Hydrogen Peroxide 20-60%

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Material Safety Data Sheet

Chemical: Hydrogen Peroxide 20-60%

NFPA: H=3 F=0 I= 1 S=OX
HMIS: H=3 F=0 R=1 PPE= Supplied by user; dependent on conditions

MSDS Number: H2O2-2060-0105
Effective Date: 20 January 2005
Issued by: Solvay Chemicals, Inc. Regulatory Affairs Department

Not valid three years after effective date or after issuance of superseding MSDS, whichever is earlier. French or Spanish translations of this MSDS may be available. Check www.solvaychemicals.us or call Solvay Chemicals, Inc. to verify the latest version or translation availability.

Material Safety Data Sheets contain country specific regulatory information; therefore, the MSDS's provided are for use only by customers of Solvay Chemicals, Inc. in North America. If you are located in a country other than the UnitedStates, please contact the Solvay Group company in your country for MSDS information applicable to your location.

1. Company and Product Identification

1.1 Product Name: Hydrogen Peroxide 20-60%

Chemical Name: Hydrogen Peroxide, Aqueous Solution

Synonyms: Hydrogen dioxide, hydroperoxide, peroxide

Chemical Formula: H_2O_2

Molecular Weight: 34

CAS Number: 7722-84-1

EINECS Number: 231-765-0

Grades/Trade Names:
27.5% - Technical
31% - Electronic , Electronic Low Carbon, UltraPure, UltraHigh Purity, UltraPure Plus, Pico-Pure™
35% - Technical, Technical 35/D, Cosmetic, Food, PFP™, Chemical, High Purity Food
40% - Technical
50% - Technical, Technical 50/D, Dilution, Cosmetic, Electronic, Food, PFP™, UltraPure, Chemical, Chemical LP, SVP-HP®(1)

(1) SVP-HP® is a trademark of EKA Chemicals

1.2 Recommended Uses: Used in bleaching textiles, food, hair, paper and other materials; component of rocket propellant; used in the manufacture of a wide range of chemicals, plastics, pharmaceuticals; used in photography, electroplating, water treatment and wastewater treatment.

1.3 Supplier:
Solvay Chemicals, Inc.
PO BOX 27328 Houston, TX 77227-7328
3333 Richmond Ave. Houston, Texas 77098

Solvay Chemicals

Interox, Fluorides & Minerals

Hydrogen Peroxide 20-60%

Material Safety Data Sheet

1.4 Emergency Telephone Numbers

General: 1-877-765-8292 (Solvay Chemicals, Inc.,)
Emergencies (USA): 1-307-872-6688 (Solvay Chemicals, Green River, WY)
1-281-479-2826 (Solvay Chemicals, Deer Park, TX)
Transportation Emergencies (USA): 1-800-424-9300 (CHEMTREC®)
Transportation Emergencies (INTERNATIONAL/MARITIME): 1-703-527-3887 (CHEMTREC®)
Transportation Emergencies (CANADA): 1-613-996-6666 (CANUTEC)
Transportation Emergencies (MEXICO-SETIQ): 91-800-00-214-00 (MEX. REPUBLIC)
-0-11-525-559-1588 (elsewhere)

2. Composition/Information on Ingredients

INGREDIENTS	FORMULA	MOLECULAR WT.	WT. PERCENT	CAS #	EINECS #
Hydrogen Peroxide	H_2O_2	34	20-60	7722-84-1	231-765-0
Water	H_2O	18	balance	7732-18-5	

3. Hazards Identification

Emergency Overview:

- Toxicity effects principally related to its corrosive properties.
- Non-combustible, but may contribute to the combustion of other substances and causes violent and sometimes explosive reactions.
- May be fatal if swallowed.

3.1 Route of Entry: Inhalation: Yes Skin: Yes Ingestion: Yes

3.2 Potential Effects of exposure:

- Corrosive to mucous membranes, eyes and skin.
- The seriousness of the lesions and the prognosis of intoxication depend directly on the concentration and duration of exposure.

Inhalation:

- Nose and throat irritation.
- Cough.
- In case of repeated or prolonged exposure; risk of sore throat, nose bleeds, chronic bronchitis.

