

1. IDENTIFICATION

Product Name	Hydrogen Peroxide 20-60%
Other Names	Hydrogen Peroxide; Hydrogen peroxide (H ₂ O ₂); Hydrogen Peroxide Solution
Uses	For industrial use. For oxidation
Chemical Family	No Data Available
Chemical Formula	H ₂ O ₂
Chemical Name	Hydrogen Peroxide 20-60%
Product Description	Clear, colourless, water-like liquid with a slightly sharp odour; mixes with water. Hydrogen peroxide readily decomposes and requires stabilization. Soluble in ether, insoluble in hydrocarbons and decomposed by many organic solvents. Material hazard increases as concentration of peroxide, H ₂ O ₂ increases.

Contact Details of the Supplier of this Safety Data Sheet

Organisation	Location	Telephone
Redox Pty Ltd	2 Swettenham Road Minto NSW 2566 Australia	+61-2-97333000
Redox Pty Ltd	11 Mayo Road Wiri Auckland 2104 New Zealand	+64-9-2506222
Redox Inc.	3960 Paramount Boulevard Suite 107 Lakewood CA 90712 USA	+1-424-675-3200
Redox Chemicals Sdn Bhd	Level 2, No. 8, Jalan Sapir 33/7 Seksyen 33, Shah Alam Premier Industrial Park 40400 Shah Alam Sengalor, Malaysia	+60-3-5614-2111

Emergency Contact Details

For emergencies only; DO NOT contact these companies for general product advice.

Organisation	Location	Telephone
Poisons Information Centre	Westmead NSW	1800-251525 131126
Chemcall	Australia	1800-127406 +64-4-9179888
Chemcall	Malaysia	+64-4-9179888
Chemcall	New Zealand	0800-243622 +64-4-9179888
National Poisons Centre	New Zealand	0800-764766
CHEMTREC	USA & Canada	1-800-424-9300 CN723420 +1-703-527-3887

2. HAZARD IDENTIFICATION

Poisons Schedule (Aust) 6

Globally Harmonised System

Hazard Classification	Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS)
Hazard Categories	Oxidising Liquids - Category 2 Acute Toxicity (Oral) - Category 4 Acute Toxicity (Inhalation) - Category 4 Serious Eye Damage/Irritation - Category 1 Specific Target Organ Toxicity (Single Exposure) - Category 3 Acute Hazard To The Aquatic Environment - Category 2 Skin Corrosion/Irritation - Category 1B Long-term Hazard To The Aquatic Environment - Category 3

Pictograms



Signal Word Danger

Hazard Statements	H272	May intensify fire; oxidizer.
	H302 + H332	Harmful if swallowed or if inhaled.
	H335	May cause respiratory irritation.
	H401	Toxic to aquatic life.
	H314	Causes severe skin burns and eye damage.
	H412	Harmful to aquatic life with long lasting effects.

Precautionary Statements	Prevention	P210	Keep away from heat.
		P220	Keep/Store away from clothing/combustible materials.
		P221	Take any precaution to avoid mixing with combustibles.
		P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
		P264	Wash skin thoroughly after handling.
		P270	Do not eat, drink or smoke when using this product.
		P271	Use only outdoors or in a well-ventilated area.
		P273	Avoid release to the environment.
		P280	Wear protective gloves/eye protection/face protection.
	Response	P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
		P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
		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.
		P330	Rinse mouth.
		P332 + P313	If skin irritation occurs: Get medical advice/attention.
		P362	Take off contaminated clothing and wash before reuse.
		P370 + P378	In case of fire: Use dry chemical, alcohol resistant foam or dry sand for extinction.
	Storage	P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
		P405	Store locked up.
	Disposal	P501	Dispose of contents/container in accordance with local / regional / national / international regulations.

National Transport Commission (Australia)

Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification

Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Environmental Protection Authority (New Zealand)

Hazardous Substances and New Organisms Amendment Act 2015

HSNO Classifications			
Physical Hazards	5.1.1B		Oxidising substances that are liquids or solids: medium hazard
Health Hazards	6.1D		Substances that are acutely toxic - Harmful
	6.9B		Substances that are harmful to human target organs or systems
	8.2B		Substances that are corrosive to dermal tissue UN PGII
	8.3A		Substances that are corrosive to ocular tissue
Environmental Hazards	9.1D		Substances that are slightly harmful to the aquatic environment or are otherwise designed for biocidal action
	9.3C		Substances that are harmful to terrestrial vertebrates

3. COMPOSITION/INFORMATION ON INGREDIENTS**Ingredients**

Chemical Entity	Formula	CAS Number	Proportion
Water	No Data Available	7732-18-5	40.0 - 80.0 %
Hydrogen Peroxide	No Data Available	7722-84-1	20.0 - 60.0 %

4. FIRST AID MEASURES**Description of necessary measures according to routes of exposure****Swallowed**

For advice, contact a Poisons Information Centre or a doctor at once. Urgent hospital treatment is likely to be needed. If swallowed do NOT induce vomiting.
If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. Observe the patient carefully.
Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. Transport to hospital or doctor without delay

Eye

Immediately hold eyelids apart and flush the eye continuously with running water.
Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
Transport to hospital or doctor without delay.
Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin

Immediately flush body and clothes with large amounts of water, using safety shower if available.
Quickly remove all contaminated clothing, including footwear.
Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. Transport to hospital, or doctor.

