



International Ltd.

## PZT; PZT Powder; PZT Ceramics without Silver

### Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations And According To The Hazardous Products Regulation (February 11, 2015).

Revision Date: 08/14/2017

Date of Issue: 07/28/2017

Version: 2.0

## SECTION 1: IDENTIFICATION

### 1.1. Product Identifier

**Product Form:** Substance

**Product Name:** PZT; PZT Powder; PZT Ceramics without silver

**CAS-No.:** 12626-81-2

**Formula:** O.Pb.Ti.Zr

**Synonyms:** Lead titanium zirconium oxide; Lead zirconate titanate; Lead titanium zirconium trioxide

### 1.2. Intended Use of the Product

**Use Of The Substance/Mixture:** For industrial use only.

### 1.3. Name, Address, and Telephone of the Responsible Party

**Company**

*APC International, Ltd.*

*P.O. Box 180, Duck Run*

*Mackeyville, Pennsylvania, 17750*

*T: +1-570-726-6961*

### 1.4. Emergency Telephone Number

**Emergency Number** : +1-570-726-6961

## SECTION 2: HAZARDS IDENTIFICATION

### 2.1. Classification of the Substance or Mixture

**GHS-US/CA Classification**

Acute Tox. 4 (Oral) H302

Acute Tox. 4 (Inhalation:dust,mist) H332

Repr. 1A H360

STOT RE 2 H373

Aquatic Acute 1 H400

Aquatic Chronic 1 H410

Full text of hazard classes and H-statements : see section 16

### 2.2. Label Elements

**GHS-US/CA Labeling**

**Hazard Pictograms (GHS-US/CA)** :



**Signal Word (GHS-US/CA)** :

Danger

**Hazard Statements (GHS-US/CA)** :

H302+H332 - Harmful if swallowed or if inhaled.

H360 - May damage fertility or the unborn child.

H373 - May cause damage to organs through prolonged or repeated exposure.

H400 - Very toxic to aquatic life.

H410 - Very toxic to aquatic life with long lasting effects.

**Precautionary Statements (GHS-US/CA)** :

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.

P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.

P270 - Do not eat, drink or smoke when using this product.

P271 - Use only outdoors or in a well-ventilated area.

P273 - Avoid release to the environment.

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P280 - Wear protective gloves, protective clothing, and eye protection.  
 P301+P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell.  
 P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
 P308+P313 - If exposed or concerned: Get medical advice/attention.  
 P312 - Call a POISON CENTER or doctor if you feel unwell.  
 P314 - Get medical advice/attention if you feel unwell.  
 P330 - Rinse mouth.  
 P391 - Collect spillage.  
 P405 - Store locked up.  
 P501 - Dispose of contents/container in accordance with local, regional, national, territorial, provincial, and international regulations.

### Supplemental Information

: This product is fully oxidized and cannot reach any other oxidation states, it is therefore not considered a combustible dust.

### 2.3. Other Hazards

This product is considered a lead compound, please refer to Code of Federal Regulations 1910.1025, OSHA's lead specific standard. While inorganic lead does not readily enter the body through the skin, it can enter the body through accidental ingestion (eating, drinking, and smoking) or inhalation via contaminated hands, clothing, and surfaces. Workers may develop a variety of ailments, such as neurological effects, gastrointestinal effects, anemia, and kidney disease. Exposure may aggravate pre-existing eye, skin, or respiratory conditions. Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

### 2.4. Unknown Acute Toxicity (GHS-US/CA)

No data available

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1. Substance

Name : PZT; PZT Powder; PZT Ceramics without silver  
 CAS-No. : 12626-81-2  
 EC-No. : 235-727-4

Name	Product Identifier	% *	GHS Ingredient Classification
Lead titanium zirconium oxide (Pb(Ti,Zr)O <sub>3</sub> )	(CAS-No.) 12626-81-2	100	Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation:dust,mist), H332 Repr. 1A, H360 STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

Full text of H-phrases: see section 16

### 3.2. Mixture

Not applicable

\*Percentages are listed in weight by weight percentage (w/w%) for liquid and solid ingredients. Gas ingredients are listed in volume by volume percentage (v/v%).

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of First-aid Measures

**General:** Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

**Inhalation:** Using proper respiratory protection, move the exposed person to fresh air at once. Encourage exposed person to cough, spit out, and blow nose to remove dust. Immediately call a poison center, physician, or emergency medical service.

**Skin Contact:** Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation develops or persists.



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**Eye Contact:** Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention.

**Ingestion:** Rinse mouth. Do NOT induce vomiting. Obtain medical attention.

#### 4.2. Most Important Symptoms and Effects Both Acute and Delayed

**General:** Harmful if swallowed. Harmful if inhaled. May damage fertility. May damage the unborn child. May cause damage to organs through prolonged or repeated exposure. Warning: Contains lead. Lead poisoning can occur via an acute dose or through chronic exposure. Symptoms of lead poisoning include headaches, abdominal pain, memory loss, kidney failure, anemia, change in skin tone or pallor, reproductive problems in men, weakness, pain, or tingling in the extremities.

