SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFIER: Hydrogen Peroxide (25-35%)

SYNONYMS: Dihydrogen dioxide (solution), Hydrogen peroxide solutions

FORMULA: H₂O₂

PRODUCT CODE: HP0001

FILE NUMBER: HP012000

MANUFACTURED BY: MGC Pure Chemicals America, Inc.
6560 South Mountain Road
Mesa, AZ 85212-9716

PHONE NUMBERS:
Inquiries - (480) 987-9100
Transportation Emergencies
U.S. (800) 424-9300 (Chemtrec)
Maritime (703) 527-3887 (Chemtrec)

SECTION 2 - HAZARDS IDENTIFICATION

************************* EMERGENCY OVERVIEW *************************

Hazard Classification: Oxidizer (category 2), Corrosive (category 2), Eye irritant (category 1), Respiratory irritant (category 3)

Danger! This product is a clear, colorless, corrosive liquid with a slightly acrid odor. Causes severe skin burns and eye damage. Inhalation of concentrated vapors can cause irritation to the nose and throat.

This material is an oxidizer. Contact with clothing may cause fire. Contact with organic liquids or vapors may cause fire or explosion. Keep away from combustible materials.

Avoid contact with skin, eyes and clothing. Do not breath vapors or mists. Wear protective clothing and gloves, and eye and face protection. Wash thoroughly after handling.

This material is considered hazardous under the OSHA Hazard Communication Std (29 CFR 1910.1200).

Section 3 continued on next page
SECTION 2 - HAZARDS IDENTIFICATION (continued)

POTENTIAL HEALTH EFFECTS

LIKELY ROUTES OF EXPOSURE:
   Eye and skin contact, and inhalation

EYES:
   Liquid can cause severe irritation that may result in permanent eye damage. May cause ulceration of the cornea.

SKIN:
   Can cause severe irritation, even burns upon prolonged contact. May result in bleaching of the hair and skin.

INGESTION (swallowing):
   Can cause severe irritation and burns to the mouth, throat and upper gastrointestinal tract.

INHALATION (breathing):
   Excessive inhalation of vapors may cause irritation to the nose, throat and respiratory tract. In severe cases, exposure may result in pulmonary edema and death. Persons with pre-existing lung conditions may be particularly susceptible.

CHRONIC EFFECTS/CARCINOGENICITY:
   The International Agency for Research on Cancer (IARC) has concluded that there is inadequate evidence for carcinogenicity of hydrogen peroxide in humans, but limited evidence in experimental animals (Group 3 - not classifiable as to its carcinogenicity to humans). The American Conference of Governmental Industrial Hygienists (ACGIH) has concluded that hydrogen peroxide is a 'Confirmed Animal Carcinogen with unknown Relevance to Humans’ (A3). Hydrogen peroxide is not regulated by OSHA as a carcinogen, nor is it listed in NTP.

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>%</th>
<th>CAS No.</th>
<th>EC No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen peroxide</td>
<td>25-35</td>
<td>7722-84-1</td>
<td>231-765-0</td>
</tr>
<tr>
<td>Water</td>
<td>65-75</td>
<td>7732-18-5</td>
<td>231-791-2</td>
</tr>
</tbody>
</table>
SECTION 4 - FIRST AID MEASURES

EYE CONTACT:
Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids occasionally. Get medical attention. Do not use chemical antidote.

SKIN CONTACT:
Flush with large amounts of water for at least 15 minutes. If irritation persists, or open sores develop, contact a physician. Remove contaminated clothing and launder before re-use.

INGESTION (swallowing):
Immediately drink two large glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Contact a physician.

INHALATION (breathing):
If affected, move to fresh air. If breathing has stopped, give artificial respiration and call a physician.