Inhaled

If fumes or combustion products are inhaled remove from contaminated area.
Lay patient down. Keep warm and rested. Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. Transport to hospital, or doctor.
Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.
Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs).
As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested.
Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered.
This must definitely be left to a doctor or person authorised by him/her.

Advice to Doctor	Treat symptomatically. Hydrogen peroxide at moderate concentrations (5% or more) 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 systemic effects attempts at evacuating the stomach via emesis induction or gastric lavage should be avoided. There is remote possibility, however, that a nasogastric or orogastric tube may be required for the reduction of severe distension due to gas formation" Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation is therefore essential. Immediate administration of an appropriate spray, by a doctor or a person authorised by him/her should be considered.
Medical Conditions Aggravated by Exposure	No information available on medical conditions aggravated by exposure to this product.

5. FIRE FIGHTING MEASURES

General Measures	Clear fire area of all non-emergency personnel. Stay upwind. Keep out of low areas. Eliminate ignition sources. Move fire exposed containers from fire area if it can be done without risk. Do NOT move cargo if cargo has been exposed to heat. Avoid getting water inside containers: a violent reaction may occur.
Flammability Conditions	Powerful oxidising agent. Not combustible, but will support the combustion of other material. Contact with other material may cause fire. Heat of reaction with reducing agents, or combustibles may cause ignition. Increases flammability of any combustible substance in contact with it. May ignite combustibles (wood, paper, clothing etc). Mixtures with combustible material are readily ignited and may burn fiercely.
Extinguishing Media	FOR SMALL FIRE: USE FLOODING QUANTITIES OF WATER. FOR LARGE FIRE : Flood fire area with water from a protected position. DO NOT use dry chemical, CO ₂ , foam or halogenated-type extinguishers. NOTE: Chemical extinguishing agents may accelerate decomposition. [CCINFO] DO NOT use halogenated fire extinguishing agents.
Fire and Explosion Hazard	May act as an ignition source for dust or vapour explosions. May explode from heating, shock, friction, or contamination. Containers may explode when heated. Runoff may create a fire or explosion hazard. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding.
Hazardous Products of Combustion	Involved in fire, it may decompose yielding oxygen.
Special Fire Fighting Instructions	Do NOT allow fire fighting water to reach waterways, drains or sewers. Store fire fighting water for treatment. Dam fire control water for later disposal.
Personal Protective Equipment	Fire fighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots and gloves) or chemical splash suit.
Flash Point	Does not flash
Lower Explosion Limit	No Data Available
Upper Explosion Limit	No Data Available
Auto Ignition Temperature	No Data Available
Hazchem Code	2P

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Avoid accidents, clean up immediately. Slippery when spilled. Eliminate all sources of ignition. Increase ventilation. Avoid generating dust. Use clean, non-sparking tools and equipment. Keep combustibles away from spilled material. Isolate defective containers immediately, if possible and safe to do. Place defective containers in waste receptacle (waste packaging receptacle) made of plastic (not metal). Do not seal defective containers or waste receptacles airtight (danger of bursting due to product decomposition). Never return spilled product into its original container for re-use. (Risk of decomposition.)
Clean Up Procedures	Minor Spills : Clean up all spills immediately. No smoking, naked lights, ignition sources. Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result. Avoid breathing dust or vapours and all contact with skin and eyes.

Control personal contact with the substance, by using protective equipment. Contain and absorb spill with dry sand, earth, inert material or vermiculite. DO NOT use sawdust as fire may result. Scoop up solid residues and seal in labelled drums for disposal. Neutralise/decontaminate area.

Major Spills : Clear area of personnel and move upwind. Alert Fire Brigade and tell them location and nature of hazard. May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or water course. Consider evacuation (or protect in place). No smoking, flames or ignition sources. Increase ventilation. Contain spill with sand, earth or other clean, inert materials. NEVER use organic absorbents such as sawdust, paper, cloth; as fire may result. Avoid any contamination by organic matter. Use spark-free and explosion-proof equipment. Collect any recoverable product into labelled containers for possible recycling. DO NOT mix fresh with recovered material. Collect residues and seal in labelled drums for disposal. Wash area and prevent runoff into drains. Decontaminate equipment and launder all protective clothing before storage and re-use. If contamination of drains or waterways occurs advise emergency services.

For hydrogen peroxide:

Dilute with large quantities of water (at least ten (10) times the volume of hydrogen peroxide).

Sodium bicarbonate may be used to accelerate breakdown

Containment

Stop leak if safe to do so. Isolate the danger area.

Dam with sand or earth. Do not use: textiles, saw dust, combustible substances.

Decontamination

Clean contaminated surface thoroughly.

Recommended cleaning agent: water.

Environmental Precautionary Measures

Do NOT let product reach drains or waterways. If product does enter a waterway, advise the Environmental Protection Authority or your local Waste Management.

Evacuation Criteria

Evacuate all unnecessary personnel.

Personal Precautionary Measures

Do NOT touch damaged containers or spilled material unless wearing appropriate protective clothing as listed in section 8.

7. HANDLING AND STORAGE

Handling

DO NOT allow clothing wet with material to stay in contact with skin

Avoid personal contact and inhalation of dust, mist or vapours. Provide adequate ventilation.

Always wear protective equipment and wash off any spillage from clothing.

Keep material away from light, heat, flammables or combustibles. Keep cool, dry and away from incompatible materials. Avoid physical damage to containers.

