1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name  KLOZUR® CR

Synonyms  Sodium Peroxydisulfate; Disodium Peroxydisulfate; Peroxydisulfuric acid, disodium salt; Peroxydisulfuric acid, sodium salt; Calcium Peroxide.

Alternate Commercial Name  KLOZUR® CR 2018

Recommended use of the chemical and restrictions on use

Recommended Use:  In situ and ex situ chemical oxidation of contaminants and compounds of concern for environmental remediation applications

Restrictions on Use  No uses to be advised against were identified.

Manufacturer/Supplier

PeroxyChem LLC
2005 Market Street
Suite 3200
Philadelphia, PA 19103
Phone: +1 267/ 422-2400 (General Information)
E-Mail: sdsinfo@peroxychem.com

Emergency telephone numbers

For leak, fire, spill or accident emergencies, call:
1 800 / 424 9300 (CHEMTREC - U.S.A.)
1 703 / 527 3887 (CHEMTREC - Collect - All Other Countries)
1 303/ 389-1409 (Medical - U.S. - Call Collect)
2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity - Oral</td>
<td>Category 4</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Category 2</td>
</tr>
<tr>
<td>Serious eye damage/eye irritation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Respiratory sensitization</td>
<td>Category 1</td>
</tr>
<tr>
<td>Skin sensitization</td>
<td>Category 1</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Category 3</td>
</tr>
<tr>
<td>Oxidizing Solids</td>
<td>Category 2</td>
</tr>
</tbody>
</table>

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Danger

Hazard Statements
- H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
- H335 - May cause respiratory irritation
- H318 - Causes serious eye damage
- H315 - Causes skin irritation
- H317 - May cause an allergic skin reaction
- H302 - Harmful if swallowed
- H272 - May intensify fire; oxidizer

Precautionary Statements - Prevention
- P261 - Avoid breathing dust.
- P271 - Use only outdoors or in a well-ventilated area
- P285 - In case of inadequate ventilation wear respiratory protection
- P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
- P270 - Do not eat, drink or smoke when using this product
- P264 - Wash face, hands and any exposed skin thoroughly after handling
- P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
- P220 - Keep/Store away from clothing/combustible materials
- P221 - Take any precaution to avoid mixing with combustibles

Precautionary Statements - Response
- P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- P310 - Immediately call a POISON CENTER or doctor/ physician
- P310 - Immediately call a POISON CENTER or doctor
- P302 + P352 - IF ON SKIN: Wash with plenty of water and soap
- P333 + P313 - If skin irritation or rash occurs: Get medical advice/ attention
- P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
- P342 + P311 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor
- P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
- P370 + P378 - In case of fire: Use water spray for extinction
Precautionary Statements - Storage
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed.

Hazards not otherwise classified (HNOC)
No hazards not otherwise classified were identified.

Other Information Risk of decomposition by heat or by contact with incompatible materials

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Persulfate</td>
<td>7775-27-1</td>
<td>40-60</td>
</tr>
<tr>
<td>Calcium Peroxide</td>
<td>1305-79-9</td>
<td>40-60</td>
</tr>
<tr>
<td>Calcium Hydroxide</td>
<td>1305-62-0</td>
<td>8 - 12</td>
</tr>
</tbody>
</table>

### 4. FIRST AID MEASURES

**General Advice**
Remove from exposure, lie down. Show this material safety data sheet to the doctor in attendance.

**Eye Contact**
Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids intermittently. Consult a physician. In case of contact, immediately flush eyes with plenty of water. If symptoms persist, call a physician.

**Skin Contact**
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.

**Inhalation**
Remove from exposure, lie down. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

**Ingestion**
Do NOT induce vomiting. Call a physician or poison control center immediately. Rinse mouth. Drink 1 or 2 glasses of water.

**Most important symptoms and effects, both acute and delayed**
Itching; Redness; Coughing and/or wheezing.

**Indication of immediate medical attention and special treatment needed, if necessary**
Treat symptomatically
5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Water. Cool containers with flooding quantities of water until well after fire is out.

Unsuitable extinguishing media
Do not use carbon dioxide or other gas filled fire extinguishers; they will have little effect on decomposing persulfate.

Specific Hazards Arising from the Chemical
Decomposes under fire conditions to release oxygen that intensifies the fire.

Explosion data
Sensitivity to Mechanical Impact
Not sensitive.

Sensitivity to Static Discharge
Not sensitive.

Protective equipment and precautions for firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Keep off any unprotected persons. Avoid contact with the skin and the eyes. Avoid breathing dust. Wear personal protective equipment.

Other
Never add other substances or combustible waste to product residues. Containers of contaminated waste material should be monitored for signs of decomposition (fuming or smoking).