**Inhalation:** Harmful if inhaled. Inhalation is likely to cause adverse health effects including but not limited to: irritation, difficulty breathing, and unconsciousness. Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

**Skin Contact:** Prolonged exposure may cause skin irritation. Repeated or prolonged contact will cause mechanical irritation.

**Eye Contact:** May cause slight irritation to eyes. May cause mechanical eye irritation.

**Ingestion:** This material is harmful orally and can cause adverse health effects or death in significant amounts.

**Chronic Symptoms:** May damage fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure. Lead: Exposure can result in lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; encephalopathy; kidney disease; hypertension.

#### 4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

### SECTION 5: FIRE-FIGHTING MEASURES

#### 5.1. Extinguishing Media

**Suitable Extinguishing Media:** Use extinguishing media appropriate for surrounding fire.

**Unsuitable Extinguishing Media:** Do not use a heavy water stream. Use of heavy stream of water may spread fire.

#### 5.2. Special Hazards Arising From the Substance or Mixture

**Fire Hazard:** Not considered flammable but may burn at high temperatures.

**Explosion Hazard:** Product is not explosive.

**Reactivity:** Hazardous reactions will not occur under normal conditions. Hazardous reactions may occur on contact with certain chemicals. Refer to incompatible materials.

#### 5.3. Advice for Firefighters

**Precautionary Measures Fire:** Exercise caution when fighting any chemical fire.

**Firefighting Instructions:** Use water spray or fog for cooling exposed containers. Remove containers from fire area if this can be done without risk. Avoid raising dust. Do not breathe fumes from fires or vapors from decomposition.

**Protection During Firefighting:** Do not enter fire area without proper protective equipment, including respiratory protection.

**Hazardous Combustion Products:** Thermal decomposition generates: Lead fumes. Oxides of lead. Oxides of titanium. Zirconium oxides.

#### Reference to Other Sections

Refer to Section 9 for flammability properties.

### SECTION 6: ACCIDENTAL RELEASE MEASURES

#### 6.1. Personal Precautions, Protective Equipment and Emergency Procedures

**General Measures:** Avoid generating dust. Do not get in eyes, on skin, or on clothing. Do not breathe dust. No smoking.

##### 6.1.1. For Non-Emergency Personnel

**Protective Equipment:** Use appropriate personal protective equipment (PPE).

**Emergency Procedures:** Evacuate unnecessary personnel.

##### 6.1.2. For Emergency Personnel

**Protective Equipment:** Equip cleanup crew with proper protection.

**Emergency Procedures:** Ventilate area. Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit.



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### 6.2. Environmental Precautions

Prevent entry to sewers and public waters. Avoid release to the environment. Collect spillage.

### 6.3. Methods and Materials for Containment and Cleaning Up

**For Containment:** Contain solid spills with appropriate barriers and prevent migration and entry into sewers or streams. As an immediate precautionary measure, isolate spill or leak area in all directions. Ventilate area. Avoid generation of dust during clean-up of spills.

**Methods for Cleaning Up:** Clean up spills immediately and dispose of waste safely. Avoid actions that cause dust to become airborne during clean-up such as dry sweeping or using compressed air. Use HEPA vacuum or thoroughly wet with water to clean-up dust. Use PPE described in Section 8. Vacuum clean-up is preferred, if sweeping is required use a dust suppressant. If spilled directly onto the ground, remove sufficient soil to ensure material is fully recovered. Contact competent authorities after a spill.

### 6.4. Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for Safe Handling

**Additional Hazards When Processed:** Inhalation of dust or fumes may cause metal fume fever. Keep dust levels to a minimum and follow applicable regulations.

**Precautions for Safe Handling:** Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Avoid creating or spreading dust. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Do not get in eyes, on skin, or on clothing. Do not breathe dust. Use only in well ventilated areas. Handle empty containers with care because they may still present a hazard. Use appropriate personal protective equipment (PPE).

**Hygiene Measures:** Handle in accordance with good industrial hygiene and safety procedures. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

### 7.2. Conditions for Safe Storage, Including Any Incompatibilities

**Technical Measures:** Comply with applicable regulations. Avoid creating or spreading dust.

**Storage Conditions:** Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Containers that are opened should be properly resealed and kept upright to prevent leakage. Keep/Store away from direct sunlight, extremely high or low temperatures and incompatible materials. Protect from moisture. Store locked up.

**Incompatible Materials:** Strong acids, strong bases, strong oxidizers. Halogenated compounds. Chromates. Chlorates. Azides. Azides can produce explosive lead-azide compounds. Peroxides.