DO NOT repack or return unused portions to original containers. Withdraw only sufficient amounts for immediate use.

Use only minimum quantity required.

Avoid using solutions of peroxides in volatile solvents. Solvent evaporation should be controlled to avoid dangerous concentration of the peroxide.

Do NOT allow peroxides to contact iron or compounds of iron, cobalt, or copper, metal oxide salts, acids or bases.

Do NOT use metal spatulas to handle peroxides.

Do NOT use glass containers with screw cap lids or glass stoppers.

Store peroxides at the lowest possible temperature, consistent with their solubility and freezing point.

CAUTION: Do NOT store liquids or solutions of peroxides at a temperature below that at which the peroxide freezes or precipitates. Peroxides in this form are extremely shock and heat-sensitive.

Refrigerated storage of peroxides must ONLY be in explosion-proof units.

The hazards and consequences of fires and explosions during synthesis and use of peroxides is widely recognised; spontaneous or induced decomposition may culminate in a variety of ways, ranging

from moderate gassing to spontaneous ignition or explosion. The heat released from spontaneous decomposition of an energy-rich compound causes a rise in the surrounding temperature;

the temperature will rise until thermal balance is established or until the material heats to decomposition, The most effective means for minimising the consequences of an

accident is to limit quantities to a practical minimum. Even gram-scale explosions can be

serious. Once ignited the burning of peroxides cannot be controlled and the area should be evacuated.

Unless there is compelling reason to do otherwise, peroxide concentration should be limited to 10% (or less with vigorous reactants). Peroxide concentration is rarely as high as 1% in the reaction mixture

of polymerisation or other free-radical reactions, Peroxides should be added slowly and cautiously to the reaction medium. This should be completed prior to heating and with good agitation.

Addition of peroxide to the hot monomer is extremely dangerous. A violent reaction (e.g., fire or explosion) can result from inadvertent mixing of promoters (frequently used with peroxides in polymerisation systems) with full-strength peroxide.

Organic peroxides are very sensitive to contamination (especially heavy-metal compounds, metal oxide salts, alkaline materials including amines, strong acids, and many varieties of dust and dirt).

This can initiate rapid, uncontrolled decomposition of peroxides and possible generation of intense heat, fire or explosion The consequences of accidental contamination from returning

withdrawn material to the storage container can be disastrous. When handling NEVER smoke, eat or drink. Always wash hands with soap and water after handling. Use only good occupational work practice. Observe manufacturer's storage and handling recommendations contained within this SDS.

Storage

Store in a cool, dry, well-ventilated area.

Packages, containers and tanks should regularly be checked by visual observation for any sign of abnormality, e.g.

corrosion, exert pressure (bulging), temperature increase etc.
 Protect against physical damage. Protect from light.
 Store away from incompatible materials as listed in section 10.
 Jointless smooth concrete floor. Recommendation: Acid-proof floor.
 Only use containers which are specially permitted for: hydrogen peroxide and/or for transport, storage and tank installations only use suitable materials.
 Use adequate venting devices on all packages, containers and tanks and check correct operation periodically.
 Do not confine product in un-vented vessels or between closed valves.
 Risk of overpressure and burst due to decomposition in confined spaces and pipes.
 Transport and store container in upright position only.
 Do not keep the container sealed.
 Avoid residues of the product on the containers.
 Avoid sun rays, heat, heat effect.
 Keep away from sources of ignition - No smoking.
 Keep away from flammable substances.
 Keep away from incompatible substances.
 Measures for storing in tank installations should include at least: Compatible materials, adequate separation, adequate venting area, venting devices, temperature measurement, earthing (grounding), bund in case of leakage.
 Prior to the first filling and operation of a tank installation all parts of the facility including all pipes must be thoroughly cleaned and flushed through.
 Metal elements of the installation must first be pickled and passivated sufficiently.
 Regularly verify the availability of water to deal with emergencies (for cooling, tank flooding, fire fighting) and check correct operation periodically.
 Do not store together with: alkalis, reductants, metallic salts (risk of decomposition).
 Do not store together with: inflammable substances (risk of fire).
 Do not store together with: organic solvents.
 This product has a UN classification of 2014, a Dangerous Goods Class 5.1 (Oxidiser) and a Subsidiary Risk 8 (Corrosive) according to The Australian Code for the Transport of Dangerous Goods By Road and Rail.

Container

Store in: containers with vented lids. Properly passivated aluminium containers. Properly passivated stainless steel. Polyethylene containers. Porcelain, vitreous stoneware. Teflon lined containers