Environmental Precautions
Knock down dust with water spray. Recover the product in solid form, if possible. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment
Do not return product to the original storage container/tank due to risk of decomposition. Vacuum, shovel or pump waste into a drum and label contents for disposal. Store in closed container. Do not allow material to enter storm or sanitary sewer system.

Methods for cleaning up
Clean up spill area and treat as special waste.

7. HANDLING AND STORAGE

Handling
Wear personal protective equipment. Use only in area provided with appropriate exhaust ventilation. Avoid dust formation. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. Avoid contact with skin and eyes. Avoid breathing dust. Remove and wash contaminated clothing before re-use. Reference to other sections.

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Do not store near combustible materials. Avoid contamination of opened product. Keep away from food, drink and animal feedingstuffs. Avoid formation and deposition of dust.

Incompatible products
Acids, Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Persulfate</td>
<td>TWA: 0.1 mg/m³</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7775-27-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium Hydroxide</td>
<td>TWA: 5 mg/m³</td>
<td>TWA: 15 mg/m³</td>
<td>TWA: 5 mg/m³</td>
<td>Mexico: TWA 5 mg/m³</td>
</tr>
<tr>
<td>1305-62-0</td>
<td></td>
<td>TWA: 5 mg/m³</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Appropriate engineering controls

**Engineering measures**  
Ensure adequate ventilation.

**Individual protection measures, such as personal protective equipment**

- **Eye/face protection**: Eye protection recommended: Tightly fitting safety goggles.
- **Skin and body protection**: Wear suitable protective clothing. Protective shoes or boots.
- **Hand protection**: Protective gloves: Neoprene gloves, Polyvinylchloride, Natural Rubber.
- **Respiratory protection**: Use only with adequate ventilation. Respirator must be worn if exposed to dust.
- **Hygiene measures**: Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Wash hands before breaks and after shifts. Keep work clothes separate, remove contaminated clothing - launder after open handling of product.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

**Information on basic physical and chemical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>British Columbia</th>
<th>Quebec</th>
<th>Ontario TWAEV</th>
<th>Alberta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Fine granules</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical state</td>
<td>Solid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>Off-white</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>odorless</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not applicable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>11.2 (1% solution)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melting/freezing point</td>
<td>Decomposes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>Not applicable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not flammable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
<td>Not applicable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper flammability limit:</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower flammability limit:</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vapor density</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.0 - 1.19 (5 to 30% slurries)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>slightly soluble</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>No information available (inorganic)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>Product is not self-ignitable.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>&gt; 100 °C (assume)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not explosive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>oxidizer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molecular weight</td>
<td>No information available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulk density</td>
<td>51.8 lb/cu ft (loose)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10. STABILITY AND REACTIVITY

Reactivity
Strong oxidizer. Oxidizer. Contact with other material may cause fire.

Chemical Stability
Stable under recommended storage conditions.

Possibility of Hazardous Reactions
Contains a strong oxidizer and will react violently with flammable or reducing agents. Oxidizable material can be ignited by grinding and may become explosive.

Hazardous polymerization
Hazardous polymerization does not occur.

Conditions to avoid
Heat. (decomposes at temperatures >100 °C); Moisture.

Incompatible materials
Acids, Bases, Halides, Oxidizing agents, Strong reducing agents, Combustible materials.

Hazardous Decomposition Products
Incomplete combustion and thermolysis produces potentially toxic gases such as carbon monoxide and carbon dioxide.

11. TOXICOLOGICAL INFORMATION

Product Information
Calcium peroxide and calcium hydroxide are not classified for acute toxicity.

LD50 Oral
No data available for the formulation. 895 mg/kg (rat) Sodium Persulfate

LD50 Dermal
No data available for the formulation. > 10,000 mg/kg (rabbit) Sodium Persulfate

LC50 Inhalation
No data available for the formulation. = > 5.1 mg/L (4-hr) (rat) Sodium Persulfate

Serious eye damage/eye irritation
Severely irritating to the eyes.

Skin corrosion/irritation
Irritating to skin.

Sensitization
Sensitizing to skin and respiratory system. Positive in a local lymph node assay. (based on components).

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
<th>NOAEL Oral Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Persulfate (7775-27-1)</td>
<td>895 mg/kg (Rat)</td>
<td>&gt; 10000 mg/kg (Rabbit)</td>
<td>&gt; 21.6 mg/L (Rat) 4 h</td>
<td></td>
</tr>
<tr>
<td>Calcium Hydroxide (1305-62-0)</td>
<td>7340 mg/kg (Rat)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Information on toxicological effects

Symptoms
Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain, or flushing.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation
corrosivity    Corrosive to eyes. Irritating to respiratory system and skin.

Carcinogenicity
Not recognized as carcinogenic by Research Agencies (IARC, NTP, OSHA, ACGIH).

Mutagenicity
This product is not recognized as mutagenic by Research Agencies

Reproductive toxicity
This product is not recognized as reprotox by Research Agencies.

