1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Peracetic Acid 5%

Synonyms: Peroxyacetic Acid Solution; Peracetic Acid Solution; Ethanperoxoic acid

Recommended Use: Oxidizing agent for a variety of organic reactions

Restrictions on Use: The substance should only be used as intended for its industrial purposes

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

EMERGENCY OVERVIEW

Clear liquid with a sharp, pungent, vinegar-like odor
Oxidizing agent: Contact with combustible material may cause fire
Decomposes under fire conditions to release oxygen that intensifies the fire. Use water to keep fire-exposed containers cool

Potential Health Effects

Principal Routes of Exposure: Eye Contact Skin Contact

Eyes: Corrosive to the eyes and may cause severe damage including blindness.
Skin: Contact causes severe skin irritation and possible burns.
Inhalation: Inhalation of vapors in high concentration may cause irritation of respiratory system.
Ingestion: Harmful if swallowed.

Chronic toxicity: Repeated inhalation of the mist may cause inflammation of the upper respiratory tract, chronic bronchitis and etching of the dental enamel.
Peracetic Acid 5%

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Chemical name</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Water</td>
<td>7732-18-5</td>
<td>63 - 65</td>
</tr>
<tr>
<td></td>
<td>Hydrogen Peroxide</td>
<td>7722-84-1</td>
<td>21 - 23</td>
</tr>
<tr>
<td></td>
<td>Acetic Acid</td>
<td>64-19-7</td>
<td>10 - 11</td>
</tr>
<tr>
<td></td>
<td>Peracetic Acid</td>
<td>79-21-0</td>
<td>5 - 6</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye Contact
In case of eye contact, remove contact lenses and rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.

Skin Contact
Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Call a physician immediately.

Inhalation
Move to fresh air. If breathing difficulty or discomfort occurs and persists, obtain medical attention. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

Ingestion
Clean mouth with water and afterwards drink plenty of water. Do NOT induce vomiting. Call a physician or poison control center immediately.

Indication of immediate medical attention and special treatment needed, if necessary
This product can be corrosive to skin, eyes and mucous membranes. Consideration should be given to careful endoscopy as stomach or esophageal burns, perforations or strictures may occur. Careful gastric lavage with an endotracheal tube in place should be considered. Observation may be warranted. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

5. FIRE-FIGHTING MEASURES

Flash point
~ 83 °C

Suitable Extinguishing Media
Cool containers with flooding quantities of water until well after fire is out. Use extinguishing agent suitable for type of surrounding fire.

Unsuitable extinguishing media
Chemical type extinguishers are not effective with peracetic acid or hydrogen peroxide.

Uniform Fire Code
Oxidizer: Class 2--Liquid

Explosion data
- Sensitivity to Mechanical Impact: Not Available
- Sensitivity to Static Discharge: Not Available

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

Protective equipment and precautions for firefighters
Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Wear self-contained breathing apparatus and protective suit.

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health Hazards</th>
<th>Flammability</th>
<th>Stability</th>
<th>Special Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>OX</td>
</tr>
</tbody>
</table>
6. ACCIDENTAL RELEASE MEASURES

Personal Precautions  For personal protection see section 8.

Methods for Containment  Approach release from upwind. Control runoff and isolate discharged material for proper disposal. Do not allow material to enter storm or sanitary sewer system.

Methods for cleaning up  Combustible materials exposed to hydrogen peroxide should be immediately submerged in or rinsed with large amounts of water to ensure that all hydrogen peroxide is removed. Residual hydrogen peroxide that is allowed to dry (upon evaporation hydrogen peroxide can concentrate) on organic materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in fire. Dispose of waste as indicated in Section 13.

Other

7. HANDLING AND STORAGE

Handling  Handle product only in closed system or provide appropriate exhaust ventilation. Drums - Empty as thoroughly as possible. Triple rinse drums before disposal. Avoid contamination; impurities accelerate decomposition. Never return product to original container.