Storage incompatibility : Hydrogen peroxide is a powerful oxidiser. contamination or heat may cause self accelerating exothermic decomposition with oxygen gas and steam release - this may generate dangerous pressures - steam explosion. Reacts dangerously with rust, dust, dirt, iron, copper, acids, metals and salts, organic material. is unstable if heated. (e.g): one volume of 70% hydrogen peroxide solution decomposes to produce 300 volumes of oxygen gas. In presence of a strong initiating source may be explosively reactive. concentrated or pure material can generate heat and decompose spontaneously; can ignite or explode when heated, shocked, contaminated; or if placed in a basic (>7) environment, especially in the presence of metal ions. mixtures with combustible materials may result in spontaneous combustion or may be impact- or heat- sensitive - evaporation or drying on towels or mop may cause a fire. reacts violently with reducing agents, alcohols, ammonia, carboxylic acids, acetic acid, cobalt oxides, copper(II) chloride, ethers, metal powder, permanganates, acetone, benzenesulfonic anhydride, 1,1-dimethylhydrazine, dimethylphenylphosphine, gadolinium hydroxide, hydrogen selenide, iron oxides lithium tetrahydroaluminate, magnesium tetrahydroaluminate, manganese (II) oxide, mercury oxide, methyl hydrazine, nickel monoxide, nitrogenous bases, osmium tetroxide, alpha-phenylselenoketones, phosphorus, phosphorus(V) oxide, quinoline, tetrahydrothiophene, tin(II) chloride, thiodiglycol, thiophane, tin(II) chloride, unsaturated organic compounds, readily oxidisable and combustible materials; avoid contact with combustibles including lubricants and graphite. reacts with cobalt, copper and its alloys, chromium, iridium, iron, lead, manganese, Monel, osmium, palladium, platinum, gold, silver, zinc, and other catalytic metals, metal oxides and salts - avoid metallic bowls and stirrers. violent catalytic decomposition will occur in contact with certain metals such as iron, copper, chromium, brass, bronze, lead, silver, manganese or their salts. forms unstable and possible explosive materials with acetic anhydride, aconitic acid, aniline, carboxylic acids, 1,4-diazabicyclo[2,2,2]octane, diphenyl diselenide, ethyl acetate, glycols, ketene, ketones, triethyltin hydroperoxide, 1,3,5-trioxane, vinyl acetate. is incompatible with mercurous chloride. decomposes in presence of alkalis and even ordinary dust or rust. decomposes in presence of alkalis and even ordinary dust or rust decomposes slowly at ordinary temperatures and builds up pressure in a closed container; the rate of decomposition doubles for each 10 deg C rise in temperature and decomposition becomes self-sustaining at 141 deg. C. Contact with rough surfaces can cause decomposition. Attacks and may ignite some plastics, rubber and coatings. Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General

Australia Exposure Standards hydrogen peroxide Hydrogen peroxide TWA 1.4 mg/m³ / 1 ppm
 EMERGENCY LIMITS : Hydrogen peroxide 30%- TEEL-1- 33 ppm

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented

exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production. Exposure to hydrogen peroxide via the skin or oral route can produce toxic effects. Animal studies have shown evidence of damage to the kidney, gut, thymus and liver. Stomach and intestinal lesions including benign and malignant cancers have been observed in mice. It may produce genetic and developmental defects but no reproductive toxicity was reported in mice. The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.

Exposure Limits

No Data Available

Biological Limits

No information available on biological limit values for this product.

Engineering Measures

A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Adequate ventilation should be provided so that exposure limits are not exceeded.

Personal Protection Equipment

RESPIRATOR: If workplace exposure limit is exceeded apply Respiratory protective equipment. If open handling is unavoidable wear self- contained breathing apparatus: Respirator with A2B2E2K192 combination filter (Draeger); ABEK2P3 combination filter (3M); or OV/AG combination filter (3M) (AS1715/1716).
 EYES: Tight fitting chemical splash goggles and full face shield or basket shaped glasses (AS1336/1337).
 HANDS: Glove material Natural rubber (NR), Material thickness 1 mm. Break through time > 480 min. Method DIN EN 374
 Glove material Nitrile, Material thickness 0,33 mm. Break through time > 480 min. Method DIN EN 374
 Glove material butyl-rubber, Material thickness 0,7 mm. Break through time > 480 min. Method DIN EN 374 (AS2161).
 CLOTHING: Wear protective, acid proof clothing. Suitable materials are: PVC, Neoprene, Nitrile rubber (NBR), rubber. Rubber or plastic boots. (AS3765/2210).

Work Hygienic Practices

Do not inhale vapour, aerosols, mist.
 Avoid contact with skin, eyes and clothing.
 Ensure there is good room ventilation.
 No eating, drinking, smoking, or snuffing tobacco at work.
 Wash face and/or hands before break and end of work.
 Preventive skin protection
 Avoid contaminating clothes with product.
 Immediately change moistened and saturated work clothes.
 Immediately rinse contaminated or saturated clothing with water.
 Any contaminated protective equipment is to be cleaned after use.
 Handle in accordance with good industrial hygiene and safety practice.
 Wear suitable protective clothing, gloves and eye/face protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Water-like liquid
Odour	Slightly sharp odour
Colour	Colourless, Clear
pH	2 - 4
Vapour Pressure	0.6(@30°C)
Relative Vapour Density	No Data Available
Boiling Point	106(as30%)°C
Melting Point	-25(as30%)°C
Freezing Point	No Data Available
Solubility	Miscible
Specific Gravity	1.134 - 1.195
Flash Point	Does not flash
Auto Ignition Temp	No Data Available
Evaporation Rate	<1

