SAFETY DATA SHEET

Warfarin Formulation

Version: 1.7
Revision Date: 04/04/2023
SDS Number: 6111710-00008
Date of last issue: 10/01/2022
Date of first issue: 07/15/2020

SECTION 1. IDENTIFICATION

Product name: Warfarin Formulation

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 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Combustible dust

Acute toxicity (Oral): Category 3
Acute toxicity (Inhalation): Category 2
Acute toxicity (Dermal): Category 4
Reproductive toxicity: Category 1A
Specific target organ toxicity - repeated exposure: Category 1 (Blood)

GHS label elements
Hazard pictograms:

Signal Word: Danger

Hazard Statements: May form combustible dust concentrations in air.
H301 Toxic if swallowed.
H312 Harmful in contact with skin.
H330 Fatal if inhaled.
H360D May damage the unborn child.
H372 Causes damage to organs (Blood) through prolonged or repeated exposure.

Precautionary Statements: Prevention:
P201 Obtain special instructions before use.
Warfarin Formulation

P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust, fume, gas, mist, vapors or spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves, protective clothing, eye protection and face protection.
P284 Wear respiratory protection.

**Response:**
P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER. Rinse mouth.
P302 + P352 + P312 IF ON SKIN: Wash with plenty of soap and water. Call a doctor if you feel unwell.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER.
P308 + P313 IF exposed or concerned: 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**
Dust contact with the eyes can lead to mechanical irritation.
Contact with dust can cause mechanical irritation or drying of the skin.

### SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Substance / Mixture</th>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Petrolatum</td>
<td>8009-03-8</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>Paraffin waxes and Hydrocarbon waxes</td>
<td>8002-74-2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Warfarin</td>
<td>81-81-2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>White mineral oil (petroleum)</td>
<td>8042-47-5</td>
<td>2</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.
If not breathing, give artificial respiration.
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**If breathing is difficult, give oxygen.**  
Get medical attention immediately.

**In case of skin contact**: If in eyes, rinse well with water.  
Get medical attention if irritation develops and persists.  
Remove contaminated clothing and shoes.  
Get medical attention.  
Wash clothing before reuse.  
Thoroughly clean shoes before reuse.

**In case of eye contact**: If in eyes, rinse well with water.  
Get medical attention if irritation develops and persists.

**If swallowed**: If swallowed, DO NOT induce vomiting.  
Call a physician or poison control center immediately.  
Rinse mouth thoroughly with water.  
Never give anything by mouth to an unconscious person.

**Most important symptoms and effects, both acute and delayed**: Contact with dust can cause mechanical irritation or drying of the skin.  
Dust contact with the eyes can lead to mechanical irritation.  
Toxic if swallowed.  
Harmful in contact with skin.  
Fatal if inhaled.  
May damage the unborn child.  
Causes damage to organs through prolonged or repeated exposure.

**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.

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### SECTION 5. FIRE-FIGHTING MEASURES

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

**Unsuitable extinguishing media**: High volume water jet

**Specific hazards during firefighting**: Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.  
Do not use a solid water stream as it may scatter and spread fire.  
Exposure to combustion products may be a hazard to health.

**Hazardous combustion products**: Carbon oxides  
Sulfur 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:

Evacuate personnel to safe areas. Only trained personnel should re-enter the area. 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. 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. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. 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:

Static electricity may accumulate and ignite suspended dust causing an explosion. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.

Local/Total ventilation:

If sufficient ventilation is unavailable, use with local exhaust ventilation.

