MATERIAL SAFETY DATA SHEET HYDROGEN PEROXIDE, 50% MSDS

1: Chemical Product and Company Identification
Product Name: Hydrogen Peroxide, 50%
Catalogue Codes: SLH1453
CAS#: Mixture.
RTECS: Not applicable.
TSCA: TSCA 8(b) inventory: Water; Hydrogen Peroxide
CI#: Not applicable.
Synonym: Hydrogen Peroxide, 50% Solution
Chemical Name: Not applicable.
Chemical Formula: Not applicable.

2: Composition and Information on Ingredients
Composition:

Name	CAS #	% by Weight
Water	7732-18-5	50
Hydrogen Peroxide	7722-84-1	50

Toxicological Data on Ingredients: Hydrogen Peroxide: ORAL (LD50): Acute: 2000 mg/kg [Mouse]. DERMAL (LD50): Acute: 4060 mg/kg [Rat]. 2000 mg/kg [pig]. VAPOR (LC50): Acute: 2000 mg/m 4 hours [Rat].

3: Hazards Identification
Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant). Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive), of ingestion, Slightly hazardous in case of inhalation (lung sensitizer). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Prolonged exposure may result in skin burns and ulcerations. Over-exposure by inhalation may cause respiratory irritation. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH [Hydrogen Peroxide]. Classified 3 (Not classifiable for human.) by IARC [Hydrogen Peroxide].
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells [Hydrogen Peroxide]. Mutagenic for bacteria and/or yeast. [Hydrogen Peroxide].
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, upper respiratory tract, skin, eyes, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce

chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact: Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation: Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion: Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

5: Fire and Explosion Data

Flammability of the Product:	Non-flammable.
Auto-Ignition Temperature:	Not applicable.
Flash Points:	Not applicable.
Flammable Limits:	Not applicable.
Products of Combustion:	Not available.
Fire Hazards in Presence of Various Substances:	Of combustible materials
Explosion Hazards in Presence of Various Substances:	Explosive in presence of open flames and sparks, of heat, of organic materials, of metals, of acids.

Fire Fighting Media and Instructions:

Fire: Small fires:

Use water. Do not use dry chemicals or foams. CO2, or Halon may provide limited control. Large fires: Flood fire area with water from a distance. Move containers from fire area if you can do it without risk. Do not move cargo or vehicle if cargo has been exposed to heat. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. ALWAYS stay away from

tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. / Hydrogen peroxide, aqueous solution, with not less than 8% but less than 20% Hydrogen peroxide; Hydrogen peroxide, aqueous solution, with not less than 20% but not more than 60% Hydrogen peroxide (stabilized as necessary)/ [QC Reviewed] [U.S. Department of Transportation. 2000 Emergency Response Guidebook. RSPA P 5800.8 Edition. Washington, D.C: U.S. Government Printing Office, 2000, p. G-140]

Special Remarks on Fire Hazards:

Most cellulose (wood, cotton) materials contain enough catalyst to cause spontaneous ignition with 90% Hydrogen Peroxide. Hydrogen Peroxide is a strong oxide. It is not flammable itself, but it can cause spontaneous combustion of flammable materials and continued support of the combustion because it liberates oxygen as it decomposes. Hydrogen peroxide mixed with magnesium and a trace of magnesium dioxide will ignite immediately.

Special Remarks on Explosion Hazards:

Soluble fuels (acetone, ethanol, glycerol) will detonate on a mixture with peroxide over 30% concentration, the violence increasing with concentration. Explosive with acetic acid, acetic anhydride, acetone, alcohols, carboxylic acids, nitrogen containing bases, As2S3, Cl2 + KOH, FeS, FeSO4 + 2 methylpyridine + H2SO4, nitric acid, potassium permanganate, P2O5, H2Se, Alcohols + H2SO4, Alcohols + tin chloride, Antimony trisulfide, chlorosulfonic acid, Aromatic hydrocarbons + trifluoroacetic acid, Azelaic acid + sulfuric acid (above 45 C), Benzenesulfonic anhydride, tert-butanol + sulfuric acid, Hydrazine, Sulfuric acid, Sodium iodate, Tetrahydrothiophene, Thiodiglycol, Mercurous oxide, mercuric oxide, Lead dioxide, Lead oxide, Manganese dioxide, Lead sulphide, Gallium + HCl, Ketenes + nitric acid, Iron (II) sulphate + 2-