NOTE TO PHYSICIAN:
Hydrogen peroxide, at this concentration, is a strong oxidant. Direct contact with the eye is likely to cause corneal damage especially if not washed immediately. Careful ophthalmologic evaluation is recommended and the possibility of local corticosteroid therapy should be considered. Because of the likelihood of corrosive effects on the gastrointestinal tract after ingestion, and the unlikelihood of systemic effects, attempts at evacuating the stomach via emesis induction or gastric lavage should be avoided. There is a remote possibility, however, that a nasogastric or orogastric tube may be required for the reduction of severe distension due to gas formation.

Pulmonary edema may be delayed for 24-72 hours after inhalation of excessive amounts.

SECTION 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA:
Use media appropriate for other materials involved in the fire. Dilute with large amounts of water, if safe to do so, to reduce the potential for re-ignition.

Section 5 continued on next page
SECTION 5 - FIRE FIGHTING MEASURES (continued)

SPECIFIC HAZARDS:
This material is a strong oxidizer. Although this product will not burn, it releases large quantities of oxygen, which can intensify a fire. Contact between this product and organic liquids or vapors may result in fire or explosion.

PROTECTION OF FIREFIGHTERS:
Keep personnel removed from and upwind. Wear full protective clothing and self-contained breathing apparatus with full face-piece. Flood area with lots of water. Cool containers with water.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Persons not wearing protective equipment should be excluded from the area of the spill until clean up has been completed. Dike area of spill with sand or dirt to prevent spreading and prevent contact with organic materials. Pump liquid to a salvage tank for treatment and disposal. Dilute remaining liquid to 5-10% hydrogen peroxide and neutralize with sodium metabisulfite or sodium sulfite. Remaining liquid may be absorbed on vermiculite or other non-combustible material and shoveled into containers.

Caution: material absorbed on absorbent may continue liberating oxygen. Do not seal containers. Do not store containers near combustible materials.

SECTION 7 - HANDLING AND STORAGE

HANDLING:
Use caution when handling this material; product may react explosively with organic liquids or vapors. Avoid contact with flammable or combustible materials. Avoid contamination from any source including metals, dust and organic materials. Do not return used or unused peroxide to original container; dispose of in accordance with Section 13 - Disposal Considerations. This product is an oxidizer, which may liberate oxygen and promote combustion of flammable materials. Avoid concentrating hydrogen peroxide by removal of water. Drying of product on combustible material may cause fire or explosion.

Avoid contact with skin, eyes and clothing. Avoid inhalation of vapors. Wash thoroughly after handling.

Section 7 continued on next page
SECTION 7 - HANDLING AND STORAGE (continued)

STORAGE:
Store only in vented containers. Store in a cool, dry, well-ventilated area, away from flammable or combustible materials. Have a source of water available near the storage area. Check storage area periodically for bulging containers. For shelf-life limitations and recommendations – contact supplier.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES:

<table>
<thead>
<tr>
<th>Chemical</th>
<th>OSHA PEL 1 ppm (1.4 mg/M³)</th>
<th>ACGIH TLV 1 ppm (1.4 mg/M³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen peroxide (CAS# 7722-84-1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ENGINEERING CONTROLS:
Provide sufficient ventilation to maintain exposure below established exposure limits.

EYE / FACE PROTECTION:
Chemical splash goggles in compliance with OSHA regulations and full face-shield made of polycarbonate, acetate, polycarbonate/acetate, PETG or thermoplastic, are advised.

SKIN PROTECTION:
Wear impervious clothing such as a protective suit made of rubber, Gore-Tex, or a specialized HAZMAT suit (Level A, B, or C). For foot protection, wear approved boots made of rubber, PVC, or neoprene. DO NOT wear any form of boot made of nylon or nylon blends. For hand protection, wear approved gloves made of nitrile, PVC, or neoprene. DO NOT use cotton, wool or leather, as these materials react RAPIDLY with higher concentrations of hydrogen peroxide.

Completely submerge contaminated clothing or other materials in water prior to drying. Residual hydrogen peroxide, if allowed to dry on materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.

Section 8 continued on next page
MGC PURE CHEMICALS AMERICA, Inc.

