg/kg/day (90days equivalent: 4.7 mg/kg/day), decreasing number of red blood cell /hemoglobin/hematocrit value/mean corpuscular hemoglobin concentration, acceleration of extramedullary hematopoiesis in liver, atrophy of splenic white pulp and hyperplasia of myeloid erythroid cells by administration of 100mg/kg/day(90 days equivalent: 47 mg/kg/day) (Safety test results by METI (2011)). Other than these, there is strong effect for rats on 13-week repeated toxicity test and 2-year carcinogenicity test by forced oral administration than mice. In the case of rats, in the 13-week study, swelling and hematopoietic enhancement of the spleen, hemosiderin deposition in the spleen / kidney were observed at 31.25 mg / kg / day (90 days equivalent: 22.57 mg / kg / day) or higher within the guidance value of Category 2, hemosiderin decomposition in the liver and hematopoietic cell hyperplasia in bone marrow were observed at 62.5 mg/kg/day (90 days equivalent: 45.14 mg/kg/day), the momentum reduction was observed at 125 mg/kg/day (90 days equivalent : 90.28 mg/kg/day). In the carcinogenicity test for 2 years, deposition of



hemosiderin in the spleen and acceleration of hematopoiesis were observed at 3 mg/kg/day or more within the guidance value of category 1, fatty degeneration and fibrosis of spleen were observed (NTP TR360 (1989), MOE Risk Assessment Volume 7: Tentative Hazard Assessment Sheet (2009), DFGOT vol. 3 (1992),ACGIH (7th, 2001)).

There are reports on the inhalation route test using rats, and it has been reported that there is an effect on the brain and liver function in addition to the blood system in the 100 days consecutive test, but the Ministry of the Environment risk assessment volume 7: Tentative Hazard Assessment Sheet (2009) stated that the details are unknown, and Recommendation of occupational exposure limit of Japan society for occupational health (1993) stated that the brain and liver are unlikely to be a target organ due to poor reliability of exposure technology and insufficient dose response relationship. Although it has been reported that the effects on the liver function as well as the influence on the blood system were affected in the 4 months exposure (6 hours / day, 6 days / week) in rats, Tentative Hazard Assessment Sheet (2009) stated that the details are not clear and DFGOT vol. 3 (1992) stated that it is considered to be an insufficient description, so these data were not used for classification.

As described above, formation of methemoglobin, secondary or adaptive findings associated with hemolytic anemia are found in spleen, liver, bone marrow, kidney, etc., and were classified as Category 1 (blood system).

Aspiration hazard

GHS classification: impossible

The data necessary for classification is insufficient.

## 12. Ecological information

Hazard to the aquatic

Acute hazard

It was classified into category 2 from 48-hour EC50=5 mg/L of Crustacean (*Daphnia magna*) (IUCLID (2000)).

Chronic hazard

Classified into category 2, since acute toxicity was category 2 and not rapidly degrading (BOD : 1.9%(NITE Chemical list safety data)), though bio-accumulative value is low (BCF=13.6 (NITE Chemical list safety data)).

Hazard to the ozone layer mobility

No information available

## 13. Disposal consideration

Residual waste

For disposal, follow relevant regulations and local authority standards.

Dispose of contents / container by a special waste disposal contractor who received permission from the local governor.

When consigning waste to a contractor, be sure to provide sufficient notice of hazards and toxicity.

Contaminated packaging

Containers should be cleaned and recycled, or appropriate disposal according to relevant laws and local government standards.

When empty containers are discarded, contents should be completely removed.

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14. Transport information

International regulations

UN number	2253
Proper shipping name	N,N-DIMETHYLANILINE
Class	6.1
Packing groupe	II
Marine pollutant	Applicable
Chemicals listed in MARPOL73/78 annex II and with IBC code	Not applicable

Domestic regulations

Regulations on transport in your region should be checked by your own responsibility.

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15. Regulatory information

Regulatory information with regard to this substance in your country or in your region should be examined by your own responsibility.

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16. Other information

References

The original data are indicated in each item.

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Disclaimer

The content of this SDS was prepared based on currently available materials, and the data and evaluations are not necessarily full and complete, therefore the content must be treated with caution. Moreover, the precautions shown here are for normal handling of the product. If you intend to use the product for special purposes, additional safety measures appropriate to the application and usage may be required.

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