

# Potassium peroxymonosulfate

sc-253223



The Power is Question

## Material Safety Data Sheet

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

### Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT NAME

Potassium peroxymonosulfate

#### STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

#### NFPA



#### SUPPLIER

Santa Cruz Biotechnology, Inc.  
2145 Delaware Avenue  
Santa Cruz, California 95060  
800.457.3801 or 831.457.3800

#### EMERGENCY

ChemWatch  
Within the US & Canada: 877-715-9305  
Outside the US & Canada: +800 2436 2255  
(1-800-CHEMCALL) or call +613 9573 3112

#### SYNONYMS

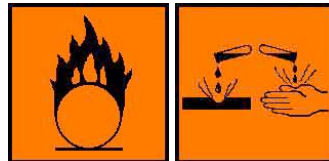
KHSO<sub>5</sub> 0.5KHSO<sub>4</sub> 0.5K<sub>2</sub>SO<sub>4</sub>, (K<sub>5</sub>H<sub>3</sub>(SO<sub>3</sub>(O<sub>2</sub>))<sub>2</sub>(SO<sub>4</sub>)<sub>2</sub>), "peroxymonosulfuric acid, monopotassium salt mixture with dipotassium sulfate and", "potassium hydrogen sulfate", "potassium monopersulfate triple salt", "potassium monopersulfate sulfate", "potassium salt of Caro's acid", Oxone, "Oxone monopersulfate compound", "potassium peroxymonosulfate triple salt", "potassium peroxy sulfate", "potassium peroxy sulphate", "pentapotassium bis(peroxymonosulfate)bis(sulfate)", Curox

### Section 2 - HAZARDS IDENTIFICATION

#### CHEMWATCH HAZARD RATINGS

|               | Min | Max |
|---------------|-----|-----|
| Flammability: | 0   | ■   |
| Toxicity:     | 2   | ■   |
| Body Contact: | 3   | ■   |
| Reactivity:   | 2   | ■   |
| Chronic:      | 2   | ■   |

Min/Nil=0  
Low=1  
Moderate=2  
High=3  
Extreme=4



#### CANADIAN WHMIS SYMBOLS



## EMERGENCY OVERVIEW

### RISK

Causes burns.

Risk of serious damage to eyes.

## POTENTIAL HEALTH EFFECTS

### ACUTE HEALTH EFFECTS

#### SWALLOWED

■ The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

■ Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and esophagus.

■ Accidental ingestion of the material may be damaging to the health of the individual.

■ Sulfates are not well absorbed orally, but can cause diarrhea.

■ Acute potassium poisoning after swallowing is rare, because vomiting usually occurs and renal excretion is fast.

Potassium causes a slow, weak pulse, irregularities in heart rhythm, heart block and an eventual fall in blood pressure.

#### EYE

■ The material can produce chemical burns to the eye following direct contact.

Vapors or mists may be extremely irritating.

■ If applied to the eyes, this material causes severe eye damage.

■ Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns.

Mild burns of the epithelia generally recover rapidly and completely.

#### SKIN

■ The material can produce chemical burns following direct contact with the skin.

■ Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.

■ Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.

■ Open cuts, abraded or irritated skin should not be exposed to this material.

■ Solution of material in moisture on the skin, or perspiration, may markedly increase skin corrosion and accelerate tissue destruction.

■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.

Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

#### INHALED

■ The material can cause respiratory irritation in some persons.

The body's response to such irritation can cause further lung damage.

■ Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.

There may be dizziness, headache, nausea and weakness.

■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

#### CHRONIC HEALTH EFFECTS

■ Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.

Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

There is some evidence that inhaling this product is more likely to cause a sensitization reaction in some persons compared to the general population.

There is limited evidence that, skin contact with this product is more likely to cause a sensitization reaction in some persons compared to the general population.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.