Bulk Density	No Data Available
Corrosion Rate	No Data Available
Decomposition Temperature	No Data Available
Density	1,132 g/cm ³
Specific Heat	No Data Available
Molecular Weight	34.02 g/mol
Net Propellant Weight	No Data Available
Octanol Water Coefficient	No Data Available
Particle Size	No Data Available
Partition Coefficient	No Data Available
Saturated Vapour Concentration	No Data Available
Vapour Temperature	No Data Available
Viscosity	1.8mPa.s(@0°C)
Volatile Percent	No Data Available
VOC Volume	No Data Available
Additional Characteristics	No Data Available
Potential for Dust Explosion	Product is a liquid.
Fast or Intensely Burning Characteristics	Risk of overpressure and burst due to decomposition in confined spaces and pipes. With large-scale fire, violent decomposition or even explosion is possible. Mixtures with organic materials (e.g. solvents) can display explosive properties.
Flame Propagation or Burning Rate of Solid Materials	No Data Available
Non-Flammables That Could Contribute Unusual Hazards to a Fire	No Data Available
Properties That May Initiate or Contribute to Fire Intensity	No Data Available
Reactions That Release Gases or Vapours	No Data Available
Release of Invisible Flammable Vapours and Gases	No Data Available

10. STABILITY AND REACTIVITY

General Information	Product is a(n) oxidizing agent and reactive. Unstable in the presence of incompatible materials.
Chemical Stability	Stable under recommended storage conditions. Commercial products are stabilised to reduce risk of decomposition due to contamination.
Conditions to Avoid	Sun rays, heat, heat effect.
Materials to Avoid	Reacts violently with reducing agents, alcohols, ammonia, carboxylic acids, acetic acid, cobalt oxides, copper(II) chloride, ethers, metal powder, permanganates, acetone, benzenesulfonic anhydride, 1,1-dimethylhydrazine, dimethylphenylphosphine, gadolinium hydroxide, hydrogen selenide, iron oxides, lithium tetrahydroaluminate, magnesium tetrahydroaluminate, manganese(II) oxide, mercury oxide, methyl hydrazine, nickel monoxide, nitrogenous bases, osmium tetroxide, alpha-phenylselenoketones, phosphorus, phosphorus(V) oxide, quinoline, tetrahydrothiophene, tin(II) chloride, thiodiglycol, thiophane, tin(II) chloride, unsaturated organic compounds, readily oxidisable and combustible materials; avoid contact with combustibles including lubricants and graphite. reacts with cobalt, copper and its alloys, chromium, iridium, iron, lead, manganese, Monel, osmium, palladium, platinum, gold, silver, zinc, and other catalytic metals, metal oxides and salts - avoid metallic bowls and stirrers. violent catalytic decomposition will occur in contact with certain metals such as iron, copper, chromium, brass, bronze, lead, silver, manganese or their salts. forms unstable and possible explosive materials with acetic anhydride, acetic acid, aniline, carboxylic acids, 1,4-diazabicyclo[2,2,2]octane, diphenyl diselenide, ethyl acetate, glycols, ketene, ketones, triethyltin hydroperoxide, 1,3,5-trioxane, vinyl acetate. Is incompatible with mercurous chloride decomposes in presence of alkalis and even ordinary dust or rust decomposes slowly at ordinary temperatures and builds up pressure in a closed container; the rate of decomposition doubles for each 10 deg C rise in temperature and decomposition becomes self-sustaining at 141 deg. C contact with rough surfaces can cause decomposition. Attacks and may ignite some plastics, rubber and coatings.

Hazardous Decomposition Products

Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous

Solutions of hydrogen peroxide slowly decompose, releasing oxygen, and so are often stabilised by the addition of acetanilide, etc.

Hazardous Polymerisation

Hazardous polymerisation will not occur.

11. TOXICOLOGICAL INFORMATION**General Information**

dermal (rat) LD50: 3000-5480 mg/kg

Inhalation (rat) LC50: 2 mg/L/4H

Oral (rat) LD50: 75 mg/kg

Acute inhalation toxicity: LC50 rat: > 0.17 mg/l / 4 h. Method: literature. Test substance: hydrogen peroxide, 50%. The maximum dose attainable under experimental conditions no fatalities.

Acute dermal toxicity: LD50 rabbit: > 6500 mg/kg. Method: literature. Test substance: Hydrogen peroxide 70%.

Skin irritation rabbit: Slightly irritating. Method: literature

Eye irritation rabbit: Corrosive. Method: literature

Sensitization guinea pig: Not sensitising. Method: literature

Repeated dose toxicity:

Mouse(female): Testing period: 90 d. Subsequent observation period: 6 weeks.

Target organ/effect: Changes of parameters of the blood, body weight development negative.

Irritative effect: Gastrointestinal tract. Method: OECD TG 408. Drinking water analysis.

Mouse(male): Testing period: 90 d. Subsequent observation period: 6 weeks.

Target organ/effect: Changes of parameters of the blood, body weight development negative.

Irritative effect: Gastrointestinal tract. Method: OECD TG 408. Drinking water analysis

Gentoxicity in vitro

Microorganisms, cell cultures. Mutagenic/genotoxic effects. Method: literature. In the presence of metabolic systems no mutagenic effects were observed.

Gentoxicity in vivo

Micronucleus test mouse intraperitoneal (i.p.): Negative. Method: OECD TG 474

Micronucleus test mouse Oral: Negative. Method: literature

Unscheduled DNA synthesis -test (UDS) rat: Negative. Method: literature

Carcinogenicity assessment

Clues to possible carcinogenic effects in animal experiments: Up to date there is no evidence of increased tumour risk.

Hydrogen peroxide is not a carcinogenic substance according to MAK, IARC, NTP, OSHA, ACGIH.

Eye/Irritant

Hydrogen peroxide concentrations above 10% are corrosive to the eye and may cause corneal ulceration even days after exposure. The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.

