

SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier **N,N-Diethyl-m-toluamide (DEET)**

Synonyms: N,N-Diethyl-m-toluamide, DETA

Chemical Abstracts Registry No: 134-62-3

1.2. Relevant identified uses of the substance or mixture and uses advised against

For Manufacturing of End-User Insect Repellent Products and Testing Purposes.

1.3. Details of the supplier of the safety data sheet

Vertellus LLC
201 North Illinois Street, Suite 1800
Indianapolis, Indiana 46204 USA
1-336-292-1781

e-mail Address: sds@vertellus.com

1.4. Emergency telephone number

Vertellus: 1-336-292-1781

CHEMTREC (USA): +1-800-424-9300 (collect calls accepted)

CHEMTREC (International): +1-703-527-3887 (collect calls accepted)

NRCC (China): +86 25 85477110

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture (According to Regulation (EC) No 1272/2008, 29 CFR 1910.1200 and the Globally Harmonized System)

Skin Irritation Category 2
Serious Eye Irritation Category 2
Environmental Chronic Category 3
Acute Toxicity Oral Category 4

2.2. Label elements

Hazard Symbols (Pictogram):



Signal Word:

Warning

Hazard Precautions:

H315 - Causes skin irritation.
H302 - Harmful if swallowed.
H319 - Causes serious eye irritation.
H412 - Harmful to aquatic life with long lasting effects.

Prevention Precautionary Statements:

P270 - Do not eat, drink or smoke when using this product.
P273 - Avoid release to the environment.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.

First Aid Precautionary Statements:

P302+P352 - IF ON SKIN: Wash with plenty of soap and water.

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P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P337+P313 - If eye irritation persists: Get medical advice/attention.
 P362 - Take off contaminated clothing and wash before reuse.

Storage Precautionary Statements: Not required.

2.3. Other hazards

Other Hazards: Not applicable.

SECTION 3: Composition/information on ingredients

3.1. Substances or 3.2. Mixtures

Ingredient	CAS Number	Concentration (weight %)	EC Number	CLP Inventory/ Annex VI	EU CLP Classification (1272/2008)
N,N-Diethyl-m-toluamide (DEET)	134-62-3	~ 100	205-149-7	616-018-00-2	Aquatic Chronic 3; H412 Acute Tox. 4; H302 Eye Irrit. 2; H319 Skin Irrit. 2; H315

NOTE: See Section 8 for exposure limit data for these ingredients. See Section 15 for trade secret information (where applicable).

SECTION 4: First aid measures

4.1. Description of first aid measures

Skin Contact: Wash thoroughly after skin contact.

Eye Contact: Immediately flush eyes with plenty of water. Get medical attention, if irritation persists.

Inhalation: Remove from exposure. If not breathing, give artificial respiration and call a physician. Seek medical advice if symptoms persist.

Ingestion: If swallowed, contact physician or poison control center immediately.

4.2 Most important symptoms and effects, both acute and delayed

Acute: May be harmful if ingested in sufficient quantities.
 Contact with skin may cause slight irritation.
 Moderately irritating to eyes.
 High gas, vapor, or mist concentrations may be harmful if inhaled.

Delayed Effects: None known.

4.3. Indication of any immediate medical attention and special treatment needed

Note to Physician: No specific indications. Treatment should be based on the judgment of the physician in response to the reactions of the patient.

SECTION 5: Firefighting measures

5.1. Extinguishing media

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Appropriate Extinguishing Media: Foam, Dry chemical, Carbon dioxide, Water spray

5.2. Special hazards arising from the substance or mixture

Hazardous Products of Combustion: Combustion will produce carbon monoxide, carbon dioxide and oxides of nitrogen.

Potential for Dust Explosion: Not applicable.

Special Flammability Hazards: Not applicable.

5.3. Advice for firefighters

Basic Fire Fighting Guidance: Wear self-contained breathing apparatus and protective clothing. Normal firefighting procedures may be used.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuation Procedures: Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Special Instructions: See Section 8 for personal protective equipment recommendations. Remove all contaminated clothing to prevent further absorption. Decontaminate affected personnel using the first aid procedures in Section 4. Leather shoes that have been saturated must be discarded.

6.2. Environmental precautions

Prevent releases to soils, drains, sewers and waterways.