Eyes:

- Severe eye irritation, watering, redness and swelling of the eyelids.
- Risk of serious or permanent eye lesions.

Skin contact:

- Irritation and temporary whitening at contact area.
- Risk of burns.

Ingestion:
- Paleness and cyanosis of the face.
- Severe irritation, risk of burns and perforation of the gastrointestinal tract accompanied by shock.
- Excessive fluid in the mouth and nose, with risk of suffocation.
- Risk of throat, edema (fluid in lungs) and suffocation.
- Nausea, vomiting (bloody).
- Cough.
- Risk of chemical pneumonitis from product inhalation.

Carcinogenicity: See section 11.3

4. First-Aid Measures

General Recommendations:
- In case of product splashing into the eyes and face, treat eyes first.
- Do not dry soiled clothing near an open flame or incandescent heat source.
- Submerge soiled clothing in water prior to drying.

4.1 Inhalation:
- Remove the subject from the contaminated area.
- Consult with a physician in case of respiratory symptoms.

Eyes:
- Flush eyes as soon as possible with running water for 15 minutes, while keeping the eyelids open.
- In the case of difficulty of opening the lids, administer an analgesic eye wash (oxybuprocaine).
- Consult with an ophthalmologist in all cases.

Skin:
- Remove contaminated shoes, socks and clothing, under a shower if necessary; wash the affected skin with running water.
- Keep warm (blanket), provide clean clothing.
- Consult with a physician in all cases.

Ingestion:
- Consult with a physician immediately in all cases.
- Take to a hospital.

If the subject is completely conscious:
- Rinse mouth with fresh water.
- Do not give anything to drink.
- Do not induce vomiting.

If the subject is unconscious:
- NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSIOUS PERSON.
- Loosen collar and tight clothing, lay the victim on his/her left side.
- Oxygen or pulmonary resuscitation if necessary.
- Keep warm (blanket).

4.2 Medical Treatment/Notes to Physician:
Inhalation: Negligible

Eyes: On the advice of the ophthalmologist.

Skin: Usual treatment for burns.

Ingestion:
- Oxygen therapy via intra-tracheal intubation.
- If necessary, tracheotomy.
- Placement of gastric catheter to release stomach gases.
- Avoid gastric lavage risk of perforation.
- In case of intense pain: inject an I.M. morphomimetic drug (piritramide) before taking to hospital.
- Prevention or treatment for shock and pulmonary edema.
- Urgent digestive endoscopy with aspiration of the product.
- Treatment of gastrointestinal tract burns and resulting effects.

5. Fire-Fighting Measures

5.1 Flash point: Non-flammable.

5.2 Auto-ignition
Temperature: Non-flammable.

5.3 Flammability Limits: Non-flammable.

5.4 Unusual Fire and Explosion Hazards:
- Oxidizer
- With flammable liquids
- With certain materials (see section 10).
- In case of heating.

5.5 Extinguishing Methods
Common:
- Large quantities of water, water spray.
- No restriction

Inappropriate extinguishing means: No restriction.

5.6 Fire Fighting Procedures
Specific hazards:
- Oxygen released on exothermic decomposition may support combustion in case of surrounding fire.
- Oxidizing agent, may cause spontaneous ignition with combustible materials.
- Contact with flammables may cause fire or explosions.
- Pressure burst may occur due to decomposition in confined spaces/containers.

Protective measures in case of intervention:
- Evacuate all non-essential personnel.
- Intervention should only be made by personnel who are trained and aware of the hazards of product.

- Wear self contained breathing apparatus when in close proximity or in confined spaces.
- When intervention in close proximity, wear full protective acid resistant suit.
- After intervention, proceed to clean the equipment. Take a shower, remove clothing carefully, clean and check.

Other precautions:

- If safe to do so, remove the exposed containers, or cool with large quantities of water.
- Stay upwind.
- Keep at a safe distance in a protected location.
- Never approach containers which have been exposed to fire, without cooling them sufficiently.

6. Accidental Release Measures

6.1 Precautions:

- Observe protective measures given in section 5 and 8.
- Isolate area.
- Approach from upwind.
- Avoid materials and products which are incompatible with the product (see section 10).
- If safe to do so, without exposing personnel, try to stop the spillage.
- In case of contact with combustible materials, avoid product drying out by dilution with water.