Ingestion

Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

Hydrogen peroxide may cause blistering and bleeding from the throat and stomach. When swallowed, it may release large quantities of oxygen which could hyper-distend the stomach and gut and may cause internal bleeding, mouth and throat burns and rupture of the gut. There may also be fever, nausea, foaming at the mouth, vomiting, chest and stomach pain, loss of consciousness, and movement disorders and death. Large amounts can also cause cessation of breath, dizziness, headache, tremors weakness or numbness in the extremities and convulsions. Hydrogen peroxide concentrate is corrosive and must not be taken undiluted.

The material can produce severe chemical burns within the oral cavity and gastrointestinal tract following ingestion.

Inhalation

Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful. Inhalation of quantities of liquid mist may be extremely hazardous, even lethal due to spasm, extreme irritation of larynx and bronchi, chemical pneumonitis and pulmonary oedema.

Inhaling excessive levels of mist may result in headache, dizziness, vomiting, diarrhoea, irritability, sleeplessness and fluid in the lungs, and cause extreme

irritation of the nose and chest, cough, discomfort, shortness of breath and inflammation of the nose and throat.

Whole-body effects of hydrogen peroxide

poisoning include tremor, numbness of the limbs, convulsions, coma and shock. Hydrogen peroxide has poor warning properties

Skin/Irritant	<p>Skin contact will result in rapid drying, bleaching, leading to chemical burns on prolonged contact. Reactions may not occur on exposure but response may be delayed with symptoms only appearing many hours later. Open cuts, abraded or irritated skin should not be exposed to this material. Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. The material can produce chemical burns following direct contact with the skin.</p>
Chronic	
Other	<p>Hydrogen peroxide as a human food additive is generally regarded as safe when used in certain limitations. In experimental animals, oral administration of hydrogen peroxide causes dental, liver, kidney, stomach, and intestinal damage. Inhalation exposure to hydrogen peroxide caused skin irritation and sneezing in dogs, and high mortality in mice.</p> <p>Hydrogen peroxide added to food is affirmed to be generally regarded as safe (GRAS) by the U.S. FDA when used to treat certain foods in specified limitations [FDA 21 CFR 184.1366 (4/1/93)].</p> <p>Hydrogen peroxide may be used as a component of articles for use in packaging, handling, transporting, or holding food in accordance with prescribed conditions [FDA 21 CFR 175.105 (4/1/93)].</p> <p>Dose-related growth retardation, induction of dental caries, and pathological changes in the periodontium were observed in young male rats receiving 1.5% hydrogen peroxide as their drinking fluid (equivalent to approximately 2.1 g/kg/day)² for 8 weeks.</p> <p>Effects observed in mice treated for 35 weeks with 0.15% hydrogen peroxide as their drinking fluid (equivalent to approximately 0.29 g/kg/day)³ included degeneration of hepatic and renal tubular epithelial tissues, necrosis, inflammation, irregularities of tissue structure of the stomach wall, and hypertrophy of the small intestine wall.</p> <p>Concentrations in excess of 1% (equivalent to approximately 1.9 g/kg/day)⁴ resulted in pronounced weight loss and death within two weeks. In a sequential study of mice treated with 0.4% hydrogen peroxide in drinking water (equivalent to approximately 0.76 g/kg/day)⁵, gastric erosion was observed at 30 days and was present consistently throughout the 108 week study period.</p> <p>Dogs exposed 6 hours/day, 5 days/week for 6 months at an average vapour concentration of 7 ppm (9.73 mg/3) of 90% hydrogen peroxide, developed skin irritation, sneezing, lacrimation, and bleaching of the hair. Autopsy disclosed pulmonary irritation and greatly thickened skin, but no hair follicle destruction. No significant changes in blood or urinary parameters were observed.</p> <p>Following eight 6-hour exposures to hydrogen peroxide at a concentration of 79 mg/m³ (56.88 ppm), 7/9 mice died. Following exposure to hydrogen peroxide at 93 mg/m³, 6 hours/day, 5 days/week for 30 exposures, 1/10 rats died. Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.</p>
Carcinogen Category	No Data Available

12. ECOLOGICAL INFORMATION

Ecotoxicity	<p>Toxicity to fish: hydrogen peroxide LC50 96 Fish 0.020mg/L hydrogen peroxide EC50 3 Algae or other aquatic plants 0.27mg/L hydrogen peroxide EC50 48 Crustacea 2.32mg/L hydrogen peroxide EC50 72 Algae or other aquatic plants 0.71mg/L hydrogen peroxide NOEC 192 Fish 0.028mg/L</p>
Persistence/Degradability	<p>Photochemical degradation (air) takes place. Under ambient conditions quick hydrolysis, reduction or decomposition occurs. The following substances are formed: oxygen and water.</p>
Mobility	hydrogen peroxide LOW (KOC = 14.3)
Environmental Fate	Do NOT let product reach waterways, drains and sewers.
Bioaccumulation Potential	hydrogen peroxide LOW (LogKOW = -1.571)
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	<p>Dispose of in accordance with all local, state and federal regulations. All empty packaging should be disposed of in accordance with Local, State, and Federal Regulations or recycled/reconditioned at an approved facility.</p>
Special Precautions for Land Fill	Contact a specialist disposal company or the local waste regulator for advice.