MATERIAL SAFETY DATA SHEET

Product Name: **Hydrogen Peroxide (25-35%)**
Preparation date: May 5, 2010

**SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION (continued)**

RESPIRATORY PROTECTION:
A NIOSH/MSHA approved respirator is recommended if there is insufficient ventilation to maintain exposures below established exposure limits. Do not use an air-purifying respirator.

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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<tbody>
<tr>
<td>Appearance:</td>
<td>Clear, colorless liquid @ 77°F (25°C)</td>
</tr>
<tr>
<td>Odor:</td>
<td>Slightly acrid odor</td>
</tr>
<tr>
<td>Odor Threshold:</td>
<td>Unavailable</td>
</tr>
<tr>
<td>pH:</td>
<td>1-4 (30% solution)</td>
</tr>
<tr>
<td>Freezing Point:</td>
<td>-15°F (-26°C) (30% solution)</td>
</tr>
<tr>
<td>Initial Boiling Point:</td>
<td>223°F (106°C) @ 760 mm Hg (30% solution)</td>
</tr>
<tr>
<td>Flash Point:</td>
<td>None - Closed Cup</td>
</tr>
<tr>
<td>Evaporation Rate:</td>
<td>Slower (Ethyl Ether = 1)</td>
</tr>
<tr>
<td>Upper Explosion Limit:</td>
<td>Unavailable</td>
</tr>
<tr>
<td>Lower Explosion Limit:</td>
<td>Unavailable</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg):</td>
<td>25 mm Hg (3.2 kPa) @ 86°F (30°C)</td>
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<tr>
<td>Vapor Density (Air = 1):</td>
<td>Unavailable</td>
</tr>
<tr>
<td>Relative Density (H₂O=1):</td>
<td>1.112 @ 68°F (20°C) 30% solution</td>
</tr>
<tr>
<td>Solubility in Water:</td>
<td>Complete</td>
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<tr>
<td>Partition Coefficient:</td>
<td>Unavailable (n-octanol/water)</td>
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<tr>
<td>Autoignition Temperature:</td>
<td>Not combustible</td>
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<tr>
<td>Decomposition Temperature:</td>
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<tr>
<td>Viscosity:</td>
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</table>

**SECTION 10 - STABILITY AND REACTIVITY**

STABILITY (conditions to avoid):
Heat or contamination may result in decomposition, which may be violent.

INCOMPATIBILITIES (materials to avoid):
Avoid contact with organic materials, flammable and combustible materials, cyanides, nitric acid, potassium permanganate and other strong oxidizers and reducing agents. Metals, such as platinum, silver, copper, iron, chromium or manganese, cause this material to rapidly decompose.

HAZARDOUS DECOMPOSITION PRODUCTS:
Decomposition releases large quantities of oxygen and steam, which may cause containers to rupture.

HAZARDOUS POLYMERIZATION:
Not known to occur
Toxicological information is based on various literature sources.

**Acute toxicity**
- Oral LD$_{50}$ (male rats) - 1,518 mg/kg (9.6% H$_2$O$_2$)
- Oral LD$_{50}$ (rats) - 1232 mg/kg (35% H$_2$O$_2$)
- Dermal LD$_{50}$ (rabbits) - >2,000 mg/kg (35% H$_2$O$_2$)
- Inhalation LC$_{50}$ (rats) - >2,000 ppm (90% H$_2$O$_2$)

**Eye irritation**
- Irritating at concentrations of 5% or less; severely irritating to corrosive at concentrations of 5% or more.

**Skin irritation**
- Corrosive at concentrations of 50% or more

**Sensitization**
- Not a skin sensitizer

**Subacute toxicity**
- Male rats were administered 60 mg/kg/day (0.6% H$_2$O$_2$). Suppression in growth rate observed after day 20.

- Male rats were administered 56.2 mg/kg/day (5% H$_2$O$_2$) for twelve weeks. No adverse effects noted.