Storage  Keep in a dry, cool and well-ventilated place. Do not store near combustible materials. Containers must be vented. To maintain product quality, do not store in heat or direct sunlight. Keep at temperatures below 30°C. Higher temperatures will accelerate decomposition resulting in loss of assay.

8. EXPOSURE CONTROLS/PERSOINAL PROTECTION

Exposure Guidelines

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>British Columbia</th>
<th>Quebec</th>
<th>Ontario TWA/TV</th>
<th>Alberta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Peroxide 7722-84-1</td>
<td>TWA: 1 ppm</td>
<td>TWA: 1 ppm</td>
<td>TWA: 1 ppm</td>
<td>TWA: 1 ppm</td>
</tr>
<tr>
<td>Acetic Acid 64-19-7</td>
<td>TWA: 10 ppm</td>
<td>TWA: 25 mg/m³</td>
<td>TWA: 10 ppm</td>
<td>TWA: 25 mg/m³</td>
</tr>
<tr>
<td>Peracetic Acid 79-21-0</td>
<td>STEL: 0.4 ppm</td>
<td>STEL: 15 ppm</td>
<td>STEL: 15 ppm</td>
<td>STEL: 15 ppm</td>
</tr>
</tbody>
</table>

Occupational exposure controls

Engineering measures  Ensure adequate ventilation, especially in confined areas.

General information  Protective engineering solutions should be implemented and in use before personal protective equipment is considered.
Respiratory Protection

If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. If exposures are anticipated to be above the limits indicated in the "Exposure Limit" table, an approved, full-face acid/gas cartridge or canister respirator should be used. If concentrations are unknown (significant spill or other emergency) or if they are anticipated to be above 5 ppm for hydrogen peroxide or 50 ppm for acetic acid, the use of a full-face airline supplied respirator or self-contained breathing apparatus (SCBA) is recommended.

Eye/Face Protection

Tightly fitting safety goggles. Face-shield.

Skin and Body Protection

Rubber or neoprene footwear. Impervious clothing materials such as rubber, neoprene, nitrile or polyvinyl chloride. Wear liquid proof rubber or neoprene gloves. Hydrogen peroxide is an ingredient in this product; completely submerge hydrogen peroxide contaminated clothing or other materials in water prior to drying. Residual hydrogen peroxide, if allowed to dry on combustible materials such as paper, fabrics, leather or wood can cause the material to ignite and result in a fire.

Hand Protection

Rubber/latex/neoprene or other suitable chemical resistant gloves. Wash the outside of gloves with soap and water prior to removal. Inspect regularly for leaks.

Hygiene measures

When using, do not eat, drink or smoke. Wear suitable gloves and eye/face protection. Wash hands before breaks and at the end of workday. Wash hands with water as a precaution. Regular cleaning of equipment, work area and clothing is recommended. Avoid breathing vapors, mist or gas.

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>Clear liquid with pungent odor.</td>
</tr>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>Pungent vinegar-like</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>2-3 (1% solution)</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>-29.5 °C</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>99 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>~ 83 °C</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>&gt;1 (BuAc = 1)</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>oxidizer</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>22 mm Hg at 25°C</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.1 @ 20 °C</td>
</tr>
<tr>
<td>Water solubility</td>
<td>completely soluble</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>55 °C (SADT)</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>270 °C</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability

Stable under recommended storage conditions.

Conditions to Avoid

Keep away from open flames, hot surfaces and sources of ignition. Contamination. Combustibles such as paper and wood. Temperatures above 30°C. Higher temperatures will accelerate decomposition resulting in loss of assay.

Materials to avoid

Dirt, alkali, reducing agents, caustic, organics and metals such as iron, copper, chromium, aluminum, and cobalt.

Hazardous Decomposition Products

Acetic acid and oxygen that supports combustion.