14. TRANSPORT INFORMATION

Land Transport (Australia)

ADG Code

Proper Shipping Name	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)
Class	5.1 Oxidising Substances
Subsidiary Risk(s)	8 Corrosive Substances
EPG	31 Oxidizing Substances
UN Number	2014
Hazchem	2P
Pack Group	II
Special Provision	No Data Available

Land Transport (Indonesia)

Proper Shipping Name	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)
Class	5.1 Oxidising Substances
Subsidiary Risk(s)	8 Corrosive Substances
EPG	31 Oxidizing Substances
UN Number	2014
Hazchem	2P
Pack Group	II
Special Provision	No Data Available

Land Transport (Malaysia)

ADR

Proper Shipping Name	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)
Class	5.1 Oxidising Substances
Subsidiary Risk(s)	8 Corrosive Substances
EPG	31 Oxidizing Substances
UN Number	2014
Hazchem	2P
Pack Group	II
Special Provision	No Data Available

Land Transport (New Zealand)

NZS5433

Proper Shipping Name	HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)
Class	5.1 Oxidising Substances
Subsidiary Risk(s)	8 Corrosive Substances
EPG	31 Oxidizing Substances
UN Number	2014
Hazchem	2P
Pack Group	II

Special Provision No Data Available

Land Transport (Tahiti)

Proper Shipping Name HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)
Class 5.1 Oxidising Substances
Subsidiary Risk(s) 8 Corrosive Substances
EPG 31 Oxidizing Substances
UN Number 2014
Hazchem 2P
Pack Group II
Special Provision No Data Available

Land Transport (United States of America)

US DOT

Proper Shipping Name HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)
Class 5.1 Oxidising Substances
Subsidiary Risk(s) 8 Corrosive Substances
ERG 140 Oxidizers
UN Number 2014
Hazchem 2P
Pack Group II
Special Provision No Data Available

Sea Transport

IMDG Code

Proper Shipping Name HYDROGEN PEROXIDE, AQUEOUS SOLUTION with not less than 20% but not more than 60% hydrogen peroxide (stabilized as necessary)
Class 5.1 Oxidising Substances
Subsidiary Risk(s) 8 Corrosive Substances
UN Number 2014
Hazchem 2P
Pack Group II
Special Provision No Data Available
EMS FH,SQ
Marine Pollutant Yes

Air Transport

IATA DGR

Proper Shipping Name Hydrogen peroxide, aqueous solution with 20% or more but 40% or less hydrogen peroxide (stabilised as necessary)
Class 5.1 Oxidising Substances
Subsidiary Risk(s) 8 Corrosive Substances
UN Number 2014
Hazchem 2P
Pack Group II
Special Provision No Data Available

Air Transport

IATA DGR

Proper Shipping Name	Hydrogen peroxide, aqueous solution with more than 40% but 60% or less hydrogen peroxide (stabilised as necessary)
Class	No Data Available
Subsidiary Risk(s)	No Data Available
UN Number	No Data Available
Hazchem	No Data Available
Pack Group	No Data Available
Special Provision	A2; A75
Comments	FORBIDDEN FOR AIR TRANSPORT

National Transport Commission (Australia)

Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Dangerous Goods Classification	Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)
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15. REGULATORY INFORMATION

General Information	No Data Available
Poisons Schedule (Aust)	6

Environmental Protection Authority (New Zealand)

Hazardous Substances and New Organisms Amendment Act 2015

Approval Code	HSR001326
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National/Regional Inventories

Australia (AICS)	Listed
Canada (DSL)	Listed
Canada (NDSL)	Not Determined
China (IECSC)	Listed
Europe (EINECS)	Not Determined
Europe (REACH)	Not Determined
Japan (ENCS/METI)	Not Determined
Korea (KECI)	Listed
Malaysia (EHS Register)	Not Determined
New Zealand (NZIoC)	Listed
Philippines (PICCS)	Listed
Switzerland (Giftliste 1)	Not Determined

Switzerland (Inventory of Notified Substances)	Not Determined
Taiwan (NCSR)	Not Determined
USA (TSCA)	Listed