**Carcinogenicity**
- Mice were administered water containing 0.1 and 0.4% H$_2$O$_2$ for a period of 740 days. Some mice have developed duodenal cancer. FDA and other organizations have reviewed this study and concluded that there is insufficient evidence that hydrogen peroxide is carcinogenic.

- Rats were administered water containing 0.3 and 0.6% H$_2$O$_2$ for a period of 78 weeks. No carcinogenic effects were noted.

**Mutagenicity**
- Weak mutagenicity-inducing property to *salmonella* and *typhimurium* bacteria
SECTION 11 - TOXICOLOGICAL INFORMATION (continued)

Reproductive toxicity

Female rats treated with 10% $H_2O_2$ produced offspring of lower body weight and some structural abnormalities. These changes were attributed to maternal toxicity.

Other limited animal studies demonstrate no reproductive toxicity.

SECTION 12 - ECOLOGICAL INFORMATION

Toxicological information is based on various literature sources.

Aquatic toxicity (saltwater)

24-hr. $LC_{50}$ (Rabbit fish) - 224 mg/L
24-hr. $LC_{50}$ (Striped triple-tooth goby) - 155 mg/L
24-hr. $LC_{50}$ (Yellowfin horse mackerel) - 89 mg/L

Aquatic toxicity (fresh water)

48-hr. $LC_{50}$ (Carp) - 41 mg/L
96-hr. $LC_{50}$ (Catfish) - 37.4 mg/L

SECTION 13 - DISPOSAL CONSIDERATIONS

Dispose of in accordance with all applicable local, state and federal regulations. Material should be sent to a registered hazardous waste treatment facility for disposal. Hydrogen peroxide should be treated by diluting to a concentration of 5-10%, then reacting with a reducing agent such as sodium sulfite or sodium metabisulfite.

This product, if disposed of, is considered an ignitable waste (D001) under current RCRA regulations.
SECTION 14 - TRANSPORT INFORMATION

U.S DOT, TDG (Canadian), ICAO (air) and IMO (water) shipping description:
UN 2014, Hydrogen peroxide, aqueous solutions (25-35%), 5.1, (8), PG II

SECTION 15 - REGULATORY INFORMATION

TSCA INFORMATION:
All components in this product are in compliance with the TSCA Inventory requirements.

EINECS:
This product is on the European Inventory of Existing Chemical Substances under 231-765-0.

CEPA:
This product is listed on the Canadian Domestic Substances List (DSL).

WHMIS:
Product Identification Number: 2014
Hazard Classification / Division: Class C (Oxidizer), Class D, Div. 2, Subdiv. B. (Toxic), Class E (Corrosive)

SARA 313 INFORMATION:
SARA requires submission of annual reports of release of toxic chemicals that appear in 40 CFR 372. This information must be included in all MSDS that are copied and distributed for this material.

Components present in this product at a level that could require reporting under the statute are: None
SECTION 16 - OTHER INFORMATION

HAZARD, RISK AND SAFETY PHRASES:

EC Symbols: O (oxidizer, C (corrosive) Xn (harmful)
EC Risk Phrases: R8, R22, R34, R41
EC Safety Phrases: S1/2, S3, S28, S36/39, S45

HAZARD RATING:

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<th>NFPA</th>
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<td>FIRE</td>
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<tr>
<td>REACTIVITY</td>
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<td>1</td>
</tr>
<tr>
<td>OTHER</td>
<td>-</td>
<td>Oxidizer</td>
</tr>
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<td></td>
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REASON FOR REVISION:
Reviewed and updated to GHS

The product information contained herein is believed to be accurate as of the date of the Material Safety Data Sheet, and is provided without warranty, expressed or implied, as to the results of use of this information or the product to which it relates. Recipient assumes all responsibility for the use of this information and the use (alone or in combination with any other product), storage or disposal of the product, including any resultant personal injury or property damage.

****END OF REPORT****