6.2 Cleanup methods:

- If possible dam large quantities of liquid with sand or earth.
- Dilute with large quantities of water.
- Do not add chemical products.
- For disposal methods, refer to section 13.
- In order to avoid the risk of contamination, the recovered product must not be returned to the original tank/container.

6.3 Precautions for protection of the environment:

- Immediately notify the appropriate authorities in case of reportable spill.
- The National Transportation Safety Board (NTSB) and Federal Aviation Administration (FAA) have requested the following information be provided:

  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 a fire.

Hydrogen Peroxide 20-60%

Material Safety Data Sheet

7. Handling and Storage

7.1 Handling:

- Operate in a well-ventilated area.
- Keep away from heat sources.
- Keep away from incompatible products.
- Prevent all contact with organics.
- Use equipment and containers which are compatible with the substance.
- Before all operations, passivate the piping circuits and vessels.
- Never return unused product to storage container.
- Ensure an adequate supply of water is available in the event of an accident.
- Containers and equipment used to handle hydrogen peroxide should be used exclusively for hydrogen peroxide.

7.2 Storage:

- Store in a ventilated, cool area.
- Store away from heat sources.
- Keep away from incompatible products (see section 10).
- Keep away from combustible substances.
- Keep in container fitted with safety valve or vent.
- Keep in original packaging, closed.
- Provide containment diking for storage of the packages and transfer installation.
- Regularly check the condition and temperature of the containers.
- For bulk storage recommendations, consult Solvay Chemicals, Inc.

7.3 Specific Uses: See Section 1.2

7.4 Other precautions:

- Warn personnel of the dangers of the product.
- Follow the protective measures given in section 8.
- Do not confine the product in the circuit, between closed valves, or in a container without a vent.

7.5 Packaging: Consult Solvay Chemicals for the proper packaging material for specific grades of hydrogen peroxide.

- Aluminum 99.5 %
- Stainless steel 304 L and 316 L.

8. Exposure Controls/Personal Protection

8.1 Exposure Limit Values - Hydrogen peroxide:

Authorized limit Values	TLV® ACGIH®-USA (2002)	OSHA PEL	NIOSH REL (1994)
Hydrogen peroxide	1 ppm TWA	1 ppm TWA	1 ppm TWA
	1.4 mg/m^3 TWA	1.4 mg/m^3 TWA	1.4 mg/m^3 TWA

ACGIH® and TLV® are registered trademarks of the American Conference of Governmental Industrial Hygienists.

Hydrogen Peroxide 20-60%
Material Safety Data Sheet

8.2 Exposure Controls:

8.2.1 Occupational Exposure Controls:

8.2.1.1 Ventilation:
- Provide local ventilation.
- Follow the protective measures given in section 7.
- Provide ventilation in work areas to keep exposure below applicable limits. See Section 8.1

8.2.1.2 Respiratory protection: NIOSH approved full-face supplied air respirator for excessive concentrations.

8.2.1.3 Hand protection: Chemical resistant protective gloves made of PVC or rubber.

8.2.1.4 Eye protection: Wear protective goggles for all industrial operations. If a risk of splashing exists, wear goggles and face shield.

8.2.1.5 Skin protection: Consult your industrial hygienist or safety manager for the selection of personal protective equipment suitable for the working conditions.

8.3 Other precautions:
- An eyewash and safety shower should be nearby and ready for use.
- Use good hygiene practices when handling this product including changing work clothes after use.
- Do not eat, drink or smoke in areas where this material is handled.

8.4 Other information: The National Transportation Safety Board (NTSB) and Federal Aviation Administration (FAA) have requested the following information be provided:

Completely submerge hydrogen peroxide 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.