6.3. Methods and material for containment and cleaning up

Remove all ignition sources. Ventilate the area of spill or leak. Wear protective equipment during clean-up. Contain spilled liquid with sand or vermiculite and place in chemical waste container. Prevent runoff from entering drains, sewers, and streams. After collection of material, flush area with water. Dispose of contents & container in accordance with local, regional, national or international regulations.

6.4. Reference to other sections

Refer to section 8 for information on selecting personal protective equipment. Refer to section 13 for information on spilled product, absorbent and clean up material disposal instructions.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for Unique Hazards: Not applicable.

Practices to Minimize Risk: Wear appropriate protective equipment when performing maintenance on contaminated equipment. Wash hands thoroughly before eating or smoking after handling this material. Do not eat, drink or smoke in work areas. Prevent contact with incompatible materials. Avoid spills and keep away from drains. Handle in a manner to prevent generation of aerosols, vapors or dust clouds.

Special Handling Equipment: Not applicable.

7.2. Conditions for safe storage, including any incompatibilities

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Storage Precautions & Recommendations:	This product should be stored at ambient temperature in a dry, well-ventilated location. Keep container closed when not in use.
Dangerous Incompatibility Reactions:	Incompatible with oxidizing materials.
Incompatibilities with Materials of Construction:	None known

7.3. Specific end use(s)

If a chemical safety assessment has been completed an exposure scenario is attached as an annex to this Safety Data Sheet. Refer to this annex for the specific exposure scenario control parameters for uses identified in subsection 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational Exposure Limit	Not applicable.
Air Monitoring Method:	Not applicable.

8.2. Exposure controls

Also see the annex to this SDS (if applicable) for specific exposure scenario controls.

Other Engineering Controls:	All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided.
Personal Protective Equipment:	Impervious gloves, boots, and clothing, chemical goggles or face shield where necessary, and a NIOSH approved chemical cartridge respirator or supplied air breathing apparatus with organic vapour/acid gas cartridges with particle filters.
Respirator Caution:	Observe OSHA regulations for respirator use (29 CFR 1910.134). Air-purifying respirators must not be used in oxygen-deficient atmospheres.
Thermal Hazards:	Not applicable.
Environmental Exposure Controls:	The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance, State & Odor (ambient temperature):	Clear, oily liquid with mild, characteristic odor		
Vapor Pressure:	< 1 mm Hg @ 32.4°C	Evaporation Rate:	< 1 (Butyl Acetate = 1)
Specific Gravity or Density:	0.996 @ 20°C	Vapor Density (air = 1):	6.7
Boiling Point:	292 °C @ 760 mm Hg	Freezing / Melting Point:	-43 °C (pour point) -45 °F
Solubility in Water:	9.04 mg/mL @ 25°C	Octanol / Water Coefficient:	11,200 mg/L @ 25°C

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pH:	No data available.	Odor Threshold:	No data available.
Viscosity:	21.86 mPa @ 20°C	Autoignition Temperature:	> 200°C
Flash Point and Method:	311°F (155°C) Tag Closed Cup	Flammable Limits:	No data available.
Flammability (solid, gas):	Not applicable.	Decomposition Temperature:	No data available.
Explosive Properties:	Not explosive.	Oxidizing Properties:	Not an oxidizer.

9.2. Other information

Not applicable.

SECTION 10: Stability and reactivity

<u>10.1. Reactivity</u>	Not classified as dangerously reactive.
<u>10.2. Chemical stability</u>	Stable
<u>10.3. Possibility of hazardous reactions</u>	Will not occur.
<u>10.4. Conditions to avoid</u>	Uncontrolled exposure to high temperatures.
<u>10.5. Incompatible materials</u>	Incompatible with oxidizing materials.
<u>10.6. Hazardous decomposition products</u>	Combustion will produce carbon monoxide, carbon dioxide and oxides of nitrogen.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute Oral LD₅₀:	1892 mg/kg (rat) 2040 mg/kg (rat) 2600 mg/kg (rat)	[KEY] Moore 2000a Moore, GE (1999) Moore, GE (1999).
Acute Dermal LD₅₀:	> 5000 mg/kg (rat) > 2000 (rabbit)	[KEY] Moore 2001a Moore, GE (1999)
Acute Inhalation LC₅₀:	2 mg/L/4-hours (rat)	[KEY] Moore 2000b
Skin Irritation:	Slightly irritating to skin.	
Eye Irritation:	Moderately irritating to eyes.	
Skin Sensitization:	Not a sensitizer	
Mutagenicity:	In vitro gene mutation in bacteria: Negative. In vitro cytogenicity in mammalian cells: Negative. In vitro gene mutation in mammalian cells: Negative in two separate studies. (DEET CAR 2010)	
Reproductive / Developmental Toxicity:	There were no effects on reproduction in a 2-generation study in rats. (DEET CAR 2010) No teratogenic effects observed in the studies up to maternally toxic doses, embryotoxicity was only expressed as decreased fetal body weights (rats). (DEET CAR 2010)	
Carcinogenicity:	2-year rat and 18-month mouse studies: no treatment related tumors observed at highest dose tested. (DEET CAR 2010)	

