

Cover Page for Safety Data Sheet

Thank you for choosing CHEMetrics, Inc. We appreciate your business. In order to best serve your needs for accurate and complete Safety Data, we offer the following information as supplemental to the attached SDS.

SDS No.: A5505

Version No.: 3.2

Product Name: Hydrogen Peroxide Standard

Part No.: A-5505

Product Descriptions:

Hydrogen Peroxide Standard: Package of 10 double-tipped glass ampoules. Each double-tipped ampoule contains 3 mL of liquid reagent.

Addendum to Section 14 Transport Information:

Shipping container markings and labels for this product, as received, may vary from the contents of section 14 of the SDS for one or both of the following reasons:

- CHEMetrics has packaged this product as Dangerous Goods in Excepted Quantities according to IATA, US DOT, and IMDG regulations.
- CHEMetrics has packaged this product as part of a test kit or reagent set composed of various chemical reagents and elected to ship as UN 3316 Chemical Kit, Hazard Class 9, Packing Group II or III.

In case of reshipment, it is the responsibility of the shipper to determine appropriate labels and markings in accordance with applicable transportation regulations.

Additional Information:

- Dates are expressed as DD/MM/YYYY. See Section 16 for Revision Date.
- Test kits and reagents sets may contain additional chemical reagents. See separate SDS(s).

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Hydrogen Peroxide Standard

CHEMetrics, Inc.

Chemwatch Hazard Alert Code: 0

SDS No: A5505

Version No: 3.2

Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Issue Date: 11/09/2018

Print Date: 11/09/2018

S.GHS.USA.EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	Hydrogen Peroxide Standard
Synonyms	Part No.: A-5505
Other means of identification	Not Available

Recommended use of the chemical and restrictions on use

Relevant identified uses	To validate performance of hydrogen peroxide analysis equipment.
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Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	CHEMetrics, Inc.
Address	4295 Catlett Road, Midland VA - 22728 United States
Telephone	1-540-788-9026
Fax	1-540-788-4856
Website	www.chemetrics.com
Email	technical@chemetrics.com

Emergency phone number

Association / Organisation	ChemTel, Inc.
Emergency telephone numbers	1-800-255-3924
Other emergency telephone numbers	+01-813-248-0585

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

Classification	Not Applicable
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Label elements

Hazard pictogram(s)	Not Applicable
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SIGNAL WORD	NOT APPLICABLE
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Hazard statement(s)

Not Applicable

Hazard(s) not otherwise specified

Not Applicable

Precautionary statement(s) General

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read label before use.

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Continued...

Hydrogen Peroxide Standard

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
7722-84-1	<0.01	<u>hydrogen peroxide</u>
Not Available	<0.01	Proprietary Ingredient
7732-18-5	>99	<u>water</u>

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with eyes: <ul style="list-style-type: none">▶ Wash out immediately with water.▶ If irritation continues, seek medical attention.▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: <ul style="list-style-type: none">▶ Flush skin and hair with running water (and soap if available).▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none">▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area.▶ Other measures are usually unnecessary.
Ingestion	<ul style="list-style-type: none">▶ Immediately give a glass of water.▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

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"

Fisher Scientific SDS

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

For hydrogen peroxide

NOTE: Chemical extinguishing agents may accelerate decomposition. [CCINFO]

- ▶ There is no restriction on the type of extinguisher which may be used.
- ▶ Use extinguishing media suitable for surrounding area.

Special hazards arising from the substrate or mixture

Fire Incompatibility	None known.
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Special protective equipment and precautions for fire-fighters

Fire Fighting	<ul style="list-style-type: none">▶ Alert Fire Brigade and tell them location and nature of hazard.▶ Wear breathing apparatus plus protective gloves in the event of a fire.▶ Prevent, by any means available, spillage from entering drains or water courses.▶ Use fire fighting procedures suitable for surrounding area.▶ DO NOT approach containers suspected to be hot.▶ Cool fire exposed containers with water spray from a protected location.▶ If safe to do so, remove containers from path of fire.▶ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	<ul style="list-style-type: none">▶ Non combustible.▶ Not considered a significant fire risk, however containers may burn.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Hydrogen Peroxide Standard