Persulfate exposure commonly manifests itself in the form of a skin rash, eczema and respiratory conditions such as asthma. Allergy may develop after repeated exposures.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| NAME                                | CAS RN     | %   |
|-------------------------------------|------------|-----|
| potassium peroxymonosulfate sulfate | 70693-62-8 | >95 |

## Section 4 - FIRST AID MEASURES

## SWALLOWED

· For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

## EYE

■ If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

## SKIN

■ If skin or hair contact occurs: · Immediately flush body and clothes with large amounts of water, using safety shower if available. · Quickly remove all contaminated clothing, including footwear.

## INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested. Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g.

## NOTES TO PHYSICIAN

■ For acute or short term repeated exposures to strong acids:

- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.
- Toxic myocarditis may follow ingestion of oxidizing agents such as peroxides.

### -----BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.

## Section 5 - FIRE FIGHTING MEASURES

|                             |               |
|-----------------------------|---------------|
| Vapour Pressure (mmHG):     | Not available |
| Upper Explosive Limit (%):  | Not available |
| Specific Gravity (water=1): | 1.25          |
| Lower Explosive Limit (%):  | Not available |

## EXTINGUISHING MEDIA

■ FOR SMALL FIRE:

- USE FLOODING QUANTITIES OF WATER.
- DO NOT use dry chemicals, CO2 or foam.

## FIRE FIGHTING

- Use water delivered as a fine spray to control fire and cool adjacent area.
- DO NOT approach containers suspected to be hot.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 500 metres in all directions.

## GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Will not burn but increases intensity of fire.
- Heating may cause expansion or decomposition leading to violent rupture of containers.
- Non combustible.
- Not considered to be a significant fire risk.

Decomposition may produce toxic fumes of: sulfur oxides (SOx), metal oxides.

Material contains oxidizing agent/organic peroxide. Oxygen provided makes fire fierce and self sustaining.

## FIRE INCOMPATIBILITY

■ Avoid storage with reducing agents.

## PERSONAL PROTECTION

Glasses:

Full face- shield.

Gloves:

Respirator:

Acid vapour Type B cartridge/ canister.

## Section 6 - ACCIDENTAL RELEASE MEASURES

### MINOR SPILLS

- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.
- Clean up all spills immediately.
- No smoking, naked lights, ignition sources.

### MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

## Section 7 - HANDLING AND STORAGE

### PROCEDURE FOR HANDLING

- Avoid personal contact and inhalation of dust, mist or vapors.
- Provide adequate ventilation.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

### RECOMMENDED STORAGE METHODS

■ DO NOT use aluminum or galvanized containers.

Check regularly for spills and leaks.

- Lined metal can, Lined metal pail/drum
- Plastic pail.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

### STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.

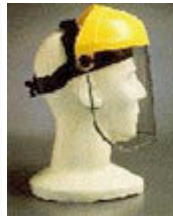
## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE CONTROLS

| Source  | Material   | TWA ppm | TWA mg/m <sup>3</sup> | STEL ppm | STEL mg/m <sup>3</sup> | Peak ppm | Peak mg/m <sup>3</sup> | TWA F/CC | Notes   |
|---|--|---------|-----------------------|----------|------------------------|----------|------------------------|----------|---|
| US ACGIH Threshold Limit Values (TLV)   | potassium peroxymonosulfate (Persulfates)                  |         | 0.1                   |          |                        |          |                        |          | TLV Basis: Skin irritation, measured as persulfates |
| Canada - British Columbia Occupational Exposure Limits                                  | potassium peroxymonosulfate (Persulfates, as persulfate)   |         | 0.1                   |          |                        |          |                        |          |   |
| Canada - Prince Edward Island Occupational Exposure Limits                              | potassium peroxymonosulfate (Persulfates)                  |         | 0.1                   |          |                        |          |                        |          | TLV Basis: Skin irritation, measured as persulfates |
| Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits | potassium peroxymonosulfate (Persulphates, as persulphate) |         | 0.1                   |          | 0.3                    |          |                        |          |   |
| Canada - Nova Scotia Occupational Exposure Limits                                       | potassium peroxymonosulfate (Persulfates)                  |         | 0.1                   |          |                        |          |                        |          | TLV Basis: Skin irritation, measured as persulfates |

ENDOELTABLE

### PERSONAL PROTECTION



**OR**

### RESPIRATOR

BR4

EYE

- Chemical goggles.
- Full face shield.

