1. PRODUCT AND COMPANY IDENTIFICATION

Product Identifier

Product Name KLOZUR® CR

Other means of identification

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 number

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 Category</th>
<th>Description</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
Page 1 / 8
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 intensity fire; oxidizer

Precautionary Statements - Prevention
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
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
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
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
P370 + P378 - In case of fire: Use water 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>Proprietary ingredient</td>
<td>Proprietary</td>
<td>40-60</td>
</tr>
<tr>
<td>Calcium Hydroxide</td>
<td>1305-62-0</td>
<td>8 - 12</td>
</tr>
</tbody>
</table>

Synonyms are provided in Section 1.

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**
Not sensitive.

**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. Avoid penetration into waterways, sewers, soil or groundwater. 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>

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>British Columbia</th>
<th>Quebec</th>
<th>Ontario TWAEV</th>
<th>Alberta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Persulfate</td>
<td>TWA: 0.1 mg/m³</td>
<td>-</td>
<td>TWA: 0.1 mg/m³</td>
<td>TWA: 0.1 mg/m³</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: 5 mg/m³</td>
<td>TWA: 5 mg/m³</td>
<td></td>
</tr>
<tr>
<td>1305-62-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

General information
Protective engineering solutions should be implemented and in use before personal protective equipment is considered.
9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

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

10. STABILITY AND REACTIVITY

Reactivity
- Strong oxidizer.

Chemical Stability
- Stable under recommended storage conditions.

Possibility of Hazardous Reactions
- Use of persulfates in chemical reactions requires appropriate precautions and design considerations for pressure and thermal relief.
- Decomposing persulfates will evolve large volumes of gas and/or vapor, can accelerate exponentially with heat generation, and create significant and hazardous pressures if contained and not properly controlled or mitigated.
- Use with alcohols in the presence of water has been demonstrated to generate conditions that require rigorous adherence to process safety methods and standards to prevent escalation to an uncontrolled reaction.

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
- None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Product Information
Proprietary ingredient 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

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

Information on toxicological effects

Symptoms Dust is irritating eyes, nose, throat, and lungs.

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

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>

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
Containers of contaminated waste material should be monitored for signs of decomposition (fuming or smoking).

US EPA Waste Number D001
Contaminated Packaging Dispose of in accordance with local regulations.

### 14. TRANSPORT INFORMATION

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

**TDG**
- **UN/ID no**: UN 1479
- **Proper Shipping Name**: OXIDIZING SOLID N.O.S. (sodium persulfate, calcium peroxide)
- **Hazard class**: 5.1
- **Packing Group**: II

**ICAO/IATA**
- **UN/ID no**: UN 1479
- **Proper Shipping Name**: OXIDIZING SOLID N.O.S. (sodium persulfate, calcium peroxide)
- **Hazard class**: 5.1
- **Packing Group**: II

**IMDG/IMO**
- **UN/ID no**: UN 1479
- **Proper Shipping Name**: OXIDIZING SOLID N.O.S. (sodium persulfate, calcium peroxide)
- **Hazard class**: 5.1
- **Packing Group**: II

### 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**
- Acute health hazard: Yes
- Chronic health hazard: No
- Fire hazard: Yes
- Sudden release of pressure hazard: No
- Reactive Hazard: No

**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**
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.
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>
<tr>
<td>Trade secret (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>
<tr>
<td>Calcium Hydroxide 1305-62-0 (8-12)</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>

CANADA

WHMIS Hazard Class

C - Oxidizing materials
D2A - Very toxic materials
D2B - Toxic materials
E - Corrosive material

16. OTHER INFORMATION

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: 2015-05-01
Revision note Initial Release

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End of Safety Data Sheet