Advice on safe handling:

Do not get on skin or clothing. Do not breathe dust, fume, gas, mist, vapors or spray. 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. Keep container tightly closed. Minimize dust generation and accumulation. Keep container closed when not in use. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. 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.
- Keep tightly closed.
- Keep in a cool, well-ventilated place.
- 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
  - Flammable liquids
  - Flammable solids
  - Pyrophoric liquids
  - Pyrophoric solids
  - Self-heating substances and mixtures
  - Substances and mixtures which in contact with water emit flammable gases
  - 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>Petrolatum</td>
<td>8009-03-8</td>
<td>TWA (Inhalable particulate matter)</td>
<td>5 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (Mist)</td>
<td>5 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (Mist)</td>
<td>5 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST (Mist)</td>
<td>10 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td>Paraffin waxes and Hydrocarbon waxes</td>
<td>8002-74-2</td>
<td>TWA (Fumes)</td>
<td>2 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>Warfarin</td>
<td>81-81-2</td>
<td>TWA (Inhalable particulate matter)</td>
<td>100 ppm 0.01 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>0.1 mg/m³</td>
<td>NIOSH REL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>0.1 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td>White mineral oil (petroleum)</td>
<td>8042-47-5</td>
<td>TWA (Inhalable particulate matter)</td>
<td>5 mg/m³</td>
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<td></td>
<td>ST (Mist)</td>
<td>10 mg/m³</td>
<td>NIOSH REL</td>
</tr>
</tbody>
</table>

#### Engineering measures:
All engineering controls should be implemented by facility design and operated in accordance with GMP principles to protect products, workers, and the environment.
Containment technologies suitable for controlling compounds are required to control at source and to prevent migration of the compound to uncontrolled areas (e.g., open-face containment devices). Minimize open handling.

**Personal protective equipment**

**Respiratory protection**: General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

**Hand protection**

- **Material**: Chemical-resistant gloves
- **Remarks**: Consider double gloving.

**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**: Work uniform or laboratory coat. Additional body garments should be used based upon the task being performed (e.g., sleevelets, apron, gauntlets, disposable suits) to avoid exposed skin surfaces. Use appropriate degowning techniques to remove potentially contaminated clothing.

**Hygiene measures**: 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**: paste
- **Color**: pink
- **Odor**: characteristic
**SECTION 10. STABILITY AND REACTIVITY**

- Odor Threshold: No data available
- pH: No data available
- Melting point/freezing point: No data available
- Initial boiling point and boiling range: 608 °F / 320 °C
- Flash point: 352 °F / 178 °C
- Evaporation rate: Not applicable
- Flammability (solid, gas): May form combustible dust concentrations in air.
- Flammability (liquids): Not applicable
- Upper explosion limit / Upper flammability limit: No data available
- Lower explosion limit / Lower flammability limit: No data available
- Vapor pressure: Not applicable
- Relative vapor density: Not applicable
- Relative density: 0.80 - 0.84
- Density: No data available
- Solubility(ies):
  - Water solubility: practically insoluble
- Partition coefficient: n-octanol/water: Not applicable
- Autoignition temperature: No data available
- Decomposition temperature: No data available
- Viscosity:
  - Viscosity, kinematic: Not applicable
- Explosive properties: Not explosive
- Oxidizing properties: The substance or mixture is not classified as oxidizing.
- Molecular weight: No data available
- Particle size: No data available
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Reactivity: Not classified as a reactivity hazard.
Chemical stability: Stable under normal conditions.
Possibility of hazardous reactions:
- May form combustible dust concentrations in air.
- Can react with strong oxidizing agents.

Conditions to avoid:
- Heat, flames and sparks.
- Avoid dust formation.

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
Toxic if swallowed.
Harmful in contact with skin.
Fatal if inhaled.

Product:

Acute oral toxicity:
- Acute toxicity estimate: 281 mg/kg
  Method: Calculation method

Acute inhalation toxicity:
- Acute toxicity estimate: 0.25 mg/l
  Exposure time: 4 h
  Test atmosphere: dust/mist
  Method: Calculation method

Acute dermal toxicity:
- Acute toxicity estimate: 2,000 mg/kg
  Method: Calculation method

Components:

Petrolatum:

Acute oral toxicity:
- LD50 (Rat): > 5,000 mg/kg
  Method: OECD Test Guideline 401
  Remarks: Based on data from similar materials

