SAFETY DATA SHEET

Diminazene / Phenazine Formulation

SECTION 1. IDENTIFICATION

Product name : Diminazene / Phenazine Formulation
Other means of identification : No data available

Manufacturer or supplier's details
Company name of supplier : Merck & Co., Inc
Address : 126 E. Lincoln Avenue
Rahway, New Jersey U.S.A. 07065
Telephone : 908-740-4000
Emergency telephone : 1-908-423-6000
E-mail address : EHSDATASTeward@merck.com

Recommended use of the chemical and restrictions on use
Recommended use : Veterinary product
Restrictions on use : Not applicable

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the Hazardous Products Regulations
Skin irritation : Category 2
Specific target organ toxicity - single exposure (Oral) : Category 1 (Brain)
Specific target organ toxicity - repeated exposure (Oral) : Category 1 (Brain)

GHS label elements
Hazard pictograms : 

Signal Word : Danger
Hazard Statements : H315 Causes skin irritation.
H370 Causes damage to organs (Brain) if swallowed.
H372 Causes damage to organs (Brain) through prolonged or repeated exposure if swallowed.

Precautionary Statements : Prevention:
P260 Do not breathe mist or vapors.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves.

Response: P302 + P352 IF ON SKIN: Wash with plenty of water.
P308 + P311 IF exposed or concerned: Call a doctor.
SAFETY DATA SHEET

Diminazene / Phenazone Formulation

P332 + P313 If skin irritation occurs: Get medical attention. 
P362 + P364 Take off contaminated clothing and wash it before 
reuse.

Storage:
P405 Store locked up.

Disposal:
P501 Dispose of contents and container to an approved waste 
disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common Name/Synonym</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diminazene</td>
<td>No data available</td>
<td>536-71-0</td>
<td>37.5</td>
</tr>
<tr>
<td>Phenazine</td>
<td>3H-Pyrazol-3-one, 1,2-dihydro-1,5-dimethyl-2-phenyl-</td>
<td>60-80-0</td>
<td>7</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical 
advice immediately. 
When symptoms persist or in all cases of doubt seek medical 
advice.

If inhaled : If inhaled, remove to fresh air. 
Get medical attention if symptoms occur.

In case of skin contact : In case of contact, immediately flush skin with plenty of water 
for at least 15 minutes while removing contaminated clothing 
and shoes. 
Get medical attention. 
Wash clothing before reuse. 
Thoroughly clean shoes before reuse.

In case of eye contact : Flush eyes with water as a precaution. 
Get medical attention if irritation develops and persists.

If swallowed : If swallowed, DO NOT induce vomiting unless directed to do 
so by medical personnel. 
Get medical attention. 
Rinse mouth thoroughly with water. 
Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed : Causes skin irritation. 
Causes damage to organs if swallowed. 
Causes damage to organs through prolonged or repeated
exposure if swallowed.

Protection of first-aiders: First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists (see section 8).

Notes to physician: Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Water spray
Alcohol-resistant foam
Carbon dioxide (CO2)
Dry chemical

Unsuitable extinguishing media: None known.

Specific hazards during firefighting: Exposure to combustion products may be a hazard to health.

Hazardous combustion products: Carbon oxides
Nitrogen oxides (NOx)

Specific extinguishing methods: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Use water spray to cool unopened containers.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.

Special protective equipment for fire-fighters: In the event of fire, wear self-contained breathing apparatus.
Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment.
Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

Environmental precautions: Avoid release to the environment.
Prevent further leakage or spillage if safe to do so.
Prevent spreading over a wide area (e.g., by containment or oil barriers).
Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up: Soak up with inert absorbent material.
For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container.
Clean up remaining materials from spill with suitable absorbent.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.
SECTION 7. HANDLING AND STORAGE

Technical measures: See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Local/Total ventilation: Use only with adequate ventilation.

Advice on safe handling:
- Do not get on skin or clothing.
- Do not breathe mist or vapors.
- Do not swallow.
- Avoid contact with eyes.
- Wash skin thoroughly after handling.
- Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment.
- Do not eat, drink or smoke when using this product.
- Take care to prevent spills, waste and minimize release to the environment.

Conditions for safe storage:
- Keep in properly labeled containers.
- Store locked up.
- Store in accordance with the particular national regulations.