Hazardous polymerization

Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION
Peracetic Acid 5%

Acute Effects

Eye irritation
Severely irritating, corrosive (rabbit)

Skin irritation
Severely irritating, corrosive (rabbit)

LD50 Oral
LD50 Rat = 50 -500 mg/kg/bw (35% Peracetic acid)
LD50 rat = 1026-1780 mg/kg/bw (15% Peracetic acid)
LD50 rat = 185-3622 mg/kg/bw (2.6-6.11% Peracetic acid)

LD50 Dermal
LD50 Rat = 1957 mg/kg/bw (15% Peracetic acid)
LD50 rat = 1147 mg/kg/bw (5% Peracetic acid)
LD50 rat = >2000 mg/kg/bw (Peracetic acid 0.15%-0.89%)

LC50 Inhalation
LC50 (4-hr) Rat = 76-189 mg/m³ (15% Peracetic acid)
LC50 (4-h) rat = 204 mg/m³ (5% Peracetic acid)

Sensitization
Did not cause sensitization on laboratory animals

Chronic toxicity
Repeated inhalation of the mist may cause inflammation of the upper respiratory tract, chronic bronchitis and etching of the dental enamel.

Carcinogenicity
Did not show carcinogenic effects in animal experiments Topical applications do not produce skin tumors Not recognized as carcinogenic by Research Agencies (IARC, NTP, OSHA, ACGIH)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Peroxide</td>
<td>A3</td>
<td>Group 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend:
IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
OSHA (Occupational Safety and Health Administration of the US Department of Labor)
X - Present
12. ECOLOGICAL INFORMATION

Ecotoxicity

<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>Peracetic Acid 15%</td>
<td>96 h</td>
<td>Oncorhynchus mykiss (rainbow trout)</td>
<td>0.53</td>
<td>mg/L</td>
</tr>
<tr>
<td>Peracetic Acid 5%</td>
<td>96 h</td>
<td>Bluegill sunfish</td>
<td>1.1</td>
<td>mg/L</td>
</tr>
<tr>
<td>Peracetic Acid 33 d NOEC</td>
<td>Brachydanio rerio</td>
<td>0.00225</td>
<td>mg/L</td>
<td></td>
</tr>
<tr>
<td>Peracetic Acid 5%</td>
<td>96 h</td>
<td>Oncorhynchus mykiss (rainbow trout)</td>
<td>1.6</td>
<td>mg/L</td>
</tr>
<tr>
<td>Peracetic Acid 5%</td>
<td>48 h</td>
<td>Daphnia magna</td>
<td>0.73</td>
<td>mg/L</td>
</tr>
<tr>
<td>Peracetic Acid 12.5%</td>
<td>48 h</td>
<td>Mytilus edulis</td>
<td>0.27</td>
<td>mg/L</td>
</tr>
<tr>
<td>Peracetic Acid 15%</td>
<td>21 d</td>
<td>Daphnia magna</td>
<td>0.05</td>
<td>mg/L</td>
</tr>
<tr>
<td>Peracetic Acid 5%</td>
<td>72 h</td>
<td>Selenastrum capricornutum</td>
<td>0.16</td>
<td>mg/L</td>
</tr>
<tr>
<td>Peracetic Acid 5%</td>
<td>120 h</td>
<td>Selenastrum capricornutum</td>
<td>0.18</td>
<td>mg/L</td>
</tr>
<tr>
<td>Peracetic Acid 5%</td>
<td>72 h</td>
<td>Selenastrum capricornutum</td>
<td>0.061</td>
<td>mg/L</td>
</tr>
<tr>
<td>Peracetic Acid</td>
<td>3 h</td>
<td>Respiration inhibition test (OECD 209)</td>
<td>5.1</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

Persistence and degradability

Peracetic acid is completely miscible with water. Aqueous solutions of peracetic acid hydrolyze to acetic acid and hydrogen peroxide. Product is biodegradable.

Bioaccumulation

Based on its low octanol-water partition coefficient and its rapid degradation in the environment, this product is not bioaccumulative.