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. ▶ Contain and absorb spill with sand, earth, inert material or vermiculite. ▶ Wipe up. ▶ Place in a suitable, labelled container for waste disposal.
Major Spills	<p>Minor hazard.</p> <ul style="list-style-type: none"> ▶ Clear area of personnel. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Control personal contact with the substance, by using protective equipment as required. ▶ Prevent spillage from entering drains or water ways. ▶ Contain spill with sand, earth or vermiculite. ▶ Collect recoverable product into labelled containers for recycling. ▶ Absorb remaining product with sand, earth or vermiculite and place in appropriate containers for disposal. ▶ Wash area and prevent runoff into drains or waterways. ▶ If contamination of drains or waterways occurs, advise emergency services.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> ▶ Limit all unnecessary personal contact. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. ▶ Avoid contact with incompatible materials. ▶ When handling, DO NOT eat, drink or smoke. ▶ Keep containers securely sealed when not in use. ▶ Avoid physical damage to containers. ▶ Always wash hands with soap and water after handling. ▶ Work clothes should be laundered separately. ▶ Use good occupational work practice. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS. ▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. ▶ Wear impact- and splash-resistant eyewear.
Other information	For optimum analytical performance, store in the dark and at room temperature.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Polyethylene or polypropylene container. ▶ Packing as recommended by manufacturer. ▶ Check all containers are clearly labelled and free from leaks. <p>Hydrogen peroxide containing/ generating materials requiring rigid packaging.</p> <p>Store in:</p> <ul style="list-style-type: none"> ▶ containers with vented lids. ▶ properly passivated aluminium containers. ▶ properly passivated stainless steel. ▶ polyethylene containers. ▶ porcelain, vitreous stoneware ▶ Teflon lined containers.
Storage incompatibility	<p>Avoid contamination of water, foodstuffs, feed or seed.</p> <p>Hydrogen peroxide</p> <ul style="list-style-type: none"> ▶ 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, 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.

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- ▶ 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
- None known

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US NIOSH Recommended Exposure Limits (RELs)	hydrogen peroxide	High-strength hydrogen peroxide, Hydrogen dioxide, Hydrogen peroxide (aqueous), Hydroperoxide, Peroxide	1 ppm / 1.4 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	hydrogen peroxide	Hydrogen peroxide	1 ppm	Not Available	Not Available	TLV® Basis: Eye, URT, & skin irr
US OSHA Permissible Exposure Levels (PELs) - Table Z1	hydrogen peroxide	Hydrogen peroxide	1 ppm / 1.4 mg/m3	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
hydrogen peroxide	Hydrogen peroxide	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
hydrogen peroxide	75 ppm	Not Available
Proprietary Ingredient	Not Available	Not Available
water	Not Available	Not Available

Exposure controls

Appropriate engineering controls

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.

Employers may need to use multiple types of controls to prevent employee overexposure.

General exhaust is adequate under normal operating conditions. If risk of overexposure exists, wear SAA approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air)	0.25-0.5 m/s (50-100 f/min)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood - local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min.) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

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Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lenses should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]
Skin protection	See Hand protection below
Hands/feet protection	<p>Wear general protective gloves, eg. light weight rubber gloves. The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended. Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:</p> <ul style="list-style-type: none"> • frequency and duration of contact, • chemical resistance of glove material, • glove thickness and • dexterity <p>Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).</p> <ul style="list-style-type: none"> • When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. • When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. • Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use. • Contaminated gloves should be replaced. <p>As defined in ASTM F-739-96 in any application, gloves are rated as:</p> <ul style="list-style-type: none"> • Excellent when breakthrough time > 480 min • Good when breakthrough time > 20 min • Fair when breakthrough time < 20 min • Poor when glove material degrades <p>For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended. It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times. Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task. Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:</p> <ul style="list-style-type: none"> • Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of. • Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential <p>Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.</p> <ul style="list-style-type: none"> ▶ Where hydrogen peroxide exposure may occur do NOT wear PVA gloves. ▶ DO NOT use leather or cotton gloves, leather shoes as spill may cause fire. ▶ Care: Effects may be delayed. ▶ Hand cream offers no protection for hydrogen peroxide and should not be used.
Body protection	See Other protection below
Other protection	<p>No special equipment needed when handling small quantities. OTHERWISE:</p> <ul style="list-style-type: none"> ▶ Overalls. ▶ Barrier cream. ▶ Eyewash unit.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

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Material	CPI
NEOPRENE	A
BUTYL	C
NAT+NEOPR+NITRILE	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C

Respiratory protection

Not Applicable

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PVA	C
PVC	C
VITON	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Colorless		
Physical state	Liquid	Relative density (Water = 1)	1
Odour	No Odour	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	8.7	Decomposition temperature	Not Available
Melting point / freezing point (°C)	0	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	100	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Applicable	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Not Applicable	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water (g/L)	Miscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	Product is considered stable and hazardous polymerisation will not occur. Solutions of hydrogen peroxide slowly decompose, releasing oxygen, and so are often stabilised by the addition of acetanilide, etc.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Not normally a hazard due to non-volatile nature of product
Ingestion	The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. 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.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. Hydrogen peroxide is used topically as dental gel and to clean minor wounds. It may cause dose dependent effect on the skin including bleaching, blistering, reddening and corrosion (at >50% concentration).
Eye	Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn). Hydrogen peroxide concentrations above 10% are corrosive to the eye and may cause corneal ulceration even days after exposure.