Materials to avoid:
- Do not store with the following product types:
  - Strong oxidizing agents
  - Self-reactive substances and mixtures
  - Organic peroxides
  - Explosives
  - Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diminazene</td>
<td>536-71-0</td>
<td>TWA</td>
<td>200 µg/m3 (OEB 2)</td>
<td>Internal</td>
</tr>
</tbody>
</table>

Engineering measures:
- Use appropriate engineering controls and manufacturing technologies to control airborne concentrations (e.g., drip-less quick connections).
- All engineering controls should be implemented by facility design and operated in accordance with GMP principles to protect products, workers, and the environment.
- Laboratory operations do not require special containment.

Personal protective equipment

Respiratory protection:
- If adequate local exhaust ventilation is not available or exposure assessment demonstrates exposures outside the recommended guidelines, use respiratory protection.

Filter type: Particulates type

Hand protection:
- Material: Chemical-resistant gloves
Eye protection : Wear safety glasses with side shields or goggles. If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles. Wear a faceshield or other full face protection if there is a potential for direct contact to the face with dusts, mists, or aerosols.

Skin and body protection

Hygiene measures : Work uniform or laboratory coat.

If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place.

When using do not eat, drink or smoke.

Wash contaminated clothing before re-use.

The effective operation of a facility should include review of engineering controls, proper personal protective equipment, appropriate degowning and decontamination procedures, industrial hygiene monitoring, medical surveillance and the use of administrative controls.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : yellow-orange

Odor : No data available

Odor Threshold : No data available

pH : 5.0 - 7.0

Melting point/freezing point : No data available

Initial boiling point and boiling range : No data available

Flash point : No data available

Evaporation rate : No data available

Flammability (solid, gas) : Not applicable

Flammability (liquids) : No data available

Upper explosion limit / Upper flammability limit : No data available

Lower explosion limit / Lower flammability limit : No data available

Vapor pressure : No data available

Relative vapor density : No data available

Relative density : No data available
Density: No data available

Solubility(ies):
  Water solubility: No data available

Partition coefficient: n-octanol/water: Not applicable

Autoignition temperature: No data available

Decomposition temperature: No data available

Viscosity:
  Viscosity, kinematic: No data available

Explosive properties: Not explosive

Oxidizing properties: The substance or mixture is not classified as oxidizing.

Molecular weight: No data available

Particle size: Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Not classified as a reactivity hazard.

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Can react with strong oxidizing agents.

Conditions to avoid: None known.

Incompatible materials: Oxidizing agents

Hazardous decomposition products: No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity
Not classified based on available information.

Product:
Acute oral toxicity: Acute toxicity estimate: > 2,000 mg/kg
  Method: Calculation method

Components:

Diminazene:
Acute toxicity (other routes of administration): LD50 (Rat): 663 mg/kg
  Application Route: Subcutaneous
LD50 (Mouse): 258 mg/kg
Application Route: Subcutaneous

LDLo (Dog): 20 mg/kg
Application Route: Intramuscular

**Phenazone:**
Acute oral toxicity: LD50 (Cat): 1,250 mg/kg

**Skin corrosion/irritation**
Causes skin irritation.

**Components:**

**Diminazene:**
Species: Rabbit
Result: Skin irritation

**Serious eye damage/eye irritation**
Not classified based on available information.

**Respiratory or skin sensitization**
Skin sensitization
Not classified based on available information.

Respiratory sensitization
Not classified based on available information.

**Germ cell mutagenicity**
Not classified based on available information.

**Components:**

**Diminazene:**
Genotoxicity in vitro:
- Test Type: Microbial mutagenesis assay (Ames test)
  - Test system: Salmonella typhimurium
  - Method: Mutagenicity (Salmonella typhimurium - reverse mutation assay)
  - Result: negative

- Test Type: Micronucleus test
  - Test system: Mouse
  - Result: negative

- Test Type: In vitro mammalian cell gene mutation test
  - Test system: Chinese hamster cells
  - Result: negative

Genotoxicity in vivo:
- Test Type: Micronucleus test
  - Species: Mouse
  - Result: negative

Germ cell mutagenicity - Weight of evidence does not support classification as a germ
Assessment: cell mutagen.