9. Physical and Chemical Properties

9.1 Appearance: Colorless liquid

Odor: Slightly pungent

9.2 Important Health, Safety and Environmental information:

pH: 1-4

Change of state:

Melting point: -33°C (-27°F) for 35% hydrogen peroxide
-52°C (-62°F) for 50% hydrogen peroxide

Boiling point: 108°C (226°F) @ 1.013 bar (760 mmHg) for 35% hydrogen peroxide
115°C (239°F) @ 1.013 bar (760 mmHg) for 50% hydrogen peroxide

Decompositon Temperature:
≥ 60°C (140°F) Self-accelerated decomposition temperature (SADT) with oxygen release

Flash Point: Non-Flammable

Hydrogen Peroxide 20-60%
Material Safety Data Sheet

Flammability: (solid, gas) Non-Flammable

Explosive Properties: See Section 4

Oxidizing Properties: Oxidizer, See Section 4

Vapor Pressure:
Total Pressure (H_2O_2 + H_2O): 12 mbar (9.0 mmHg) @ 20°C (68°F) for 50% hydrogen peroxide
72 mbar (54 mmHg) @ 50°C (122°F) for 50% hydrogen peroxide
Partial (H_2O_2): 1 mbar (0.75 mmHg) @ 30°C (86°F) for 50% hydrogen peroxide

Relative Density:
Specific gravity (H_2O=1): 1.1 @ 20°C (68°F) for 27.5% hydrogen peroxide
1.2 @ 20°C (68°F) for 50% hydrogen peroxide

Solubility:
Water: Complete in water.
Fat: Not Applicable.

Partition coefficient: P (n-octanol/water): Not applicable

Viscosity: 1.07 mPa. s @ 20°C (68°F) for 27.5% hydrogen peroxide
1.17 mPa. s @ 20°C (68°F) for 50% hydrogen peroxide

Vapor Density (air=1): 1.0 for 50% hydrogen peroxide

Evaporation Rate: No data.

9.3 Other Information:

Surface Tension: 74 mN/m @ 20°C (68°F) for 27.5% hydrogen peroxide
75.6 mN/m @ 20°C (68°F) for 50% hydrogen peroxide

10. Stability and Reactivity

Stability: Stable under normal conditions of use with slow gas release.

10.1 Conditions to avoid:
- Heat/Sources of heat
- Contamination

10.2 Materials and substances to avoid:
- Acids
- Bases
- Metals
- Salts of metals
- Reducing agents
- Organic materials
- Flammable substances

10.3 Hazardous decomposition products: Oxygen; Decomposition releases steam and heat.

10.4 Hazardous Polymerization: Will not occur.

10.5 Other information: None.

Hydrogen Peroxide 20-60%
Material Safety Data Sheet

11. Toxicological Information

11.1 Acute toxicity:

Inhalation:

- Inhalation, LC_{50} , 4 hours, rat, 2000 mg/m³
- Inhalation, LC_{0} , 1 hour, mouse, 2170 mg/m³

Oral:

- Oral route, LD_{50}, rat, 1232 mg/kg for 35% hydrogen peroxide
- Oral route, LD_{50}, rat, 841 mg/kg for 60% hydrogen peroxide

Dermal: Dermal route, LD_{50}, rabbit, > 2000 mg/kg for 35% hydrogen peroxide

Irritation:

- Rabbit, Serious damage (eyes) for 70% hydrogen peroxide
- Rabbit, Irritant (skin) for < 50% hydrogen peroxide
- Rabbit, Corrosive (skin) 1 hour, for 50% hydrogen peroxide
- Mouse, Respiratory irritation (RD_{50}), 665 mg/m³

Sensitization: Guinea Pig, Nonsensitizing (skin).

Comments:

- Toxic effect linked with corrosive properties.
- The carcinogenic effect found in animals is not demonstrated in humans

11.2 Chronic toxicity:

- In vitro, without metabolic activation, mutagenic effect.
- In vivo, no mutagenic effect.
- Oral route, after prolonged exposure, mouse.
- Target organ: duodenum, carcinogenic effect.
- Dermal route, after prolonged exposure, mouse, no carcinogenic effect.
- Oral route, after prolonged exposure, rat, no carcinogenic effect.
- Oral route, after prolonged exposure, rat/mouse.
- Target organ: gastro-intestinal system, observed effect.
- Inhalation, after repeated exposure, dog, 7 ppm, irritating effect.

11.3 Carcinogenic Designation:

- IARC (International Agency for Research on Cancer): 3 - Not Classifiable as to Carcinogenicity to Humans.
- TLV A3 - Animal carcinogen: Agent is carcinogenic in experimental animals at relatively high dose, by route(s) of administration, at site(s), of histologic types(s), or by mechanism(s) not considered relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence suggests that the agent is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.

