

**SAFETY DATA SHEET****SECTION 1 : IDENTIFICATION**Product identifier used on the label:

**Product Name:** Bortezomib for Injection

Other means of identification:

**Synonyms:** None.

Recommended use of the chemical and restrictions on use:

**Product Use/Restriction:** Antineoplastic.

Chemical manufacturer address and telephone number:

**Manufacturer Name:** Fresenius Kabi USA, LLC  
**Address:** Three Corporate Drive  
Lake Zurich, Illinois 60047  
**General Phone Number:** (847) 550-2300  
**Customer Service Phone Number:** (888) 386-1300  
**Health Issues Information:** (800) 551-7176

**SECTION 2 : HAZARD(S) IDENTIFICATION**Classification of the chemical in accordance with CFR 1910.1200(d)(f):**GHS Pictograms:**

**Signal Word:** DANGER.

**GHS Class:** Acute Toxicity Inhalation, Category 2.  
Specific Target Organ Toxicity, Category 1.  
Acute Oral Toxicity, Category 3.  
Acute Dermal Toxicity, Category 3. Reproductive Toxicity, Category 1B.

**Hazard Statements:** Toxic if swallowed. Toxic in contact with skin. Fatal if inhaled. Causes damage to organs through prolonged or repeated exposure. May damage fertility or the unborn child.

**Precautionary Statements:** P201 Obtain special instructions before use.  
P202 Do not handle until all safety precautions have been read and understood.  
P260 - Do not breathe dust/fume/gas/mist/vapours/spray.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.  
P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER/ doctor.  
P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
P320 - Specific treatment is urgent (see label).  
P361 - Take off all contaminated clothing immediately.  
P405 - Store locked up.  
P501 - Dispose of contents/container in accordance with Local, State, Federal and Provincial regulations.

Hazards not otherwise classified that have been identified during the classification process:

**Route of Exposure:** Inhalation Ingestion Eye contact Skin Absorption. Injection.

**Potential Health Effects:** This product is intended for therapeutic use only when prescribed by a physician. Potential adverse reactions from prescribed doses and overdoses are described in the package insert.  
Handling should only be performed by personnel trained and familiar with handling of potent active pharmaceutical ingredients.  
May cause irritation to eyes, skin, and respiratory tract, nausea, vomiting, rash, diarrhea.

**Acute Health Effects:** The effects reported are from use of the drug product clinically or the testing of the drug substance in laboratory animals.  
In patients given the drug, Bortezomib produces many of the acute offsets typical of drugs that kill rapidly growing cells, including effects on the hematological system, fatigue, nausea, vomiting, diarrhea, and fever. Other organ systems reported to be effected include the respiratory tract (shortness of breath), and nervous system (headache, dizziness, and peripheral neuropathy). Some of the acute effects may be delayed in onset, such as the effects on the hematological system, which are characterized by decreased white blood cells, platelets and red blood cells, and may occur several days or weeks following the acute exposure. These effects may potentially occur from acute (severe spill) or repeated overexposure in occupational settings.

**Chronic Health Effects:** Based on other antineoplastic agents and data on Bortezomib, the spectrum of effects after chronic exposure would be expected to be similar to those after acute exposure. Initial repeated dose studies in laboratory animals have shown similar effects as acute studies.

**Signs/Symptoms:** Repeated occupational overexposure may cause fatigue and fever, and effects on the hematological (decreases in hemoglobin/anemia, blood counts and platelets), gastrointestinal (nausea, diarrhea, vomiting, abdominal pain), and nervous systems (headache, peripheral neuropathy). May affect fertility based on animal toxicity studies.

**Target Organs:** Eyes, Skin, Respiratory system, Hematological system, Peripheral nervous system, Liver, Kidney, Reproductive system

### SECTION 3 : COMPOSITION/INFORMATION ON INGREDIENTS

Mixtures:

Chemical Name	CAS#	Ingredient Percent	EC Num.
Bortezomib	179324-69-7	3.5 mg by weight	
Boric Acid	10043-35-3	10.5 mg by weight	
Glycine	56-40-6	25 mg by weight	

### SECTION 4 : FIRST AID MEASURES

Description of necessary measures:

<b>Eye Contact:</b>	Immediately flush eyes with plenty of water for at least 15 to 20 minutes. Ensure adequate flushing of the eyes by separating the eyelids with fingers. Get immediate medical attention.
<b>Skin Contact:</b>	Immediately wash skin with plenty of soap and water for 15 to 20 minutes, while removing contaminated clothing and shoes. Get medical attention if irritation develops or persists.
<b>Inhalation:</b>	If inhaled, remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention. Only remove breathing apparatus after soiled clothing has been completely removed.
<b>Ingestion:</b>	If conscious, flush mouth out with water immediately. Call a physician or poison control center immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