### 7.3. Specific End Use(s)

For industrial use only.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), OSHA (PEL), Canadian provincial governments, or the Mexican government.

Lead compounds		
USA NIOSH	NIOSH REL (TWA) (mg/m <sup>3</sup> )	0.05 mg/m <sup>3</sup>
USA IDLH	US IDLH (mg/m <sup>3</sup> )	100 mg/m <sup>3</sup>

### 8.2. Exposure Controls

**Appropriate Engineering Controls:** Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Avoid creating or spreading dust. Ensure adequate ventilation, especially in confined areas. Use local exhaust or general dilution ventilation or other suppression methods to maintain dust levels below exposure limits. Power equipment should be equipped with proper dust collection devices. Ensure all national/local regulations are observed.



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**Personal Protective Equipment:** Gloves. Protective clothing. Protective goggles. Insufficient ventilation: wear respiratory protection.



**Materials for Protective Clothing:** Chemically resistant materials and fabrics.

**Hand Protection:** Wear protective gloves.

**Eye and Face Protection:** Chemical safety goggles.

**Skin and Body Protection:** Wear suitable protective clothing.

**Respiratory Protection:** If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

**Environmental Exposure Controls:** Avoid release to the environment.

**Other Information:** When using, do not eat, drink or smoke.

### SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1. Information on Basic Physical and Chemical Properties

Physical State	: Solid
Appearance	: Shades of Yellow, Tan, Red, Brown, Green, and Black.
Odor	: Odorless
Odor Threshold	: Not available
pH	: Not available
Evaporation Rate	: Not available
Melting Point	: > 1350 °C (> 2462 °F)
Freezing Point	: Not available
Boiling Point	: Not available
Flash Point	: Not available
Auto-ignition Temperature	: Not available
Decomposition Temperature	: Not available
Flammability (solid, gas)	: Not available
Lower Flammable Limit	: Not available
Upper Flammable Limit	: Not available
Vapor Pressure	: Not available
Relative Vapor Density at 20°C	: Not available
Relative Density	: Not available
Density	: 2 g/cm <sup>3</sup> (bulk powder)
Specific Gravity	: Not available
Solubility	: Water: 0.05 g/l
Partition Coefficient: N-Octanol/Water	: Not available
Viscosity	: Not available
Fired Density	: 7.6 - 8.1 g/cc

### SECTION 10: STABILITY AND REACTIVITY

**10.1. Reactivity:** Hazardous reactions will not occur under normal conditions. Hazardous reactions may occur on contact with certain chemicals. Refer to incompatible materials.

**10.2. Chemical Stability:** Stable under recommended handling and storage conditions (see section 7).

**10.3. Possibility of Hazardous Reactions:** Hazardous polymerization will not occur.

**10.4. Conditions to Avoid:** Incompatible materials. Moisture. Avoid creating or spreading dust.

**10.5. Incompatible Materials:** Strong acids, strong bases, strong oxidizers. Halogenated compounds. Chromates. Chlorates. Azides. Azides can produce explosive lead-azide compounds. Peroxides.



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**10.6. Hazardous Decomposition Products:** Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1. Information on Toxicological Effects - Product

**Acute Toxicity (Oral):** Oral: Harmful if swallowed.

**Acute Toxicity (Dermal):** Not classified

**Acute Toxicity (Inhalation):** Inhalation:dust,mist: Harmful if inhaled.

**LD50 and LC50 Data:**

<b>PZT; PZT Powder; PZT Ceramics without silver (12626-81-2)</b>	
<b>ATE US/CA (oral)</b>	500.00 mg/kg body weight
<b>ATE US/CA (dust, mist)</b>	1.50 mg/l/4h

**Skin Corrosion/Irritation:** Not classified

**Eye Damage/Irritation:** Not classified

**Respiratory or Skin Sensitization:** Not classified

**Germ Cell Mutagenicity:** Not classified

**Carcinogenicity:** Not classified

**Specific Target Organ Toxicity (Repeated Exposure):** May cause damage to organs through prolonged or repeated exposure.

**Reproductive Toxicity:** May damage fertility or the unborn child.

**Specific Target Organ Toxicity (Single Exposure):** Not classified

**Aspiration Hazard:** Not classified

**Symptoms/Injuries After Inhalation:** Harmful if inhaled. Inhalation is likely to cause adverse health effects including but not limited to: irritation, difficulty breathing, and unconsciousness. Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

**Symptoms/Injuries After Skin Contact:** Prolonged exposure may cause skin irritation. Repeated or prolonged contact will cause mechanical irritation.

**Symptoms/Injuries After Eye Contact:** May cause slight irritation to eyes. May cause mechanical eye irritation.

**Symptoms/Injuries After Ingestion:** This material is harmful orally and can cause adverse health effects or death in significant amounts.

