SAFETY DATA SHEET
Vaniprevir Formulation

Section 1: Identification

Product name : Vaniprevir Formulation

Manufacturer or supplier’s details
Company : MSD
Address : 33 Whakatiki Street - Private Bag 908
         Upper Hutt - New Zealand
Telephone : 908-740-4000
Emergency telephone number : 1-908-423-6000
E-mail address : EHSDATASTEWARD@msd.com
Telefax : 908-735-1496

Recommended use of the chemical and restrictions on use
Recommended use : Pharmaceutical

Section 2: Hazard identification

GHS Classification
Specific target organ toxicity - repeated exposure (Oral) : STOT RE2 (gallbladder, Liver)

GHS label elements
Hazard pictograms :

Signal word : Warning
Hazard statements : H373 May cause damage to organs (gallbladder, Liver) through prolonged or repeated exposure if swallowed.
Precautionary statements :
  Prevention:
  P260 Do not breathe dust.
  Response:
  P314 Get medical advice/ attention if you feel unwell.
  Disposal:
  P501 Dispose of contents/ container to an approved waste disposal plant.
**SAFETY DATA SHEET**

**Vaniprevir Formulation**

**Version** 4.6  
**Revision Date:** 09/13/2019  
**SDS Number:** 25800-00015  
**Date of last issue:** 24.04.2019  
**Date of first issue:** 27.10.2014

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**Other hazards which do not result in classification**

Dust contact with the eyes can lead to mechanical irritation.  
Contact with dust can cause mechanical irritation or drying of the skin.  
May form explosive dust-air mixture during processing, handling or other means.

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**Section 3: Composition/information on ingredients**

**Substance / Mixture:** Mixture  

**Components**

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaniprevir</td>
<td>923590-37-8</td>
<td>&gt;= 10 - &lt; 30</td>
</tr>
</tbody>
</table>

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**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**

Wash with water and soap.  
Get medical attention if symptoms occur.

**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.  
Get medical attention if symptoms occur.  
Rinse mouth thoroughly with water.

**Most important symptoms and effects, both acute and delayed**

May cause damage to organs through prolonged or repeated exposure if swallowed.  
Contact with dust can cause mechanical irritation or drying of the skin.  
Dust contact with the eyes can lead to mechanical irritation.

**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**

None known.

**Specific hazards during fire-fighting**

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.  
Exposure to combustion products may be a hazard to health.

**Hazardous combustion products**

Carbon oxides
Section 6: Accidental release measures

**Personal precautions, protective equipment and emergency procedures**
- Use personal protective equipment.
- Follow safe handling advice and personal protective equipment recommendations.

**Environmental precautions**
- Discharge into the environment must be avoided.
- 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**
- Sweep up or vacuum up spillage and collect in suitable container for disposal.
- 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.
- 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**
- Use only with adequate ventilation.

**Advice on safe handling**
- Do not breathe dust.
- Do not swallow.
- Avoid contact with eyes.
- Avoid prolonged or repeated contact with skin.
- Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment.
- 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.
Take care to prevent spills, waste and minimize release to the environment.

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.

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

Materials to avoid:
- Do not store with the following product types: Strong oxidizing agents

### Section 8: Exposure controls/personal protection

#### Components 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>Vaniprevir</td>
<td>923590-37-8</td>
<td>TWA</td>
<td>300 µg/m³</td>
<td>Internal</td>
</tr>
</tbody>
</table>

**Engineering measures**:
- Ensure adequate ventilation, especially in confined areas.
- Minimize workplace exposure concentrations.
- Apply measures to prevent dust explosions.
- Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).

**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**:
- Combined particulates and organic vapour type

**Hand protection**:
- Chemical-resistant gloves

**Remarks**:
- Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

**Eye protection**:
- Wear the following personal protective equipment:
  - Safety goggles

**Skin and body protection**:
- Skin should be washed after contact.

### Section 9: Physical and chemical properties
**SAFETY DATA SHEET**

**Vaniprevir Formulation**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>powder</td>
</tr>
<tr>
<td><strong>Colour</strong></td>
<td>tan</td>
</tr>
<tr>
<td><strong>Odour</strong></td>
<td>odourless</td>
</tr>
<tr>
<td><strong>Odour Threshold</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Melting point/freezing point</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Initial boiling point and boiling range</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flash point</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Evaporation rate</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flammability (solid, gas)</strong></td>
<td>May form explosive dust-air mixture during processing, handling or other means.</td>
</tr>
<tr>
<td><strong>Flammability (liquids)</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Upper explosion limit / Upper flammability limit</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Lower explosion limit / Lower flammability limit</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Vapour pressure</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Relative vapour density</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>1 g/cm³</td>
</tr>
<tr>
<td><strong>Solubility(ies)</strong></td>
<td>Water solubility: No data available</td>
</tr>
<tr>
<td><strong>Partition coefficient: n-octanol/water</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Auto-ignition temperature</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Decomposition temperature</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td>Viscosity, dynamic: No data available</td>
</tr>
<tr>
<td></td>
<td>Viscosity, kinematic: No data available</td>
</tr>
<tr>
<td><strong>Explosive properties</strong></td>
<td>Not explosive</td>
</tr>
<tr>
<td><strong>Oxidizing properties</strong></td>
<td>The substance or mixture is not classified as oxidizing.</td>
</tr>
<tr>
<td><strong>Molecular weight</strong></td>
<td>No data available</td>
</tr>
</tbody>
</table>

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Section 10: Stability and reactivity

Reactivity: Not classified as a reactivity hazard.
Chemical stability: Stable under normal conditions.
Possibility of hazardous reactions: May form explosive dust-air mixture during processing, handling or other means. 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

Exposure routes: Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity
Not classified based on available information.