Most important symptoms/effects, acute and delayed:

<b>Other First Aid:</b>	Instantly remove any soiled clothing. For Adverse Event Information, please call (800) 551-7176.
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### SECTION 5 : FIRE FIGHTING MEASURES

Suitable and unsuitable extinguishing media:

<b>Suitable Extinguishing Media:</b>	Use alcohol resistant foam, carbon dioxide, dry chemical, or water fog or spray when fighting fires involving this material. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
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Specific hazards arising from the chemical:

<b>Hazardous Combustion Byproducts:</b>	Thermal decomposition products may include smoke and toxic fumes. Oxides of carbon, oxides of nitrogen and other organic substances may be formed. Other undetermined low molecular weight hydrocarbon compounds may be released in small quantities depending upon specific conditions of combustion.
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Special protective equipment and precautions for fire-fighters:

<b>Protective Equipment:</b>	As in any fire, wear Self-Contained Breathing Apparatus (SCBA), MSHA/NIOSH (approved or equivalent) and full protective gear.
<b>Fire Fighting Instructions:</b>	Evacuate area of unprotected personnel. Use cold water spray to cool fire exposed containers to minimize risk of rupture. Do not enter confined fire space without full protective gear. If possible, contain fire run-off water.

### SECTION 6 : ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:

<b>Personal Precautions:</b>	Evacuate area and keep unnecessary and unprotected personnel from entering the spill area. Avoid personal contact and breathing vapors or mists. Use proper personal protective equipment as listed in Section 8.
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Environmental precautions:

<b>Environmental Precautions:</b>	Avoid runoff into storm sewers, ditches, and waterways.
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Methods and materials for containment and cleaning up:

<b>Methods for containment:</b>	Contain spills with an inert absorbent material such as soil, sand or oil dry.
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**Methods for cleanup:**

Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container. After removal, flush spill area with soap and water to remove trace residue.

## SECTION 7 : HANDLING and STORAGE

**Precautions for safe handling:**

**Handling:** When handling pharmaceutical products, avoid all contact and inhalation of vapor, mists and/or fumes. Use with adequate ventilation. Use only in accordance with directions. Handling should only be performed by personnel trained and familiar with handling of potent active pharmaceutical ingredients.

**Conditions for safe storage, including any incompatibilities:**

**Storage:** Unopened vials may be stored at controlled room temperature 20 - 25° C (68 - 77° F). Excursions permitted from 15 to 30° C (59 to 86° F). [See USP Controlled Room Temperature]. Retain in original package to protect from light.

## SECTION 8: EXPOSURE CONTROLS, PERSONAL PROTECTION

**EXPOSURE GUIDELINES:****Boric Acid :**

**Guideline ACGIH:** TLV-TWA: 2 mg/m<sup>3</sup>  
TLV-STEL: 6 mg/m<sup>3</sup>

**Glycine :**

**Guideline ACGIH:** TLV-TWA: 100 ppm  
**Guideline OSHA:** PEL-TWA: 100 ppm

**Appropriate engineering controls:**

**Engineering Controls:** General ventilation is sufficient if this product is being used in a controlled medical setting (clinic, hospital, medical office) for its sole intended parenteral (injection) purpose. Otherwise, use appropriate engineering control such as process enclosures, local exhaust ventilation, or other engineering controls including use of a biosafety cabinet / fume hood to control airborne levels below recommended exposure limits.

**Individual protection measures:**

**Eye/Face Protection:** Chemical splash goggles. Wear a face shield also when splash hazard exist.

**Skin Protection Description:** Protective laboratory coat, apron, or disposable garment recommended.

**Hand Protection Description:** Wear appropriate protective gloves. Consult glove manufacturer's data for permeability data. Nitrile rubber or natural rubber gloves are recommended.

**Respiratory Protection:** No personal respiratory protective equipment is normally required when this product is being used/administered by a licensed healthcare practitioner (i.e. an end-user such as a clinician / doctor / nurse) for its sole intended parenteral (injection) purpose in a controlled medical setting. The need for respiratory protection will vary according to the airborne concentrations and environmental conditions. A NIOSH approved air-purifying respirator with an organic vapor cartridge or canister may be permissible under certain circumstances. Consult the NIOSH web site (<http://www.cdc.gov/niosh/npptl/topics/respirators/>) for a list of respirator types and approved suppliers.