**Chronic Symptoms:** May damage fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure.

**Lead:** Exposure can result in lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; encephalopathy; kidney disease; hypertension.

### 11.2. Information on Toxicological Effects - Ingredient(s)

**LD50 and LC50 Data:**

<b>Lead titanium zirconium oxide (Pb(Ti,Zr)O3) (12626-81-2)</b>	
<b>ATE US/CA (oral)</b>	500.00 mg/kg body weight
<b>ATE US/CA (dust, mist)</b>	1.50 mg/l/4h

<b>Lead compounds</b>	
<b>National Toxicology Program (NTP) Status</b>	Reasonably anticipated to be Human Carcinogen.
<b>OSHA Hazard Communication Carcinogen List</b>	In OSHA Hazard Communication Carcinogen list.

## SECTION 12: ECOLOGICAL INFORMATION

### 12.1. Toxicity

**Ecology - General:** Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

### 12.2. Persistence and Degradability

<b>PZT; PZT Powder; PZT Ceramics without silver (12626-81-2)</b>	
<b>Persistence and Degradability</b>	May cause long-term adverse effects in the environment.



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## 12.3. Bioaccumulative Potential

<b>PZT; PZT Powder; PZT Ceramics without silver (12626-81-2)</b>	
<b>Bioaccumulative Potential</b>	Not established.

**12.4. Mobility in Soil** Not available

## 12.5. Other Adverse Effects

**Other Information:** Avoid release to the environment.

# SECTION 13: DISPOSAL CONSIDERATIONS

## 13.1. Waste treatment methods

**Waste Disposal Recommendations:** Dispose of contents/container in accordance with local, regional, national, territorial, provincial, and international regulations.

**Additional Information:** Container may remain hazardous when empty. Continue to observe all precautions.

**Ecology - Waste Materials:** Avoid release to the environment. This material is hazardous to the aquatic environment. Keep out of sewers and waterways.

# SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

## 14.1. In Accordance with DOT

**Proper Shipping Name** : ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (Lead titanium zirconium oxide)  
**Hazard Class** : 9  
**Identification Number** : UN3077  
**Label Codes** : 9  
**Packing Group** : III  
**Marine Pollutant** : Marine pollutant  
**ERG Number** : 171



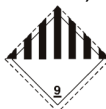
## 14.2. In Accordance with IMDG

**Proper Shipping Name** : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead titanium zirconium oxide)  
**Hazard Class** : 9  
**Identification Number** : UN3077  
**Label Codes** : 9  
**Packing Group** : III  
**EmS-No. (Fire)** : F-A  
**EmS-No. (Spillage)** : S-F  
**Marine pollutant** : Marine pollutant



## 14.3. In Accordance with IATA

**Proper Shipping Name** : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead titanium zirconium oxide)  
**Identification Number** : 9  
**Hazard Class** : UN3077  
**Label Codes** : 9  
**Packing Group** : III  
**ERG Code (IATA)** : 9L



## 14.4. In Accordance with TDG

**Proper Shipping Name** : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead titanium zirconium oxide)  
**Hazard Class** : 9  
**Identification Number** : UN3077  
**Label Codes** : 9  
**Packing Group** : III  
**Marine Pollutant (TDG)** : Marine pollutant





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## SECTION 15: REGULATORY INFORMATION

### 15.1. US Federal Regulations

<b>PZT; PZT Powder; PZT Ceramics without silver (12626-81-2)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>SARA Section 311/312 Hazard Classes</b>	Immediate (acute) health hazard Delayed (chronic) health hazard
<b>Lead titanium zirconium oxide (Pb(Ti,Zr)O3) (12626-81-2)</b>	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
<b>Lead compounds</b>	
Subject to reporting requirements of United States SARA Section 313	

### 15.2. US State Regulations

<b>Lead compounds</b>	
<b>U.S. - California - Proposition 65 - Carcinogens List</b>	WARNING: This product contains chemicals known to the State of California to cause cancer.
<b>Lead compounds</b>	
U.S. - New Jersey - Right to Know Hazardous Substance List	
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List	
U.S. - Pennsylvania - RTK (Right to Know) List	

### 15.3. Canadian Regulations

<b>Lead titanium zirconium oxide (Pb(Ti,Zr)O3) (12626-81-2)</b>	
Listed on the Canadian DSL (Domestic Substances List)	

## SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

**Date of Preparation or Latest Revision** : 08/14/17  
**Revision** : 2  
**Other Information** : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada's Hazardous Products Regulations (HPR) SOR/2015-17.

### GHS Full Text Phrases:

Acute Tox. 4 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Repr. 1A	Reproductive toxicity Category 1A
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H302	Harmful if swallowed
H332	Harmful if inhaled
H360	May damage fertility or the unborn child
H373	May cause damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*

NA GHS SDS 2015 (Can, US, Mex)