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Target Organs:	No data available.
Aspiration Hazard:	Not likely to be an aspiration hazard.
Primary Route(s) of Exposure:	Skin contact and absorption, eye contact, and inhalation. Ingestion is not likely to be a primary route of exposure.
Most important symptoms and effects, both acute and delayed	May be harmful if ingested in sufficient quantities. Contact with skin may cause slight irritation. Moderately irritating to eyes. High gas, vapor, or mist concentrations may be harmful if inhaled. Delayed Effects: None known.
Additive or Synergistic effects:	None known.

SECTION 12: Ecological information

<u>12.1. Toxicity</u>	EC50 (48h) Daphnia = 75 ppm LC50 (96h) Oncorhynchus mykiss (rainbow trout) = 97 mg/L LC50 Colinus virginianus (Northern bobwhite quail) = 1375 mg/kg NOEC (72-hr) Pseudokirchneriella subcapitata (algae) = 7.6 mg/L	[KEY] Forbis 1989 [KEY] Palmer 2002 [KEY] Grimes 1989 [KEY] Desjardins 2002
<u>12.2. Persistence and degradability</u>	Readily biodegradable.	
<u>12.3. Bioaccumulative potential</u>	Bioconcentration is not expected to occur.	
<u>12.4. Mobility in soil</u>	This material is expected to have high mobility in soil. It absorbs weakly to most soil types.	
<u>12.5. Results of PBT and vPvB assessment</u>	This substance is not a PBT or vPvB.	
<u>12.6. Other adverse effects</u>	BCF = 22; Koc = 43.3 (Schaefer 2002; Lezotte 2002)	

SECTION 13: Disposal considerations

<u>13.1. Waste treatment methods</u>	
US EPA Waste Number:	Non-Hazardous
Waste Classification: (per US regulations)	The waste may be classified as "special" or hazardous per State regulations.
Waste Disposal:	NOTE: Generator is responsible for proper waste characterization. State hazardous waste regulations may differ substantially from federal regulations. Dispose of this material responsibly, and in accordance with standard practice for disposal of potentially hazardous materials as required by applicable international, national, regional, state or local laws, and environmental protection duty of care principles. Do NOT dump into any sewers, on the ground, or into any body of water. For disposal within the EC, the appropriate classification code according to the European Community List of Wastes should be used. Note that disposal regulations may also apply to empty containers and equipment rinsates.

SECTION 14: Transport information

The following information applies to all shipping modes (DOT/IATA/ICAO/IMDG/ADR/RID/ADN), unless otherwise indicated:

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14.1. UN number	Not applicable	14.2. UN proper shipping name	Insect repellent other than agricultural DEET
14.3. Transport hazard class(es)	Non-hazardous	14.4. Packing group	Not applicable
14.5. Environmental hazards	Not applicable		
14.6. Special precautions for user	Not applicable.		
NA Emergency Guidebook Numbers:	Not applicable	IMDG EMS:	Not applicable;
14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code			Not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemical Inventory Lists:	Status:		
USA TSCA:	Listed	EINECS:	205-149-7
Canada(DSL/NDSL):	DSL	Japan:	(3)-1321
Korea:	KE-10492	Australia:	Listed
China:	Listed	Philippines:	Listed
Taiwan:	Listed	New Zealand:	Listed
German Water Hazard Classification:	ID Number 4679, hazard class 2 - hazard to waters (<i>N,N-Diethyl-m-toluamid</i>)		
SARA 313:	Not applicable.		
Reportable Quantities:	Not applicable.		
State Regulations:	This product is regulated under various pesticide laws (e.g., US FIFRA, EU Biocides Regulation) at international, federal and state levels. Contact DEETRegulatory@Vertellus.com with any questions.		