**Other Protective:** Consult with local procedures for selection, training, inspection and maintenance of the personal protective equipment.

**General Hygiene Considerations:** Wash thoroughly after handling. Do not eat, drink, smoke or apply cosmetics while handling the product. Particular care in working with this product must be practiced in pharmacies and other preparation areas, during manufacture of this product, and during patient administration. Work should be performed in a designated area for working with hazardous drugs. Contaminated waste must be properly handled. Work areas must be regularly decontaminated.

## SECTION 9 : PHYSICAL and CHEMICAL PROPERTIES

**PHYSICAL AND CHEMICAL PROPERTIES:**

**Physical State:** Lyophilized powder.

**Color:** White

**Odor:** Not determined.

**Odor Threshold:** Not determined.

**Boiling Point:** Not determined.

**Melting Point:** Not determined.

**Specific Gravity:** Not determined.

**Solubility:** Not determined.

**Vapor Density:** Not determined.

**Vapor Pressure:** Not determined.

**Evaporation Rate:** Not determined.

**pH:** Not determined.

**Viscosity:** Not determined.

**Flash Point:** Not established.

**Flash Point Method:** Not established.

Lower Flammable/Explosive Limit:	Not established.
Upper Flammable/Explosive Limit:	Not established.
Auto Ignition Temperature:	Not established.
VOC Content:	Not determined.

## SECTION 10 : STABILITY and REACTIVITY

### Chemical Stability:

**Chemical Stability:** Stable under normal temperatures and pressures.

### Possibility of hazardous reactions:

**Hazardous Polymerization:** Not reported.

### Conditions To Avoid:

**Conditions to Avoid:** Protect from light.

### Incompatible Materials:

**Incompatible Materials:** Avoid contact with oxidizing agents.

### Hazardous Decomposition Products:

**Special Decomposition Products:** Carbon oxides. Nitrogen oxides (NOx). Boron oxide.

## SECTION 11 : TOXICOLOGICAL INFORMATION

### TOXICOLOGICAL INFORMATION:

#### Bortezomib :

<b>Ingestion:</b>	No single dose oral toxicity studies in rats or mice. Most studies conducted either by intravenous or intraperitoneal administration. In one study in the monkey, an oral dose of 0.7 mg/kg was fatal in a female monkey, but not in a male monkey tested at this dose. Based on this limited data and intravenous data indicating significant potential to be toxic or lethal at doses < 2 mg/kg in rats and mice, bortezomib should be considered highly acutely toxic.
<b>Sensitization:</b>	Moderate to severe skin irritant based on studies in rabbits. Considered to be severe eye irritant based on the skin irritation study. No studies assessing allergic skin potential.
<b>Chronic Effects:</b>	Repeated Dose Studies: Administration by intravenous injection has produced effects consistent with other cytotoxic drugs including effects on the gastrointestinal tract, hematological system, liver, peripheral nervous system, kidney and liver.
<b>Mutagenicity:</b>	Studies evaluating gene mutation were negative (Ames gene mutation assay). Positive in vitro chromosomal aberration study in Chinese hamster ovary cells most likely due to pharmacological mechanism of action. Not a clastogen in vivo (mouse micronucleus test),
<b>Reproductive Toxicity:</b>	Bortezomib has not been evaluated for reproductive toxicity (effects on fertility). Repeated dose studies in laboratory animals have caused degenerative changes in the ovary and testes.
<b>Teratogenicity:</b>	Developmental Toxicity: At low doses in laboratory animal (< 0.05 mg/kg/day by injection) during gestation, Bortezomib at maternally toxic doses was embryo lethal and embryo toxic but did not cause a significant increase in malformations in the rat and rabbit. Because of the embryo lethal effects at low doses, it should be considered a reproductive toxicant but not a teratogenic agent.
<b>Other Toxicological Information:</b>	Intravenous - mouse TDLo: 6 mg/kg/3W (intermittent) [Tumorigenic - active as anti-cancer agent] Intravenous - Primate monkey LDLo: 0.3 mg/kg [Cardiac - pulse rate Vascular - BP lowering not characterized in autonomic section] Intraperitoneal - mouse TDLo: 5 mg/kg/14D (intermittent) [Vascular - structural changes in vessels Tumorigenic - active as anti-cancer agent] Unreported - Human : 0.147 mg/kg/2W (intermittent) [Peripheral Nerve and Sensation - sensory change involving peripheral nerve]