methylpyridine + sulfuric acid, Iron (II) sulphate + nitric acid, + sodium carboxymethylcellulose (when evaporated), Vinyl acetate, trioxane, water + oxygenated compounds (e.g.: acetaldehyde, acetic acid, acetone, ethanol, formaldehyde, formic acid, methanol, 2-propanol, propionaldehyde), organic compounds. Beware: Many mixtures of hydrogen peroxide and organic materials may not explode upon contact. However, the resulting combination is detonatable either upon catching fire or by impact. EXPLOSION HAZARD: SEVERE, WHEN HIGHLY CONCENTRATED OR PURE H2O2 IS EXPOSED TO HEAT, MECHANICAL IMPACT, OR CAUSED TO DECOMPOSE CATALYTICALLY BY METALS & THEIR SALTS, DUSTS & ALKALIES. ANOTHER SOURCE OF HYDROGEN PEROXIDE EXPLOSIONS IS FROM SEALING THE MATERIAL IN STRONG CONTAINERS. UNDER SUCH CONDITIONS EVEN GRADUAL DECOMPOSITION OF HYDROGEN PEROXIDE TO WATER + 1/2 OXYGEN CAN CAUSE LARGE PRESSURES TO BUILD UP IN THE CONTAINERS WHICH MAY BURST EXPLOSIVELY. Fire or explosion: May explode from friction, heat or contamination. These substances will accelerate burning when involved in a fire. May ignite combustibles (wood, paper, oil, clothing, etc.). Some will react explosively with hydrocarbons (fuels). Containers may explode when heated. Runoff may create fire or explosion hazard. /Hydrogen peroxide, aqueous solution, stabilized, with more than 60% Hydrogen peroxide; Hydrogen peroxide, stabilized/ [QC Reviewed] [U.S. Department of Transportation. 2000 Emergency Response Guidebook. RSPA P 5800.8 Edition. Washington, D.C: U.S. Government Printing Office, 2000, p. G-143]. Fire or explosion: These substances will accelerate burning when involved in a fire. Some may decompose explosively when heated or involved in a fire. May explode from heat or contamination. Some will react explosively

with hydrocarbons (fuels). May ignite combustibles (wood, paper, oil, clothing, etc.). Containers may explode when heated. Runoff may create fire or explosion hazard. /Hydrogen peroxide, aqueous solution, with not less than 8% but less than 20% Hydrogen peroxide; Hydrogen peroxide, aqueous solution, with not less than 20% but not more than 60% Hydrogen peroxide (stabilized as necessary)/ [QC Reviewed] [U.S. Department of Transportation. 2000 Emergency Response Guidebook. RSPA P 5800.8 Edition. Washington, D.C: U.S. Government Printing Office, 2000, p. G-140] (Hydrogen Peroxide)

6: Accidental Release Measures

Small Spill: Dilute with water and mop up or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill: Corrosive liquid. Oxidizing material. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Avoid contact with a combustible material (wood, paper, oil, clothing...). Keep substance damp using water spray. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

7: Handling and Storage

Precautions:

Keep locked up. Keep container dry. Keep away from heat. Keep away from sources of ignition. Keep away from combustible material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or
the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, combustible materials, organic materials, metals, acids, alkalis.

Storage:

Keep container tightly closed. Keep container in a cool, well-ventilated area. Separate from acids, alkalis, reducing agents and combustibles. See NFPA 43A, Code for the Storage of Liquid and Solid Oxidizers. Do not store above 8°C (46.4°F).

Refrigerate. Sensitive to light. Store in light-resistant containers.

8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the workstation location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

Hydrogen Peroxide TWA: 1 (ppm) from ACGIH (TLV) [United States] TWA: 1 (ppm) from OSHA (PEL) [United States] TWA:
1 STEL: 2 [Canada] TWA: 1.4 (mg/m3) from NIOSH TWA: 1.4 (mg/m3) from OSHA (PEL) [United States] TWA: 1 (ppm) [United Kingdom (UK)] TWA: 1.4 (mg/m3) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

9: Physical and Chemical Properties

Physical state and appearance:	Liquid.
odour:	Odourless.
Taste:	Slight acid. Bitter
Molecular Weight:	Not applicable.
Colour:	Clear Colourless.
pH (1% soln/water):	Not available
Boiling Point:	108°C (226.4°F)
Melting Point:	-33°C (-27.4°F)
Critical Temperature:	Not available.
Specific Gravity:	1.2 (Water = 1)
Vapor Pressure:	3.1 kPa (@ 20°C)
Vapor Density:	1.1 (Air = 1)
Volatility:	Not available.
odour Threshold:	Not available.
Water/Oil Dist. Coeff.:	Not available.
Iconicity (in Water):	Not available.
Dispersion Properties:	See solubility in water, diethyl ether.
Solubility:	Easily soluble in cold water. Soluble in diethyl ether.