Acute dermal toxicity:
- LD50 (Rat): > 2,000 mg/kg
  Method: OECD Test Guideline 402
  Assessment: The substance or mixture has no acute dermal toxicity
  Remarks: Based on data from similar materials

Paraffin waxes and Hydrocarbon waxes:

Acute oral toxicity:
- LD50 (Rat): > 5,000 mg/kg
  Method: OECD Test Guideline 420

Acute dermal toxicity:
- LD50 (Rabbit): > 3,600 mg/kg
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Method: OECD Test Guideline 402  
Assessment: The substance or mixture has no acute dermal toxicity

Warfarin:
Acute oral toxicity : LD50 (Rat): 5.62 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 0.001 - 0.005 mg/l  
                          Exposure time: 4 h  
                          Test atmosphere: dust/mist

Acute dermal toxicity : LD50 (Rat): 40 mg/kg

White mineral oil (petroleum):
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 5 mg/l  
                          Exposure time: 4 h  
                          Test atmosphere: dust/mist  
                          Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity : LD50 (Rabbit): > 2,000 mg/kg  
                        Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation
Not classified based on available information.

Components:

Petrolatum:
Species : Rabbit  
Method : OECD Test Guideline 404  
Result : No skin irritation  
Remarks : Based on data from similar materials

Paraffin waxes and Hydrocarbon waxes:
Species : Rabbit  
Method : OECD Test Guideline 404  
Result : No skin irritation

Warfarin:
Species : Rabbit  
Method : OECD Test Guideline 404  
Result : No skin irritation

White mineral oil (petroleum):
Species : Rabbit  
Result : No skin irritation
Serious eye damage/eye irritation
Not classified based on available information.

**Components:**

**Petrolatum:**
- Species: Rabbit
- Result: No eye irritation
- Method: OECD Test Guideline 405
- Remarks: Based on data from similar materials

**Paraffin waxes and Hydrocarbon waxes:**
- Species: Rabbit
- Result: No eye irritation
- Method: OECD Test Guideline 405

**Warfarin:**
- Species: Rabbit
- Result: Irritation to eyes, reversing within 7 days

**White mineral oil (petroleum):**
- Species: Rabbit
- Result: No eye irritation

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

Respiratory sensitization
Not classified based on available information.

**Components:**

**Petrolatum:**
- Test Type: Buehler Test
- Routes of exposure: Skin contact
- Species: Guinea pig
- Result: negative
- Remarks: Based on data from similar materials

**Paraffin waxes and Hydrocarbon waxes:**
- Test Type: Maximization Test
- Routes of exposure: Skin contact
- Species: Guinea pig
- Method: OECD Test Guideline 406
- Result: negative

**Warfarin:**
- Test Type: Maximization Test
- Routes of exposure: Skin contact
- Species: Guinea pig
### White mineral oil (petroleum):

**Test Type**: Buehler Test  
**Routes of exposure**: Skin contact  
**Species**: Guinea pig  
**Result**: negative

### Germ cell mutagenicity

Not classified based on available information.

### Components:

#### Petrolatum:

**Genotoxicity in vitro**  
Test Type: Chromosome aberration test in vitro  
Result: negative  
Remarks: Based on data from similar materials

**Genotoxicity in vivo**  
Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application Route: Intraperitoneal injection  
Method: OECD Test Guideline 474  
Result: negative  
Remarks: Based on data from similar materials

#### Paraffin waxes and Hydrocarbon waxes:

**Genotoxicity in vitro**  
Test Type: Chromosome aberration test in vitro  
Result: negative

**Genotoxicity in vivo**  
Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application Route: Intraperitoneal injection  
Result: negative  
Remarks: Based on data from similar materials

#### Warfarin:

**Genotoxicity in vitro**  
Test Type: Bacterial reverse mutation assay (AMES)  
Result: equivocal  
Test Type: In vitro mammalian cell gene mutation test  
Result: equivocal  
Test Type: Chromosome aberration test in vitro  
Result: equivocal

**Genotoxicity in vivo**  
Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Result: negative
White mineral oil (petroleum):
Genotoxicity in vitro: Test Type: In vitro mammalian cell gene mutation test
Result: negative

Genotoxicity in vivo:
Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Carcinogenicity
Not classified based on available information.