Hydrogen Peroxide 20-60%
Material Safety Data Sheet

12. Ecological Information

12.1 Acute ecotoxicity:
- Fish, Pimephales promelas; LC_{50} , 96 hours, 16.4 mg/L; NOEC, 96 hours, 5 mg/L
- Crustaceans, Daphnia pulex; EC_{50}, 48 hours, 2.4 mg/L; NOEC, 48 hours, 1 mg/L
- Algae, various species; EC_{50}, 72 to 96 hours, 3.7 to 160 mg/L in fresh water
- Algae, Nitzchia closterium; EC_{50}, 72 to 96 hours, 0.85 mg/L in salt water

12.2 Chronic ecotoxicity: No data.

12.3 Mobility:
- Air, Henry's law constant (H) = 1 mPa.m³/mol @ 20°C (68°F) Result: non-significant volatility.
- Air, condensation on contact with water droplets. Result: rain washout.
- Water - Non-significant evaporation.
- Soil/sediments - Non-significant evaporation and adsorption

12.4 Degradation

Abiotic:
- Air, indirect photo-oxidation, $t_{½}$ 10 to 20 hours. Conditions: sensitizer: OH radical.
- Water, redox reaction, $t_{½}$ 2.5 days, 10,000 ppm. Conditions: mineral and enzymatic catalysis/fresh water.
- Water, redox reaction, $t_{½}$ 20 days, 100 ppm. Conditions: mineral and enzymatic catalysis/fresh water.
- Water, redox reaction, $t_{½}$ 60 hours. Conditions: mineral and enzymatic catalysis/salt water.
- Soil, redox reaction, $t_{½}$ 15 hour(s). Conditions: mineral catalysis.

Biotic:
- Aerobic, $t_{½} < 1$ minutes in biological treatment sludge. Result: rapid and considerable biodegradation.
- Aerobic, $t_{½}$ between 0.3 to 2 days in fresh water. Result: rapid and considerable biodegradation.
- Effects on biological treatment plants, > 200 mg/l. Result: inhibitory action.

12.5 Potential for bioaccumulation: Result: non-bioaccumulable (enzymatic metabolism).

12.6 Other adverse effects /Comments:
- Toxic for aquatic organisms.Nevertheless, hazard for the environment is limited due to product properties:
  No bioaccumulation.
  Considerable abiotic and biotic degradability.
  No toxicity of degradation products (H_2O and O_2).

13. Disposal Considerations

13.1 Waste treatment: Consult current federal, state and local regulations regarding the proper disposal of this material.

13.2 Packaging treatment: Consult current federal, state and local regulations regarding the proper disposal of emptied containers.

13.3 RCRA Hazardous Waste: Listed as D001 (Ignitable), D002 (Corrosive)

MSDS No. H2O2-2060-0105 Revised 1-20-05

Hydrogen Peroxide 20-60%

Material Safety Data Sheet

14. Transport Information

Mode	DOT	IMDG	IATA
UN Number	UN 2014	UN 2014	UN 2014
Class (Subsidiary)	5.1(8)	5.1(8)	5.1(8)
Proper Shipping Name	Hydrogen Peroxide, aqueous solution	Hydrogen Peroxide, aqueous solution	Hydrogen Peroxide, aqueous solution
Hazard label (Subsidiary)	Oxidizer (Corrosive)	Oxidizing Agent + Corrosive	Oxidizer + Corrosive
Marine Pollutant	No	No	No
Placard (Subsidiary)	Oxidizer (5.1) [Corrosive (8)]	2014	
Packing Group	II	II	II
Reportable Quantity	100 lbs.		
MFAG			
Emergency Info	ERG 140	EmS 5.1-02	ERG Code 5C
Other			Forbidden over 40%

15. Regulatory Information

National Regulations (US)

TSCA Inventory 8(b): Yes

SARA Title III Sec. 302/303 Extremely Hazardous Substances (40 CFR355): Yes,> 52 % H_2O_2

- Reportable quantity - 1,000 lbs.
- Threshold planning quantity - 1,000 lbs.