#### **HANDS/FEET**

- Elbow length PVC gloves.

NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

#### **OTHER**

- Overalls.
- PVC Apron.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

#### **ENGINEERING CONTROLS**

- Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### **PHYSICAL PROPERTIES**

Mixes with water.

Corrosive.

Acid.

|                           |               |                                |                |
|---------------------------|---------------|--------------------------------|----------------|
| State                     | DIVIDED SOLID | Molecular Weight               | 307.38         |
| Melting Range (°F)        | Not available | Viscosity                      | Not Applicable |
| Boiling Range (°F)        | Not available | Solubility in water (g/L)      | Miscible       |
| Flash Point (°F)          | Not available | pH (1% solution)               | 2.3            |
| Decomposition Temp (°F)   | Not Available | pH (as supplied)               | Not applicable |
| Autoignition Temp (°F)    | Not available | Vapour Pressure (mmHG)         | Not available  |
| Upper Explosive Limit (%) | Not available | Specific Gravity (water=1)     | 1.25           |
| Lower Explosive Limit (%) | Not available | Relative Vapor Density (air=1) | Not Applicable |
| Volatile Component (%vol) | Not available | Evaporation Rate               | Not available  |

### **APPEARANCE**

White crystalline powder with no odour; very soluble in water. >4.7% active (=available) oxygen. "Triple Salt" is the stable form of the unstable monoperoxydisulfuric acid. Often referred to (misleadingly) as potassium peroxomonosulfate which is the "single salt" KHSO<sub>5</sub>

## Section 10 - CHEMICAL STABILITY

### **CONDITIONS CONTRIBUTING TO INSTABILITY**

- Many of the salts of peroxyacids are unstable or explosive and are capable of initiation by heat, friction or impact, and all are powerful oxidants.

BREThERICK L.: Handbook of Reactive Chemical Hazards.

- Contact with alkaline material liberates heat.

### **STORAGE INCOMPATIBILITY**

- Inorganic acids are generally soluble in water with the release of hydrogen ions. The resulting solutions have pH's of less than 7.0.
- Inorganic acids neutralize chemical bases (for example: amines and inorganic hydroxides) to form salts.
- Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). The products may themselves be capable of further reactions (such as combustion in the air).
- Organic compounds in general have some reducing power and can in principle react with compounds in this class. Actual reactivity varies greatly with the identity of the organic compound.
- Inorganic oxidising agents can react violently with active metals, cyanides, esters, and thiocyanates.
- Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise

reactive. Their reactions with oxidizing agents may be violent.

- Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so-called redox reactions.
- Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
- These trifluorides are hypergolic oxidisers. They ignite on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
- The state of subdivision may affect the results.

For persulfate salts:

- Segregate from organics and other readily oxidisable materials.
- Segregate from powdered metals, phosphorous, hydrides, halogens, acids and alkalis.
- Avoid contact with combustibles, organic matter.
- Avoid reaction with acids, alkalis, halides, heavy metals and combustible material (wood, cloth).
- Contact with metals such as lead, silver, copper, magnesium, zinc, cadmium, nickel, iron and cobalt can lead to catalytic decomposition.
- An explosion hazard when mixed with finely powdered organic matter, metal powders such as aluminium, or reducing agents.
- Avoid reaction with alkaline hydroxide and water.
- Reacts vigorously with hydrazine.
- Dry material may decomposes rapidly above 100 deg C liberating oxygen.
- Wet material may decomposes at 50 deg C with decomposition.
- Liberates oxygen on decomposition.

A vigorous self-sustaining fire resulted from the contact of two flakes of moist potassium hydroxide with potassium persulfate. The fire was extinguished with water but not CO<sub>2</sub> or dry powder.