Mobility

Peracetic acid released in the environment will partition almost exclusively (>99%) to the water compartment. Only a minor part (<1%) will remain in the atmosphere, where it is expected to undergo rapid decomposition with a half life of 22 minutes. The fate of peracetic acid in the environment is mainly determined by its degradation.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Partition coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic Acid</td>
<td>-0.31</td>
</tr>
</tbody>
</table>

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). If these wastes cannot be disposed of by use according to label instructions, contact appropriate disposal authorities for guidance.

RCRA D Waste Code

D001 (ignitable). D002 (corrosive).

Contaminated Packaging

Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

DOT

UN/ID no          3149
Proper Shipping Name HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE, STABILIZED
Hazard class      5.1
Subsidiary class  8
Peracetic Acid 5%

Packing Group 5.1
Reportable Quantity (RQ) Hazardous Substance/RQ: Not applicable

TDG
UN/ID no 3149
Proper Shipping Name HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE, STABILIZED
Hazard class 5.1
Subsidiary class 8
Packing Group II

ICAO/IATA
Oxidizers are prohibited from aircraft.

IMDG/IMO
UN/ID no 3149
Proper Shipping Name HYDROGEN PEROXIDE AND PEROXYACETIC ACID MIXTURE, STABILIZED
Hazard class 5.1
Subsidiary Hazard Class 8
Packing Group II
Special Provisions When shipped via a vessel, container requires subsidiary placarding to main hazard class placards.

OTHER INFORMATION
Protect from physical damage. Material is shipped in 5 gal. (45 lb.) and 55 gal. (450 lb.) vented linear (not cross-linked) polyethylene containers, as well as linear (not cross-linked) polyethylene IBC's (300 gal.). Do not ship on wooden pallets.

15. REGULATORY INFORMATION

International Inventories
TSCA (United States) Complies
DSL (Canada) Complies
NDSL (Canada) Complies
EINECS/ELINCS (Europe) Complies
ENCS (Japan) Complies
China (IECSC) Complies
KECL (Korea) Complies
PICCS (Philippines) Complies
AICS (Australia) Complies
NZIoC (New Zealand) Complies

U.S. Federal Regulations
SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peracetic Acid</td>
<td>79-21-0</td>
<td>5 - 6</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazard Categories
Acute health hazard Yes
Chronic health hazard Yes
Fire hazard Yes
Sudden release of pressure hazard No
Reactive Hazard Yes

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.
Peracetic Acid 5%

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Peroxide</td>
<td>1000 lb</td>
<td></td>
</tr>
<tr>
<td>Acetic Acid</td>
<td>5000 lb</td>
<td></td>
</tr>
<tr>
<td>Peracetic Acid</td>
<td>500 lb</td>
<td></td>
</tr>
</tbody>
</table>

SARA 302/CERCLA 355 Extremely Hazardous Substances: Hydrogen Peroxide RQ is for concentrations of > 52% only

International Regulations
Mexico - Grade Moderate risk, Grade 2

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Carcinogen Status</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Peroxide</td>
<td>A3</td>
<td>Mexico: TWA 1 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: TWA 1.5 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: STEL 2 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: STEL 3 mg/m³</td>
</tr>
<tr>
<td>Acetic Acid</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: TWA 10 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: TWA 25 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: STEL 15 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mexico: STEL 37 mg/m³</td>
</tr>
</tbody>
</table>

CANADA
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class
C - Oxidizing materials
E - Corrosive material
D2B - Toxic materials
B3 - Combustible liquid

Legend
NPRI - National Pollutant Release Inventory

16. OTHER INFORMATION

<table>
<thead>
<tr>
<th>HMIS</th>
<th>Health Hazards</th>
<th>Flammability</th>
<th>Stability</th>
<th>Special precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>1</td>
<td>h</td>
</tr>
</tbody>
</table>

NFPA/HMIS Ratings Legend
Severe = 4; Serious = 3; Moderate = 2; Slight = 1; Minimal = 0

Protection=H (Safety goggles, gloves, apron, the use of supplied air or SCBA respirator is required in lieu of a vapor cartridge respirator)

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End of Safety Data Sheet