10: Stability and Reactivity Data

Stability:	The product is stable. It contains a stabilizer.
Instability Temperature:	Not available.
Conditions of Instability:	Heat, Combustible materials, incompatible materials, light
Incompatibility with various substances:	Reactive with reducing agents, combustible materials, organic materials, metals, acids, alkalis.
Corrosivity:	Non-corrosive in presence of glass.
Special Remarks on Reactivity:	Light sensitive. Incompatible with reducing materials, ethers (dioxane, furfuran, tetrahydrofuran), oxidizing materials, Metals (e.g. potassium, sodium lithium,

iron, copper, brass, bronze, chromium, zinc, lead, silver, nickel), metal oxides (e.g. cobalt oxide, iron oxide, lead oxide, lead hydroxide, manganese oxide), metal salts (e.g. calcium permanganate, salts of iron), manganese, asbestos, vanadium, platinum, tungsten, molybdenum, triethylamine, palladium, sodium pyrophosphate, carboxylic acids, cyclopentadiene, formic acid, rust, ketones, sodium carbonate, alcohols, sodium borate, aniline, mercurous chloride, rust, nitric acid, sodium pyrophosphate, hexavalent chromium compounds, tetrahydrofuran, sodium fluoride organic matter, potassium permanganate, urea, chlorosulfonic acid, manganese dioxide, hydrogen selenide, charcoal, coal, sodium borate, alkalis, cyclopentadiene, glycerine, cyanides (potassium, cyanide, sodium cyanide), nitrogen compounds. Caused to decompose catalytically by metals (in order of decreasing effectiveness): Osmium, Palladium, Platinum, Iridium, Gold, Silver, Manganese, Cobalt, Copper, Lead. Concentrated hydrogen peroxide may decompose violently or explosively in contact with iron, copper, chromium, and most other metals and their salts, and dust. (Hydrogen Peroxide)

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact.

Toxicity to Animals: Acute oral toxicity (LD50): 4000 mg/kg (Mouse) (Calculated value for the mixture). Acute dermal toxicity (LD50): 4000 mg/kg (pig) (Calculated value for the mixture).

Chronic Effects on Humans: CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH [Hydrogen Peroxide]. Classified 3 (Not classifiable for human.) by IARC [Hydrogen Peroxide]. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. [Hydrogen Peroxide]. Mutagenic for bacteria and/or yeast. [Hydrogen Peroxide]. Contains material which may cause damage to the following organs: blood, upper respiratory tract, skin, eyes, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant). Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive), of ingestion, of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May cause cancer and may affect genetic material based on animal data. May be tumorigenic. (Hydrogen Peroxide)
Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:

Skin: Causes severe skin irritation and possible burns. Absorption into skin may affect behaviour/central nervous system (tremor, ataxia, convulsions), respiration (dyspnoea, pulmonary emboli), brain.

Eyes: Causes severe eye irritation, superficial clouding, corneal enema, and may cause burns.

Inhalation: Causes respiratory tract irritation with coughing, lacrimation. May cause chemical burns to the respiratory tract. May affect behaviour/Central nervous system (insomnia, headache, ataxia, nervous tremors with numb extremities) and may cause ulceration of nasal tissue, and, chemical pneumonia, unconsciousness, and possible death. At high concentrations, respiratory effects may include acute lung damage, and delayed pulmonary enema. May affect blood.

Ingestion: Causes gastrointestinal tract irritation with nausea, vomiting, hypermotility, and diarrhea.

12: Ecological Information
Ecotoxicity: Not available.
BOD5 and COD: Not available.
Products of Biodegradation: Possibly hazardous short-term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.
Special Remarks on the Products of Biodegradation: Not available.

13: Disposal Considerations
Waste Disposal: Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14: Transport Information
DOT Classification: Class 8: Corrosive material CLASS 5.1: Oxidizing material.
Identification: Hydrogen Peroxide, Aqueous Solution UNNA: 2014 PG: II
Special Provisions for Transport: Not available.

15: Other Regulatory Information
Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator
when ventilation is inadequate. Face shield.

16: Other Information
References: Not available.
Other Special Considerations: Not available.

EXCLUSION OF LIABILITY

All information and instructions provided in this Material Safety Data Sheet in respect of the substance is given solely in terms of the provisions of the Occupational Health and Safety Act No 85 of 1993 and Regulations ("the Act"), is based on scientific and technical knowledge as at the date indicated on this MS Material Safety Data Sheet and is presented in good faith to be correct.
The information and instructions provided in this MSDS apply only to the substance in its present form and not to any formulation or mix, in which event it is the sole responsibility of the user of the substance as formulated and/or mixed to investigate and establish any danger which may arise out of its use, wherever such user may be situated.

It is the sole responsibility of the person in receipt of this Material Safety Data Sheet wherever such recipient may be situated, to ensure that the information provided is communicated to and understood by any person who may come in contact with the substance in any place and in any manner whatsoever. If such recipient produces formulations or mixes using the substance, then it is such recipient's sole responsibility to comply with the provisions of the Act in respect of the provision of the necessary Material Safety Data Sheet, or to comply with any other applicable legislation.