SARA Title III Sec. 311/312 (40 CFR 370:

Hazard Category Yes, > 52 % H_2O_2
- Immediate (acute) Health hazard, Fire Hazard
- Threshold planning quantity - 500 lbs

Yes,< 52 % H_2O_2
- Threshold planning quantity - 10,000 lbs

SARA Title III Sec. 313 Toxic Chemical Emissions Reporting (40 CFR 372): No

CERCLA Hazardous Substance (40CFR Part 302)

Listed: No
Unlisted Substance: Yes, Reportable Quantity 100 lbs
Characteristic: Ignitability (D001), Corrosivity (D002)

Other: Occupational Safety and Health Administration (OSHA) requirements for **process safety management** must be followed anytime at least 7,500 lbs. of hydrogen peroxide at concentrations of at least 52% are used or stored. Refer to **29 CFR 1910.119** for specific details.

State Component Listing:
State Comment: No Data.

National Regulations (Canada) Canadian DSL Registration: Non Confidential #6754

WHMIS Classification: C Oxidizing material
E Corrosive
F Dangerously reactive material

This product has been classified in accordance with the hazard criteria of the ***Controlled Products Regulations*** and the MSDS contains all the information required by the ***Controlled Products Regulations.***

MSDS No. H2O2-2060-0105 Revised 1-20-05

www.solvaychemicals.us 1.800.765.8292

Hydrogen Peroxide 20-60%
Material Safety Data Sheet

Labeling according to Directive 1999/45/EC.

Symbols	C	Corrosive
Phrases R	34	Causes burns
Phrases S	1/2	Keep Locked and out of reach of children.
	3	Keep in a cool place.
	28.1	After contact with skin, wash immediately with plenty of water.
	36/39	Wear suitable protective clothing and eye/face protection.
	45	IN case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

16. Other Information

16.1 Ratings:

NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)

Health = 3 Flammability = 0 Instability = 1 Special = OX

HMIS (HAZARDOUS MATERIAL INFORMATION SYSTEM)

Health = 3 Fire = 0 Reactivity = 1 PPE = Supplied by User; dependent on local conditions

16.2 NSF: Material(s) listed for use under NSF/ANSI Standard 60 - Drinking Water Treatment Chemicals - Health Effects have a maximum use in potable water as follows:

Material	Product Function	Maximum Use
Hydrogen Peroxide (31%)[1]	Dechlorination	3.4mg/L
	Disinfection & Oxidation	3.4mg/L
Hydrogen Peroxide (35%)[2]	Dechlorination	3mg/L
	Disinfection & Oxidation	3mg/L
Hydrogen Peroxide (40%)[3]	Dechlorination	2.6mg/L
	Disinfection & Oxidation	2.6mg/L
Hydrogen Peroxide (50%)[4]	Dechlorination	2.1mg/L
	Disinfection & Oxidation	2.1mg/L
Hydrogen Peroxide (60%)[5]	Dechlorination	1.75mg/L
Disinfection & Oxidation		1.75mg/L

[1] This product may be used for sulfide control and in conjunction with ozone for organic control at a concentration use level of 97 mg/L when followed by chlorination of the treated water.

[2] This product may be used for sulfide control and in conjunction with ozone for organic control at a concentration use level of 85 mg/L when followed by chlorination of the treated water.

[3] This product may be used for sulfide control and in conjunction with ozone for organic control at a concentration use level of 75 mg/L when followed by chlorination of the treated water.

[4] This product may be used for sulfide control and in conjunction with ozone for organic control at a concentration use level of 60 mg/L when followed by chlorination of the treated water.

[5] This product may be used for sulfide control and in conjunction with ozone for organic control at a concentration use level of 50 mg/L when followed by chlorination of the treated water.

Use of this product shall be followed by chlorination to remove levels of hydrogen peroxide. Chlorine residuals shall not exceed 4 mg/L, the EPA's proposed maximum residual level.

MSDS No. H2O2-2060-0105 Revised 1-20-05

Hydrogen Peroxide 20-60%

Material Safety Data Sheet

16.3 Other Information:

The previous information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations of mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure product).

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16.3 Reason for revision:

Supersedes edition: Solvay Chemicals MSDS H2O2-2060-0903 dated 1 September 2003.
Purpose of revision: Add section 16.2 NSF use information.