Components:

Petrolatum:
Species: Rat
Application Route: Ingestion
Exposure time: 2 Years
Result: negative

Paraffin waxes and Hydrocarbon waxes:
Species: Rat
Application Route: Ingestion
Exposure time: 2 Years
Result: negative

White mineral oil (petroleum):
Species: Rat
Application Route: Ingestion
Exposure time: 24 Months
Result: negative

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity
May damage the unborn child.

Components:

Petrolatum:
Effects on fertility: Test Type: Reproduction/Developmental toxicity screening test
Species: Rat
Effects on fetal development:

- Test Type: Embryo-fetal development
  - Species: Rat
  - Application Route: Skin contact
  - Result: negative
  - Remarks: Based on data from similar materials

**Paraffin waxes and Hydrocarbon waxes:**

Effects on fertility:
- Test Type: Reproduction/Developmental toxicity screening test
  - Species: Rat
  - Application Route: Ingestion
  - Result: negative
  - Remarks: Based on data from similar materials

Effects on fetal development:
- Test Type: Fertility/early embryonic development
  - Species: Rat
  - Application Route: Skin contact
  - Result: negative
  - Remarks: Based on data from similar materials

**Warfarin:**

Effects on fetal development:
- Test Type: Fertility/early embryonic development
  - Species: Humans, female
  - Application Route: Ingestion
  - Result: positive

Reproductive toxicity assessment:
- Positive evidence of adverse effects on development from human epidemiological studies.

**White mineral oil (petroleum):**

Effects on fertility:
- Test Type: One-generation reproduction toxicity study
  - Species: Rat
  - Application Route: Skin contact
  - Result: negative

Effects on fetal development:
- Test Type: Embryo-fetal development
  - Species: Rat
  - Application Route: Ingestion
  - Result: negative

**STOT-single exposure**

Not classified based on available information.

**STOT-repeated exposure**

Causes damage to organs (Blood) through prolonged or repeated exposure.
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**Components:**

**Paraffin waxes and Hydrocarbon waxes:**
Routes of exposure: Ingestion
Assessment: No significant health effects observed in animals at concentrations of 100 mg/kg bw or less.

**Warfarin:**
Routes of exposure: Ingestion
Target Organs: Blood
Assessment: Shown to produce significant health effects in animals at concentrations of 10 mg/kg bw or less.

**Repeated dose toxicity**

**Components:**

**Petrolatum:**
Species: Rat
NOAEL: 5,000 mg/kg
Application Route: Ingestion
Exposure time: 2 y

**Paraffin waxes and Hydrocarbon waxes:**
Species: Rat
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

**Warfarin:**
Species: Rat
LOAEL: < 10 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

**White mineral oil (petroleum):**
Species: Rat
LOAEL: >= 1 mg/l
Application Route: inhalation (dust/mist/fume)
Exposure time: 4 Weeks
Method: OECD Test Guideline 412

**Aspiration toxicity**
Not classified based on available information.
## SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity**

### Components:

**Petrolatum:**

Toxicity to fish: LL50 (Pimephales promelas (fathead minnow)): > 100 mg/l
- Exposure time: 96 h
- Test substance: Water Accommodated Fraction
- Method: OECD Test Guideline 203
- Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): > 10,000 mg/l
- Exposure time: 48 h
- Test substance: Water Accommodated Fraction
- Method: OECD Test Guideline 203
- Remarks: Based on data from similar materials

Toxicity to algae/aquatic plants: NOEL (Pseudokirchneriella subcapitata (green algae)): >= 100 mg/l
- Exposure time: 72 h
- Test substance: Water Accommodated Fraction
- Method: OECD Test Guideline 201
- Remarks: Based on data from similar materials

Paraffin waxes and Hydrocarbon waxes:

Toxicity to fish: LL50 (Pimephales promelas (fathead minnow)): > 100 mg/l
- Exposure time: 96 h
- Method: OECD Test Guideline 203
- Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): > 1,000 mg/l
- Exposure time: 48 h
- Test substance: Water Accommodated Fraction
- Method: OECD Test Guideline 201
- Remarks: Based on data from similar materials

Toxicity to algae/aquatic plants: NOEC (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l
- Exposure time: 72 h
- Method: OECD Test Guideline 201
- Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Daphnia magna (Water flea)): 10 mg/l
- Exposure time: 21 d
- Test substance: Water Accommodated Fraction
- Method: OECD Test Guideline 203
- Remarks: Based on data from similar materials

Warfarin:

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): > 105 mg/l
- Exposure time: 48 h
Toxicity to algae/aquatic plants:
EC50 (Desmodesmus subspicatus (green algae)): > 83.2 mg/l
Exposure time: 72 h

Toxicity to fish (Chronic toxicity):
NOEC (Oncorhynchus mykiss (rainbow trout)): 2 mg/l
Exposure time: 21 d

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC (Daphnia magna (Water flea)): 0.059 mg/l
Exposure time: 21 d

Toxicity to microorganisms:
EC50 (Photobacterium phosphoreum): 67.5 mg/l
Exposure time: 5 min

White mineral oil (petroleum):
Toxicity to fish:
LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates:
EC50 (Daphnia magna (Water flea)): > 100 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants:
NOEC (Pseudokirchneriella subcapitata (green algae)): 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to fish (Chronic toxicity):
NOEC (Oncorhynchus mykiss (rainbow trout)): 1,000 mg/l
Exposure time: 28 d

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC (Daphnia magna (Water flea)): 1,000 mg/l
Exposure time: 21 d

Persistence and degradability

Components:

Petrolatum:
Biodegradability: Result: Not readily biodegradable.
Biodegradation: 31 %
Exposure time: 28 d
Method: OECD Test Guideline 301F
Remarks: Based on data from similar materials

Paraffin waxes and Hydrocarbon waxes:
Biodegradability: Result: Not readily biodegradable.
Biodegradation: 31 %
Exposure time: 28 d
Method: OECD Test Guideline 301F
Remarks: Based on data from similar materials

Warfarin:
Biodegradability: Result: Readily biodegradable. 
Biodegradation: 92.7 % 
Exposure time: 28 d

White mineral oil (petroleum):
Biodegradability: Result: Not readily biodegradable. 
Biodegradation: 31 % 
Exposure time: 28 d

Bioaccumulative potential

Components:

Paraffin waxes and Hydrocarbon waxes:
Partition coefficient: n-octanol/water: log Pow: 5.3 - 6.7

Warfarin:
Bioaccumulation: Species: Oncorhynchus mykiss (rainbow trout) 
Bioconcentration factor (BCF): <= 21.6

Partition coefficient: n-octanol/water: log Pow: 0.7

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
UN number: UN 2811
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Warfarin)
Class: 6.1
Packing group: II
Labels: 6.1

IATA-DGR
UN/ID No.: UN 2811
Proper shipping name: Toxic solid, organic, n.o.s.
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Class: 6.1
Packing group: II
Labels: Toxic
Packing instruction (cargo aircraft): 676
Packing instruction (passenger aircraft): 669

IMDG-Code
UN number: UN 2811
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Warfarin)
Class: 6.1
Packing group: II
Labels: 6.1
EmS Code: F-A, S-A
Marine pollutant: no

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

Domestic regulation
49 CFR
UN/ID/NA number: UN 2811
Proper shipping name: Toxic solids, organic, n.o.s. (Warfarin)
Class: 6.1
Packing group: II
Labels: TOXIC
ERG Code: 154
Marine pollutant: no

Special precautions for user
The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

CERCLA Reportable Quantity

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Component RQ (lbs)</th>
<th>Calculated product RQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warfarin</td>
<td>81-81-2</td>
<td>100</td>
<td>5000</td>
</tr>
</tbody>
</table>