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Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. Hydrogen peroxide as a human food additive is generally regarded as safe, when used with certain limitations. In experimental animals hydrogen peroxide given by mouth causes damage to the teeth, liver, kidney, stomach and bowel. Inhalation exposure to hydrogen peroxide caused skin irritation, sneezing and death in animals. Skin irritation, sneezing, excessive secretion of tears, and whitening of the hair was also seen in animals chronically exposed to hydrogen peroxide.
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Hydrogen Peroxide Standard	TOXICITY	IRRITATION
	Not Available	Not Available

hydrogen peroxide	TOXICITY	IRRITATION
	dermal (rat) LD50: 4060 mg/kg ^[2]	Not Available
	Inhalation (rat) LC50: >0.17 mg/l4 h ^[1]	
	Oral (rat) LD50: 376 mg/kg ^[2]	

water	TOXICITY	IRRITATION
	Not Available	Not Available

Legend: 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances

HYDROGEN PEROXIDE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. 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. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, 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.
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HYDROGEN PEROXIDE & WATER	No significant acute toxicological data identified in literature search.
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Acute Toxicity	☉	Carcinogenicity	☉
Skin Irritation/Corrosion	☉	Reproductivity	☉
Serious Eye Damage/Irritation	☉	STOT - Single Exposure	☉
Respiratory or Skin sensitisation	☉	STOT - Repeated Exposure	☉
Mutagenicity	☉	Aspiration Hazard	☉

Legend: ✘ - Data available but does not fill the criteria for classification
✔ - Data available to make classification
 ☉ - Data Not Available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

Hydrogen Peroxide Standard	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available

hydrogen peroxide	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	16.4mg/L	2
	EC50	48	Crustacea	2.32mg/L	4
	EC50	72	Algae or other aquatic plants	0.71mg/L	4
	EC0	24	Crustacea	=3.8mg/L	1
	NOEC	192	Fish	0.028mg/L	4

water	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available

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Legend:	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data
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For hydrogen peroxide: log Kow: -1.36:

Environmental Fate: Hydrogen peroxide is a naturally occurring substance (typical background concentrations < 1 - 30 g/l), which is produced by almost all cells in their metabolism, with the exception of anaerobic bacteria. Hydrogen peroxide is a reactive substance in the presence of other substances, elements, radiation, materials and can be degraded by micro-organisms or higher organisms. Air - Hydrogen peroxide is degraded by light and thus may be removed from the atmosphere by photolysis giving rise to hydroxyl radicals, by reaction with hydroxyl radicals, or by heterogenous loss processes such as rain-out. Significantly higher hydrogen peroxide concentrations are found in polluted atmospheres as compared with clean air, presumably due to oxidation of reactive hydrocarbons as a result of exposure to light. Soil - No information was found regarding the transformation or persistence of hydrogen peroxide in soil, however, solutions of hydrogen peroxide gradually deteriorate. Water - Hydrogen peroxide is a naturally occurring substance. Surface water concentrations of hydrogen peroxide have been found to vary between 51-231 mg/L, increasing both with exposure to sunlight and the presence of dissolved organic matter. Hydrogen peroxide degrades by various mechanisms, including chemical reduction and enzymatic decomposition by algae, zooplankton, and bacteria. However microorganisms, especially bacteria, account for the majority of degradation. The rate of decomposition in natural water varies from a few minutes to more than a week, depending on numerous chemical, biological, and physical factors. Hydrogen peroxide is rapidly degraded in a biological waste water treatment plant. Hydrogen peroxide adsorbs poorly to sediment particles and is rapidly degraded, thus accumulation in the sediment is also not expected. Hydrogen peroxide (log Kow < -1) is an inorganic substance and therefore shows little potential to bioaccumulate.