- Many of the salts of peroxyacids are unstable or explosive and are capable of initiation by heat, friction or impact, and all are powerful oxidants.

BREThERICK L.: Handbook of Reactive Chemical Hazards.

Avoid storage with reducing agents.

potassium peroxymonosulfate sulfate Incompatible with acetone, combustible materials (saw dust, sweeping compounds), salts (sodium, bromine, etc.)+ water. The mixture of "Oxone" with compounds containing halides or active halogens can cause release of respective halogen if moisture is present. For example, mixing sodium dichloroisocyanurate or, sodium chloride, or sodium bromide can cause the release of chlorine or bromine gas. Mixing with cyanides can cause release of hydrogen cyanide gas. Mixing with metal salts such as those of cobalt, nickel, copper or manganese can cause decomposition with release of oxygen and heat.

For incompatible materials - refer to Section 7 - Handling and Storage.

## Section 11 - TOXICOLOGICAL INFORMATION

potassium peroxymonosulfate sulfate

### TOXICITY AND IRRITATION

POTASSIUM PEROXYMONOSULFATE SULFATE:

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY IRRITATION

Oral (Rat) LD50: 2000 mg/kg \*

Dermal (Rabbit) LD50: 11000 mg/kg \*

Inhalation (Rat) LC50: >5000 mg/m<sup>3</sup>/4h \*

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

\*Science Lab MSDS

## Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

## Section 13 - DISPOSAL CONSIDERATIONS

### US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

### Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

‡ Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in

their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

For small quantities of oxidizing agent:

- Cautiously acidify a 3% solution to pH 2 with sulfuric acid.
- Gradually add a 50% excess of sodium bisulfite solution with stirring.

## Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols: None Hazard class or Division: 8

Identification Numbers: UN3084 PG: II

Label Codes: 8, 5.1 Special provisions: IB6, IP2,

T3, TP33

Packaging: Exceptions: None Packaging: Non- bulk: 212

Packaging: Exceptions: None Quantity limitations: 15 kg

Passenger aircraft/rail:

Quantity Limitations: Cargo 50 kg Vessel stowage: Location: C  
aircraft only:

Vessel stowage: Other: None

Hazardous materials descriptions and proper shipping names:

Corrosive solids, oxidizing, n.o.s.

### Air Transport IATA:

ICAO/IATA Class: 8 (5.1) ICAO/IATA Subrisk: None

UN/ID Number: 3084 Packing Group: II

Special provisions: None

Cargo Only

Packing Instructions: 50 kg Maximum Qty/Pack: 15 kg

Passenger and Cargo Passenger and Cargo

Packing Instructions: 863 Maximum Qty/Pack: 859

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 5 kg Maximum Qty/Pack: Y844

Shipping Name: CORROSIVE SOLID, OXIDIZING, N.O.S. \*

(CONTAINS POTASSIUM PEROXYMONOSULFATE SULFATE)

### Maritime Transport IMDG:

IMDG Class: 8 IMDG Subrisk: 5.1

UN Number: 3084 Packing Group: II

EMS Number: F-A , S-Q Special provisions: 274

Limited Quantities: 1 kg

Shipping Name: CORROSIVE SOLID, OXIDIZING, N.O.S.

(contains potassium peroxymonosulfate sulfate)

## Section 15 - REGULATORY INFORMATION

**potassium peroxymonosulfate sulfate (CAS: 70693-62-8,37222-66-5) is found on the following regulatory lists;**

"Canada Domestic Substances List (DSL)", "OECD Representative List of High Production Volume (HPV) Chemicals", "US Toxic Substances Control Act (TSCA) - Inventory"

## Section 16 - OTHER INFORMATION

### Ingredients with multiple CAS Nos

Ingredient Name CAS potassium peroxymonosulfate sulfate 70693-62-8, 37222-66-5

*Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.*

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.  
A list of reference resources used to assist the committee may be found at:  
[www.chemwatch.net/references](http://www.chemwatch.net/references).

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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