SARA 304 Extremely Hazardous Substances Reportable Quantity

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Component RQ (lbs)</th>
<th>Calculated product RQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warfarin</td>
<td>81-81-2</td>
<td>100</td>
<td>5000</td>
</tr>
</tbody>
</table>

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Component TPQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warfarin</td>
<td>81-81-2</td>
<td>10000</td>
</tr>
<tr>
<td>Warfarin</td>
<td>81-81-2</td>
<td>500*</td>
</tr>
</tbody>
</table>
*: Solid in the molten or powdered form (particles < 100 microns), in solution, or meeting the NFPA reactivity criteria

**SARA 311/312 Hazards**
- Combustible dust
- Acute toxicity (any route of exposure)
- Reproductive toxicity
- Specific target organ toxicity (single or repeated exposure)

**SARA 313**
- The following components are subject to reporting levels established by SARA Title III, Section 313:
  - Warfarin 81-81-2 2 %

**US State Regulations**

**Pennsylvania Right To Know**
- Petrolatum 8009-03-8
- Paraffin waxes and Hydrocarbon waxes 8002-74-2
- White mineral oil (petroleum) 8042-47-5
- Warfarin 81-81-2

**California Prop. 65**
WARNING: This product can expose you to chemicals including Warfarin, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

**California List of Hazardous Substances**
- Petrolatum 8009-03-8
- Paraffin waxes and Hydrocarbon waxes 8002-74-2
- White mineral oil (petroleum) 8042-47-5
- Warfarin 81-81-2

**California Permissible Exposure Limits for Chemical Contaminants**
- Petrolatum 8009-03-8
- Paraffin waxes and Hydrocarbon waxes 8002-74-2
- White mineral oil (petroleum) 8042-47-5
- Warfarin 81-81-2

The ingredients of this product are reported in the following inventories:
- AICS: not determined
- DSL: not determined
- IECSC: not determined

**SECTION 16. OTHER INFORMATION**

Further information
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Version: 1.7  Revision Date: 04/04/2023  SDS Number: 6111710-00008  Date of last issue: 10/01/2022
Date of first issue: 07/15/2020

NFPA 704:

Health: 3  Flammability: 2  Instability: 0

Special hazard

**HMIS® IV:**

HEALTH  *  3
FLAMMABILITY  2
PHYSICAL HAZARD  0

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Full text of other abbreviations

ACGIH - USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL - USA. NIOSH Recommended Exposure Limits
OSHA Z-1 - USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
ACGIH / TWA - 8-hour, time-weighted average
NIOSH REL / TWA - Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
NIOSH REL / ST - STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
OSHA Z-1 / TWA - 8-hour time weighted average

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; 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; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; BC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - 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; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Pesticide Programs; PDI - Pesticide Data Information; PPE - Personal Protective Equipment; PRIDE - Programme for Registration of Industrial Chemicals in Europe; RCRA - Resource Conservation and Recovery Act; RTECS - Registry of Toxic Effects of Chemical Substances; SC - Scientific Committee; SDP - Surface Drying Point; SL - Solubility Limit; TWA - Time-weighted average; UCIC - United Chemical Information Center; VPC - Vapour Pressure Class; WFPS - Water Frontal Protection System; WOE - World Organization of EPPO; WHO - World Health Organization; WHO-ROE - World Health Organization - Region Office for Europe; WPL - Workplace Limit; XRC - Critical Load; ZLAC - Limite d'Accommodation et de Conservation des Substances; ZVW - Zulassungsverfahren des Wirtschaftsministeriums.
SAFETY DATA SHEET

Warfarin Formulation

Version  1.7  Revision Date:  04/04/2023  SDS Number:  6111710-00008  Date of last issue:  10/01/2022
Date of first issue:  07/15/2020

Sources of key data used to compile the Material Safety Data Sheet:

Revision Date:  04/04/2023

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.

US / Z8