Components:
Vaniprevir:
Acute oral toxicity: LD50 (Rat): > 750 mg/kg
Remarks: No adverse effect has been observed in acute toxicity tests.
LD0 (Dog): > 300 mg/kg
Remarks: No adverse effect has been observed in acute toxicity tests.
LD50 (Mouse): > 2,000 mg/kg
Remarks: No mortality observed at this dose.

Skin corrosion/irritation
Not classified based on available information.

Components:
Vaniprevir:
Species: Rabbit
Result: No skin irritation

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

Vaniprevir:
Species : Bovine cornea
Result : Mild eye irritation
Method : Bovine cornea (BCOP)

Respiratory or skin sensitisation

Skin sensitisation
Not classified based on available information.

Respiratory sensitisation
Not classified based on available information.

Components:

Vaniprevir:
Test Type : Local lymph node assay (LLNA)
Species : Mouse
Result : negative

Chronic toxicity

Germ cell mutagenicity
Not classified based on available information.

Components:

Vaniprevir:
Genotoxicity in vitro : Test Type: Chromosomal aberration
Test system: Chinese hamster ovary cells
Result: negative

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

Test Type: Alkaline elution assay
Test system: rat hepatocytes
Result: negative

Genotoxicity in vivo : Test Type: Micronucleus test
Species: Mouse
Application Route: Oral
Result: negative

Carcinogenicity
Not classified based on available information.

Components:

Vaniprevir:
Species : Rat, male and female
Application Route : Oral
Activity duration : 104 Weeks
Species: Mouse
Application Route: Oral
Activity duration: 6 Months
Result: negative
Target Organs: gallbladder

Reproductive toxicity
Not classified based on available information.

Components:

Vaniprevir:
Effects on fertility:
Species: Rat, male and female
Application Route: Oral
General Toxicity - Parent: NOAEL: >= 250 mg/kg body weight
Result: No effects on fertility

Effects on foetal development:
Species: Rat, female
Application Route: Oral
Developmental Toxicity: LOAEC F1: 180 mg/kg body weight
Symptoms: No specific developmental abnormalities
Result: negative

Test Type: Development
Species: Rabbit, female
Application Route: Oral
Developmental Toxicity: NOAEL F1: >= 240 mg/kg body weight
Symptoms: No specific developmental abnormalities
Result: negative

STOT - single exposure
Not classified based on available information.

STOT - repeated exposure
May cause damage to organs (gallbladder, Liver) through prolonged or repeated exposure if swallowed.

Components:

Vaniprevir:
Exposure routes: Ingestion
Target Organs: gallbladder, Liver
Assessment: May cause damage to organs through prolonged or repeated exposure.
Repeated dose toxicity

Components:

Vaniprevir:
Species : Rat
NOAEL : 120 mg/kg
LOAEL : 360 mg/kg
Application Route : Oral
Exposure time : 6 Months
Target Organs : Liver

Species : Dog
NOAEL : 15 mg/kg
LOAEL : 30 mg/kg
Application Route : Oral
Exposure time : 9 Months
Target Organs : Liver, gallbladder
Symptoms : Gastrointestinal disturbance

Species : Mouse
NOAEL : 150 mg/kg
LOAEL : 300 mg/kg
Application Route : Oral
Exposure time : 90 d
Target Organs : Liver, Kidney, Gastrointestinal tract, Heart, gallbladder, Stomach

Aspiration toxicity
Not classified based on available information.

Experience with human exposure

Components:

Vaniprevir:
Ingestion : Symptoms: stomach discomfort, Diarrhoea, Nausea, Headache

Section 12: Ecological information

Ecotoxicity

Components:

Vaniprevir:
Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 4 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: No toxicity at the limit of solubility

LC50 (Americamysis): > 4 mg/l
Exposure time: 96 h
Method: US-EPA OPPTS 850.1035
Remarks: No toxicity at the limit of solubility
Toxicity to algae/aquatic plants : EC50 (Pseudokirchneriella subcapitata (green algae)): > 4 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: No toxicity at the limit of solubility

NOEC (Pseudokirchneriella subcapitata (green algae)): 4 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: No toxicity at the limit of solubility

Toxicity to microorganisms : EC50: > 1,000 mg/l
Exposure time: 3 h
Test Type: Respiration inhibition
Method: OECD Test Guideline 209

NOEC: 1,000 mg/l
Exposure time: 3 h
Test Type: Respiration inhibition
Method: OECD Test Guideline 209

Persistence and degradability

Components:

Vaniprevir:
Biodegradability : Result: not rapidly degradable
Method: OECD Test Guideline 314

Bioaccumulative potential

Components:

Vaniprevir:

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.
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.

National Regulations

NZS 5433
Not regulated as a dangerous good

Section 15: Regulatory information

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

HSNO Approval Number
HSR100425 Pharmaceutical Active Ingredients Group Standard 2017

HSW Controls
Certified handler certificate not required.
Tracking hazardous substance not required.
Refer to the Health and Safety at Work (Hazardous Substances) Regulations 2017, for further information.

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

AICS : not determined
DSL : not determined
IECSC : not determined

Section 16: Other information

Further information


Date format : dd.mm.yyyy

Full text of other abbreviations
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.

NZ / EN