Ecotoxicity: Fish LC50 (96 h): catfish 37.4 mg/l/Fish LC50 (24 h): mackerel 89 mg/l; chameleon gobi 155 mg/l/Zebra mussel LC50 (28 h) 30 mg/l; (228 h): 12 mg/l

Ecotoxicity data show that microorganisms (i.e., bacteria, algae) and zooplankton present in aquatic ecosystems are generally less tolerant of hydrogen peroxide exposure than fish or other vertebrates. Effects of short-term exposures on sensitive bacteria and invertebrates (e.g., *Daphnia pulex*) have been observed at concentrations in the low mg/L (ppm) range, while effects on sensitive algae have been reported at levels less than 1.0 mg/L. Algae are the most sensitive species for hydrogen peroxide. The algal EC50 of hydrogen peroxide was 1.6-5 mg/l, while the NOEC was 0.1 mg/l. In a 21-d continuous exposure study on *Daphnia magna*, the chronic no observable effect concentration (NOEC) for reproduction was 0.63 mg/L and the NOEC for mortality was 1.25 mg/L. In chronic toxicity studies with invertebrates (zebra mussels) and hydrogen peroxide shows a NOEC of 2 mg/l. The PNEC of hydrogen peroxide is equal to 10 ug/l. Risk mitigation is needed to ensure that use of hydrogen peroxide will not adversely impact aquatic life. An acute water quality criterion or "benchmark" has been determined. For hydrogen peroxide, the acute benchmark is 0.7 mg/L. This value was calculated using the extensive toxicity database for hydrogen peroxide and procedures in U.S. Environmental Protection Agency guidance for deriving numerical national water quality criteria. The use of hydrogen peroxide in intensive aquaculture in finfish (at up to 100 mg/L for 60 minutes) and finfish eggs (at up to 1,000 mg/L for 15 minutes) is not expected to have a significant impact on the environment.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
hydrogen peroxide	LOW	LOW
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
hydrogen peroxide	LOW (LogKOW = -1.571)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
hydrogen peroxide	LOW (KOC = 14.3)
water	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	Dispose of according to federal, state and local regulations.
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SECTION 14 TRANSPORT INFORMATION

Labels Required

Marine Pollutant	NO
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Land transport (DOT): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

HYDROGEN PEROXIDE(7722-84-1) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Hydrogen Peroxide Standard

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants
International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants
US - Alaska Limits for Air Contaminants	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants
US - California Permissible Exposure Limits for Chemical Contaminants	US - Washington Permissible exposure limits of air contaminants
US - Hawaii Air Contaminant Limits	US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants
US - Idaho - Limits for Air Contaminants	US ACGIH Threshold Limit Values (TLV)
US - Massachusetts - Right To Know Listed Chemicals	US ACGIH Threshold Limit Values (TLV) - Carcinogens
US - Michigan Exposure Limits for Air Contaminants	US NIOSH Recommended Exposure Limits (RELs)
US - Minnesota Permissible Exposure Limits (PELs)	US OSHA Permissible Exposure Levels (PELs) - Table Z1
US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Mutagens	US SARA Section 302 Extremely Hazardous Substances
US - Oregon Permissible Exposure Limits (Z-1)	US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US - Pennsylvania - Hazardous Substance List	US TSCA Chemical Substance Inventory - Interim List of Active Substances
US - Rhode Island Hazardous Substance List	

WATER(7732-18-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory	US TSCA Chemical Substance Inventory - Interim List of Active Substances
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Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SECTION 311/312 HAZARD CATEGORIES

Flammable (Gases, Aerosols, Liquids, or Solids)	No
Gas under pressure	No
Explosive	No
Self-heating	No
Pyrophoric (Liquid or Solid)	No
Pyrophoric Gas	No
Corrosive to metal	No
Oxidizer (Liquid, Solid or Gas)	No
Organic Peroxide	No
Self-reactive	No
In contact with water emits flammable gas	No
Combustible Dust	No
Carcinogenicity	No
Acute toxicity (any route of exposure)	No
Reproductive toxicity	No
Skin Corrosion or Irritation	No
Respiratory or Skin Sensitization	No
Serious eye damage or eye irritation	No
Specific target organ toxicity (single or repeated exposure)	No
Aspiration Hazard	No
Germ cell mutagenicity	No
Simple Asphyxiant	No

US. EPA CERCLA HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES (40 CFR 302.4)

None Reported

State Regulations

US. CALIFORNIA PROPOSITION 65

None Reported

National Inventory Status

National Inventory	Status
Australia - AICS	Y
Canada - DSL	Y
Canada - NDSL	N (hydrogen peroxide; water)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	Y
Japan - ENCS	Y
Korea - KECI	Y
New Zealand - NZIoC	Y
Philippines - PICCS	Y
USA - TSCA	Y

Hydrogen Peroxide Standard

Legend:

Y = All ingredients are on the inventory

N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

SECTION 16 OTHER INFORMATION

Revision Date	11/09/2018
Initial Date	07/09/2018

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC – TWA: Permissible Concentration-Time Weighted Average
PC – STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit,
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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