STOT - single exposure
May cause respiratory irritation.

STOT - repeated exposure
No information available.
Target organ effects: Eyes, Skin, Respiratory System.

Aspiration hazard: No information available.

### 12. ECOLOGICAL INFORMATION

**Ecotoxicity**

#### Ecotoxicity effects

<table>
<thead>
<tr>
<th>Active Ingredient(s)</th>
<th>Duration</th>
<th>Species</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Persulfate</td>
<td>96 h LC50</td>
<td>Rainbow trout</td>
<td>163</td>
<td>mg/L</td>
</tr>
<tr>
<td>Sodium Persulfate</td>
<td>48 h LC50</td>
<td>Daphnia magna</td>
<td>133</td>
<td>mg/L</td>
</tr>
<tr>
<td>Sodium Persulfate</td>
<td>96 h LC50</td>
<td>Grass shrimp</td>
<td>519</td>
<td>mg/L</td>
</tr>
<tr>
<td>Sodium Persulfate</td>
<td>72 h EC50</td>
<td>Algae Selenastrum capricornutum</td>
<td>116</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Toxicity to algae</th>
<th>Toxicity to fish</th>
<th>Toxicity to Microorganisms</th>
<th>Toxicity to daphnia and other aquatic invertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Hydroxide</td>
<td></td>
<td>96 h LC50: = 160 mg/L (Gambusia affinis)</td>
<td>static</td>
<td></td>
</tr>
</tbody>
</table>

**Persistence and degradability**

Biodegradability does not pertain to inorganic substances.

**Bioaccumulation**

Does not bioaccumulate.

**Mobility**

Dissociates into ions.

**Other Adverse Effects**

None known.

### 13. DISPOSAL CONSIDERATIONS

**Waste disposal methods**

This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261). It must undergo special treatment, e.g. at suitable disposal site, to comply with local regulations. Containers of contaminated waste material should be monitored for signs of decomposition (fuming or smoking).

**US EPA Waste Number**

D001.

**Contaminated Packaging**

Empty remaining contents. Dispose of in accordance with local regulations.

### 14. TRANSPORT INFORMATION

#### DOT

- **UN/ID no**: UN 1479
- **Proper Shipping Name**: OXIDIZING SOLID N.O.S.
- **Hazard class**: 5.1
- **Packing Group**: II
- **Reportable Quantity (RQ)**: not applicable

#### TDG

- **UN/ID no**: UN 1479
- **Proper Shipping Name**: OXIDIZING SOLID N.O.S.
- **Hazard class**: 5.1
- **Packing Group**: II
ICAO/IATA
UN/ID no
Proper Shipping Name
Hazard class
Packing Group

IMDG/IMO
UN/ID no
Proper Shipping Name
Hazard class
Packing Group

ADR/RID
UN/ID no
Proper Shipping Name
Hazard class
Packing Group
15. REGULATORY INFORMATION

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories
This product has the following hazards that are reportable under The Emergency Planning and Community Right-to-Know rule (EPCRA Tier II):

- Oxidizer
- Serious eye damage/eye irritation
- Skin corrosion/irritation
- Respiratory/skin sensitization
- Specific Target Organ Toxicity (STOT) - Single Exposure

Clean Water Act
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA/EPCRA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

US State Regulations

U.S. State Right-to-Know Regulations
This product contains the following substances regulated under state Right-to-Know laws:

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Persulfate</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium Peroxide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium Hydroxide</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

California Proposition 65
This product does not contain any Proposition 65 chemicals

CANADA

Environmental Emergencies
This product contains no substances listed under Canada's Environmental Emergency regulations.

Canadian National Pollutant Release Inventory
This product contains no substances reportable under Canada's National Pollutant Release Inventory regulations.

International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA (United States)</th>
<th>DSL (Canada)</th>
<th>EINECS/EL INCS (Europe)</th>
<th>ENCS (Japan)</th>
<th>China (IECSC)</th>
<th>KECL (Korea)</th>
<th>PICCS (Philippines)</th>
<th>AICS (Australia)</th>
<th>NZIoC (New Zealand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Persulfate 7775-27-1 (40-60)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
### 16. OTHER INFORMATION

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health Hazards</th>
<th>Flammability</th>
<th>Stability</th>
<th>Special Hazards</th>
<th>HMIS</th>
<th>Health Hazards</th>
<th>Flammability</th>
<th>Physical hazard</th>
<th>Special precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>OX</td>
<td></td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>J</td>
</tr>
</tbody>
</table>

**NFPA/HMIS Ratings Legend**
- Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0
- Protection=J (Safety goggles, gloves, apron, combination dust and vapor respirator)

**Revision date:** 2018-04-10  
**Revision note:** SDS sections updated: 1, 15  
**Issuing Date:** 2015-07-20

**Disclaimer**

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**Prepared By:**  
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**End of Safety Data Sheet**