16. OTHER INFORMATION

Related Product Codes	<p>HYPERA1000, HYPERA2000, HYPERA2001, HYPERA2500, HYPERA2600, HYPERA3000, HYPERA3400, HYPERA3500, HYPERA3600, HYPERB5000, HYPERB5001, HYPERB5100, HYPERB6000, HYPERC1000, HYPERC9900, HYPERD4900, HYPERD5000, HYPERD5001, HYPERD5002, HYPERD5003, HYPERD5004, HYPERD5005, HYPERD5006, HYPERD5007, HYPERD5008, HYPERD5009, HYPERD5100, HYPERD5101, HYPERD5200, HYPERD5201, HYPERD5500, HYPERD5501, HYPERD5502, HYPERD5503, HYPERD5504, HYPERD5505, HYPERD5506, HYPERD5507, HYPERD5508, HYPERD6000, HYPERD6001, HYPERD6100, HYPERD9000, HYPERE1000, HYPERE3500, HYPERE5000, HYPERE5001, HYPERF1000, HYPERF1500, HYPERF5000, HYPERL1800, HYPERL1900, HYPERL2000, HYPERL2600, HYPERL2700, HYPERL2800, HYPERL2900, HYPERL3000, HYPERL3500, HYPERL3501, HYPERL3502, HYPERL3503, HYPERL3504, HYPERL3505, HYPERL3506, HYPERL3507, HYPERO0400, HYPERO0500, HYPERO0501, HYPERO1000, HYPERO1001, HYPERO1002, HYPERO1003, HYPERO1004, HYPERO1005, HYPERO1006, HYPERO1007, HYPERO1008, HYPERO1009, HYPERO1010, HYPERO1011, HYPERO1012, HYPERO1013, HYPERO1014, HYPERO1015, HYPERO1016, HYPERO1017, HYPERO1018, HYPERO1019, HYPERO1020, HYPERO1021, HYPERO1022, HYPERO1023, HYPERO1024, HYPERO1025, HYPERO1026, HYPERO1027, HYPERO1028, HYPERO1029, HYPERO1030, HYPERO1031, HYPERO1032, HYPERO1033, HYPERO1034, HYPERO1500, HYPERO1800, HYPERO2000, HYPERO2001, HYPERO3000, HYPERO4000, HYPERO5000, HYPERO5001, HYPERO5002, HYPERO5003, HYPERO5004, HYPERO5005, HYPERO5006, HYPERO5007, HYPERO5008, HYPERO5009, HYPERO5010, HYPERO5100, HYPERO5500, HYPERO6000, HYPERO6100, HYPERO6200, HYPERT4000, HYPERT4100, HYPERT4500, HYPERT4900, HYPERT5000, HYPERT5001, HYPERT5100, HYPERT5200, HYPERT5300, HYPERT5400, HYPERT5500, HYPERT5600, HYPERT5700, HYPERT5800, HYPERT5900, HYPERT6000, HYPERT6100, HYPERT6200, HYPERT6500, HYPERT6501, HYPERT7000, HYPERO2200, HYPERO1801, HYPERO1802, HYPERO1803, HYPERO1804, HYPERO1805, HYPERO1806, HYPERO1807, HYPERO1808, HYPERO1809, HYPERO1810, HYPERO1811, HYPERO1812, HYPERO1813, HYPERO1814, HYPERO1815, HYPERO1816, HYPERO1817, HYPERO1818, HYPERO1819, HYPERO1820, HYPERO1821, HYPERO1822, HYPERO1823, HYPERO1824, HYPERO1825, HYPERO1826, HYPERO1827, HYPERO1828, HYPERO1829, HYPERO1830, HYPERO1831, HYPERO1832, HYPERO1833, HYPERO1834, HYPERO1835, HYPERO1836, HYPERO1837, HYPERO1838, HYPERO1839, HYPERO1840, HYPERO1841, HYPERO1842, HYPERO1843, HYPERO1844, HYPERO1845, HYPERO1846, HYPERO1847, HYPERO1848, HYPERO1849, HYPERO1850, HYPERO1851, HYPERO1852, HYPERO1853, HYPERO1854, HYPERO1855, HYPERE5500, HYPERD6200, HYPERB5050, HYPERD6400, HYPERT3500, HYPERD3500, HYPERO3500, HYPERD7000, HYPERD7010, HYPERF5500, HYPERD7100, HYPERD7150, HYPERL2750, HYPERO2500, HYPERO9506, HYPERD7001, HYPERT6201, HYPERB6001, HYPERO2050, HYPERO2055, HYPERV5000, HYPERV6000, HYPERT6001, HYPERL2701, HYPERB6002, HYPERT6002, HYPERT6003, HYPERO2056, HYPERD7200, HYPERO6001, HYPERF5501, HYPERT6205, HYPERT6206, HYPERT6202</p>
Revision	3
Revision Date	12 Apr 2016
Reason for Issue	SDS updated
Key/Legend	<p>< Less Than > Greater Than AICS Australian Inventory of Chemical Substances atm Atmosphere CAS Chemical Abstracts Service (Registry Number) cm² Square Centimetres CO₂ Carbon Dioxide COD Chemical Oxygen Demand deg C (°C) Degrees Celcius EPA (New Zealand) Environmental Protection Authority of New Zealand deg F (°F) Degrees Fahrenheit g Grams g/cm³ Grams per Cubic Centimetre g/l Grams per Litre HSNO Hazardous Substance and New Organism IDLH Immediately Dangerous to Life and Health immiscible Liquids are insoluable in each other. inHg Inch of Mercury inH₂O Inch of Water K Kelvin kg Kilogram</p>

kg/m³ Kilograms per Cubic Metre

lb Pound

LC50 LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours.

LD50 LD stands for Lethal Dose. LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals.

ltr or **L** Litre

m³ Cubic Metre

mbar Millibar

mg Milligram

mg/24H Milligrams per 24 Hours

mg/kg Milligrams per Kilogram

mg/m³ Milligrams per Cubic Metre

Misc or **Miscible** Liquids form one homogeneous liquid phase regardless of the amount of either component present.

mm Millimetre

mmH₂O Millimetres of Water

mPa.s Millipascals per Second

N/A Not Applicable

NIOSH National Institute for Occupational Safety and Health

NOHSC National Occupational Health and Safety Commission

OECD Organisation for Economic Co-operation and Development

Oz Ounce

PEL Permissible Exposure Limit

Pa Pascal

ppb Parts per Billion

ppm Parts per Million

ppm/2h Parts per Million per 2 Hours

ppm/6h Parts per Million per 6 Hours

psi Pounds per Square Inch

R Rankine

RCP Reciprocal Calculation Procedure

STEL Short Term Exposure Limit

TLV Threshold Limit Value

tne Tonne

TWA Time Weighted Average

ug/24H Micrograms per 24 Hours

UN United Nations

wt Weight