#### Boric Acid :

**Ingestion:** Oral - Rat LD50 - Lethal dose, 50 percent kill: 13500 mg/kg [Details of toxic effects not reported other than lethal dose value] (RTECS)

#### Glycine :

<b>Eye:</b>	Administration into the eye - Rabbit Standard Draize test: 100 uL/24H [Severe] (RTECS)
<b>Skin:</b>	Administration onto the skin - Rabbit LD50 - Lethal dose, 50 percent kill: >2 gm/kg [Skin and Appendages - Dermatitis, other(After systemic exposure) ] Administration onto the skin - Rabbit LD50 - Lethal dose, 50 percent kill: >2000 mg/kg [Blood - Hemorrhage Skin and Appendages - Primary irritation(After topical exposure)Nutritional and Gross Metabolic - Weight loss or decreased weight gain] (RTECS)
<b>Inhalation:</b>	Inhalation - Rat LC50 - Lethal concentration, 50 percent kill: >10000 ppm/4H [Behavioral - Ataxia Lungs, Thorax, or Respiration - Dyspnea Lungs, Thorax, or Respiration - Pulmonary emboli] Inhalation - Rat LC50 - Lethal concentration, 50 percent kill: 14100 ppm/4H [Behavioral - Ataxia Lungs, Thorax, or Respiration - Respiratory depression] (RTECS)
<b>Ingestion:</b>	Oral - Rat LD50 - Lethal dose, 50 percent kill: 2743 mg/kg [Sense Organs and Special Senses (Eye) - Lacrimation Lungs, Thorax, or Respiration - Respiratory depression Gastrointestinal - Other changes] Oral - Rat LD50 - Lethal dose, 50 percent kill: 3500 mg/kg [Details of toxic effects not reported other than lethal dose value] Oral - Rat LD50 - Lethal dose, 50 percent kill: 2733 mg/kg [Behavioral - Ataxia Lungs, Thorax, or Respiration - Respiratory depression] Oral - Rat LD50 - Lethal dose, 50 percent kill: 3500 mg/kg [Behavioral - Wakefulness Behavioral - Ataxia] (RTECS)

## SECTION 12 : ECOLOGICAL INFORMATION

### Other adverse effects:

Effect of Material On Aquatic Life: No data available

### Boric Acid:

### Ecotoxicity:

#### Ecotoxicity:

Toxicity to fish:  
LC50 *Ptychocheilus lucius* - 279 mg/l - 96 h  
LC0 - *Lepomis macrochirus* (Bluegill) - > 1,021 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates:  
LC50 - *Daphnia magna* (Water flea) - 53.2 mg/l - 21 d  
EC50 - *Daphnia magna* (Water flea) - 133 mg/l - 48 h

## SECTION 13 : DISPOSAL CONSIDERATIONS

### Description of waste:

Waste Disposal: All wastes containing the material should be properly labeled. Dispose of any waste residues according to federal, state and local guidelines, e.g., appropriately permitted chemical waste incinerator. Rinse waters resulting from spill should be discharged in an environmentally safe manner, e.g. appropriately permitted municipal or on site wastewater treatment facility.

## SECTION 14 : TRANSPORT INFORMATION

DOT Shipping Name: Medicine, solid, toxic, n.o.s.

DOT UN Number: UN3249

DOT Hazard Class: 6.1

DOT Packing Group: II

IATA Shipping Name: Medicine, solid, toxic, n.o.s.

IATA UN Number: UN3249

IATA Hazard Class: 6.1

IATA Packing Group: II

## SECTION 15 : REGULATORY INFORMATION

### Safety, health and environmental regulations specific for the product:

### Boric Acid:

TSCA Inventory Status: Listed

Canada DSL: Listed

### Glycine:

TSCA Inventory Status: Listed

Section 313: EPCRA - 40 CFR Part 372 - (SARA Title III) Section 313 Listed Chemical.

Canada DSL: Listed

## SECTION 16 : ADDITIONAL INFORMATION

### HMIS Ratings:

HMIS Health Hazard: 3\*

HMIS Fire Hazard: 1

HMIS Reactivity: 1

HMIS Personal Protection: C

Health Hazard	3*
Fire Hazard	1
Reactivity	1
Personal Protection	C

\* Chronic Health Effects

SDS Creation Date: February 04, 2016

SDS Revision Date: February 13, 2024

SDS Revision Notes: Overall SDS review - no changes to formulation. Updated the HMIS rating for Personal Protective Equipment (PPE) only.

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