HMIS IV:

HEALTH	1
FLAMMABILITY	1
PHYSICAL HAZARD	0

NFPA:



15.2. Chemical safety assessment

Not applicable.

SECTION 16: Other information

Key Data Sources:

- **[DEET CAR 2010]** Directive 98/8/EC concerning the placing biocidal products on the market, Inclusion of active substances in Annex I or IA to Directive 98/8/EC, Assessment Report, N,N- diethyl-meta-toluamide (DEET) Product-type 19 (Repellents and attractants), 11 March 2010.
- **[Desjardins 2002]** Desjardins, D, Kendall, T, and Krueger, H (2002) DEET: A 96-Hour Toxicity Test with the Freshwater Alga (*Selenastrum capricornutum*). Wildlife International, Ltd., Project No. 538A-102 (unpublished).
- **[Forbis 1985]** Forbis, AD and Burgess, D (1985) Acute Toxicity of N,N-Diethyl-Meta-Toluamide (DEET) to *Daphnia magna*. Analytical Bio-Chemistry Laboratories, Inc., Report No. 33909 (unpublished).

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- **[Grimes 1989]** Grimes, J and Jaber, M (1989) An Evaluation of DEET in an Acute Oral Toxicity Study with the Bobwhite. Wildlife International Ltd., Project No. 262-101 (unpublished).
- **[Lezotte 2002]** Lezotte, FJ and Nixon, WB (2002) DEET: An Evaluation of Hydrolysis as a Function of pH. Wildlife International, Ltd., Project No. 538C-103 (unpublished).
- **[Moore 2000a]** Moore, GE (2000) Acute Oral Toxicity with DEET Insect Repellent. Product Safety Labs, Project No. 8392 (unpublished).
- **[Moore 2000b]** Moore, GE (2000) Acute Inhalation Toxicity Test with DEET Insect Repellent. Product Safety Labs, Project No. 8394 (unpublished).
- **[Moore 2000c]** Moore, GE (2000) Primary Skin Irritation Test with DEET Insect Repellent. Product Safety Labs, Project No. 8396 (unpublished).
- **[Moore 2001a]** Moore, GE (2001) Acute Dermal Toxicity Study - Limit Test with N, N-Diethyl-m-toluamide. Product Safety Labs, Project No. 10883 (unpublished).
- **[Moore 2001b]** Moore, GE (2001) Primary Eye Irritation Study in Rabbits with N,N-Diethyl-m-toluamide. Product Safety Labs, Project No. 10885 (unpublished).
- **[Moore 2001c]** Moore, GE (2001) Dermal Sensitization Study in Guinea Pigs (Buehler Method) with N,N-Diethyl-m-toluamide Product Safety Labs, Project No. 10887 (unpublished).
- **[Palmer 2002]** Palmer, SJ, Kendall, TZ and Krueger, HO (2002) A 96-Hour Static Acute Toxicity Test with the Rainbow Trout (*Oncorhynchus mykiss*). Wildlife International, Ltd., Project No. 538A-101 (unpublished) [Ref. No. 100049].
- **[Schaefer 2002]** Schaefer, EC and Siddiqui, AI (2002) Ready Biodegradability by the Carbon Dioxide Evolution Test Method. Wildlife International, Ltd., Project No. 538E-102 (unpublished).

Classification Method: On basis of test data

Legend of Abbreviations:

ACGIH = American Conference on Governmental Industrial Hygienists.

CAS = Chemical Abstracts Service.

CFR = Code of Federal Regulations.

DSL/NDSL = Domestic Substances List/Non-Domestic Substances List.

EC = European Community.

EINECS = European Inventory of Existing Commercial Chemical Substances.

ELINCS = European List of Notified Chemical Substances.

EU = European Union.

GHS = Globally Harmonized System.

LC = Lethal Concentration.

LD = Lethal Dose.

NFPA = National Fire Protection Association.

NIOSH = National Institute of Occupational Safety and Health.

NTP = National Toxicology Program.

OSHA = Occupational Safety and Health Administration

PEL = Permissible Exposure Limit.

RQ = Reportable Quantity.

SARA = Superfund Amendments and Reauthorization Act of 1986.

TLV = Threshold Limit Value.

WHMIS = Workplace Hazardous Materials Information System.

Important Note: Please note that the information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. The information contained herein may change without prior notice. THIS SAFETY DATA SHEET SUPERSEDES ALL PREVIOUS EDITIONS.

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