**Phenazone:**

Genotoxicity in vitro: Test Type: Bacterial reverse mutation assay (AMES)  
Result: negative

Genotoxicity in vivo: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application Route: Ingestion  
Method: OECD Test Guideline 474  
Result: negative

Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)  
Species: Rat  
Application Route: Ingestion  
Result: negative

**Carcinogenicity**  
Not classified based on available information.

**Reproductive toxicity**  
Not classified based on available information.

**Components:**

**Diminazene:**

Effects on fetal development: Test Type: reproductive and developmental toxicity study  
Species: Rat  
Application Route: Oral  
General Toxicity Maternal: LOAEL: 800 mg/kg body weight  
Developmental Toxicity: LOAEL: 800 mg/kg body weight  
Symptoms: Skeletal malformations, Embryo-fetal toxicity.

Test Type: reproductive and developmental toxicity study  
Species: Rat  
Application Route: Oral  
General Toxicity Maternal: NOAEL: 400 mg/kg body weight  
Developmental Toxicity: NOAEL: 400 mg/kg body weight

Reproductive toxicity - Assessment: Experiments have shown reproductive toxicity effects on laboratory animals.

**Phenazone:**

Effects on fertility: Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Result: negative

**STOT-single exposure**  
Causes damage to organs (Brain) if swallowed.
Components:

Diminazene:
Routes of exposure : Oral
Target Organs : Brain
Assessment : Shown to produce significant health effects in animals at concentrations of 1000 mg/kg bw or less.

STOT-repeated exposure
Causes damage to organs (Brain) through prolonged or repeated exposure if swallowed.

Components:

Diminazene:
Routes of exposure : Oral
Target Organs : Brain
Assessment : Causes damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

Diminazene:
Species : Rat
NOAEL : 63 mg/kg
Application Route : Oral
Exposure time : 3 Months

Species : Rat
NOAEL : 300 mg/kg
Application Route : Oral
Exposure time : 9 Months

Species : Dog
LOAEL : 60 mg/kg
Application Route : Oral
Exposure time : 9 Months
Target Organs : Brain, Testis
Symptoms : Disorder

Phenazone:
Species : Dog
NOAEL : 63 mg/kg
Application Route : Ingestion
Exposure time : 6 Months

Aspiration toxicity
Not classified based on available information.
Experience with human exposure

**Components:**

**Diminazene:**

**Ingestion:**
- Target Organs: Stomach
- Symptoms: Vomiting
- Target Organs: Central nervous system
- Symptoms: paralysis
- Target Organs: Immune system
- Symptoms: Fever

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

**Components:**

**Phenazone:**

**Toxicity to fish:**
- LC50 (Oryzias latipes (Japanese medaka)): > 100 mg/l
- Exposure time: 96 h
- Method: OECD Test Guideline 203

**Toxicity to daphnia and other aquatic invertebrates:**
- EC50 (Daphnia magna (Water flea)): >= 1,000 mg/l
- Exposure time: 48 h
- Method: OECD Test Guideline 202

**Toxicity to algae/aquatic plants:**
- ErC50 (Selenastrum capricornutum (green algae)): > 1,000 mg/l
- Exposure time: 72 h
- Method: OECD Test Guideline 201

- NOEC (Selenastrum capricornutum (green algae)): 10 mg/l
- Exposure time: 72 h
- Method: OECD Test Guideline 201

**Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):**
- NOEC (Daphnia magna (Water flea)): 100 mg/l
- Exposure time: 21 d
- Method: OECD Test Guideline 211

**Toxicity to microorganisms:**
- EC50: 16,900 mg/l
- Exposure time: 48 h

Persistence and degradability

**Components:**

**Phenazone:**

**Biodegradability:**
- Result: Not inherently biodegradable.
- Biodegradation: 50 %
- Exposure time: 20 d
Bioaccumulative potential

Components:

Phenazone:
Partition coefficient: n-octanol/water: log Pow: 0.38

Mobility in soil
No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues: Dispose of in accordance with local regulations.
Do not dispose of waste into sewer.
Contaminated packaging: Empty containers should be taken to an approved waste
handling site for recycling or disposal.
If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG
Not regulated as a dangerous good

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation

TDG
Not regulated as a dangerous good

Special precautions for user
Not applicable

SECTION 15. REGULATORY INFORMATION

The ingredients of this product are reported in the following inventories:

AICS: not determined
DSL: not determined
IECSC: not determined
SECTION 16. OTHER INFORMATION

Full text of other abbreviations

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECS - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50% of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Sources of key data used to compile the Material Safety Data Sheet:
- Revision Date: 04/04/2023
- Date format: mm/dd/yyyy

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user’s end product, if applicable.