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MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION

Revision Date JULY 2011

Product Name CALCIUM HYPOCHLORITE, HYDRATED

Other Names CALCIUM HYPOCHLORITE DRY CHLORINE TABLETS

Uses Algicide, bactericide, deodorant, potable water purification, disinfectant for swimming pools, fungicide, bleaching agent (paper, textiles).

Contact Information

Organisation	Location	Telephone	Ask For
Price Chemicals Pty Ltd	10 Pile Rd Somersby NSW Australia	+61 2 43400088	Technical Officer
Poison Information Centre	Westmead NSW Australia	131126	
Chemcall 24 Hour Emergency Number	Australia New Zealand	1800-127406 0800-243622	
National Poisons Centre	New Zealand	0800-764766	

2. HAZARD IDENTIFICATION

Hazardous according to criteria of NOHSC/ASCC.

Dangerous According to the Australian Code for the Transport of Dangerous Goods.

Classified as Dangerous Goods According to NZS 5433:1999.

OXIDIZING CORROSIVE DANGEROUS FOR THE ENVIRONMENT

Risk Phrases

- R8 Contact with combustible material may cause fire.
- R31 Contact with acids liberates toxic gas.
- R34 Causes burns.
- R22 Harmful if swallowed.

R50 Very toxic to aquatic organisms.

Safety Phrases

- S1/2 Keep locked up and out of the reach of children.
- S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
- S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S61 Avoid release to the environment. Refer to special instructions/Material Safety Data Sheets.

ERMA New Zealand Approval Code HSR001317

HSNO Hazard Classification 5.1.1B 6.1D 8.1A 8.2B 8.3A 9.1A 9.2A 9.3C

This Material Safety Data Sheet may not provide exhaustive guidance for all HSNO Controls assigned to this substance. The ERMA Web Site should be consulted for a full list of triggered controls and cited regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	CAS Number	Proportions (%)
CALCIUM HYPOCHLORITE	[7778-54-3]	65-75
SODIUM CHLORIDE	[7647-14-5]	10-20
CALCIUM CHLORIDE	[10043-52-4]	0-5
WATER	[7732-18-5]	0-5.5
CALCIUM HYDROXIDE	[1305-62-0]	0-4
CALCIUM CARBONATE	[471-34-1]	0-4
CALCIUM CHLORATE	[10137-74-3]	0-5

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure.

Swallowed Rinse mouth with water. Give water to drink provided victim is conscious. Do NOT induce vomiting. If vomiting occurs naturally, rinse mouth and repeat administration of water. Seek medical attention immediately.

Eye Immediately flush eyes with water for at least 20-30 minutes. Neutral saline solution may be used as soon as it is available. Do NOT interrupt flushing. Take care not to rinse contaminated water into the non-affected eye or onto the face. Seek immediate medical attention.

Skin Immediately flush skin with water for at least 20-30 minutes. Do NOT interrupt flushing. Under running water, remove contaminated clothing. Discard contaminated leather goods. Transport to the nearest medical facility for treatment.

Inhaled Remove victim from exposure to fresh air. If breathing is difficult give oxygen. Do NOT use mouth to mouth respiration. If breathing has ceased, apply artificial respiration using

oxygen and a suitable mechanical device such as a bay and a mask. Seek immediate medical assistance.

Advice to Doctor Treat symptomatically based on individual reactions of patient and judgement of doctor. Effects may be delayed. May cause corneal burns. NOTE: For advice in an emergency, contact a Poisons Information Centre (Australia 13-11-26 or New Zealand 0800-764-766).

Aggravated medical conditions caused by exposure Persons with pre-existing skin, eye, tooth, or respiratory disorders, or with seasonal allergic rhinitis may be more susceptible to the effects of this material.

5. FIRE FIGHTING MEASURES

Extinguishing Media SMALL FIRE: Use flooding quantities of water. Do NOT use dry chemicals, carbon dioxide or foam. If safe to do so, move undamaged containers from fire area. Do NOT move cargo if cargo has been exposed to heat. LARGE FIRE: Flood area with water from a protected position. Cool containers with flooding quantities of water until well after fire is out. If impossible, withdraw from area and let fire burn. Avoid getting water inside containers: a violent reaction may occur. Dam fire control water for safe disposal.

Hazards from Combustion Products Powerful oxidizing solid. Will accelerate burning when involved in a fire. This strong oxidiser may cause a fire as it contacts with combustible materials. Containers may explode when heated. Incompatible with flammable, organic and combustible materials, ammonia, primary amines, aromatic amines, and urea acids, ammonium chloride, different types of chlorinating chemicals, ethanol or methanol, hydroxy compounds, acetylene, acetic acid and potassium cyanide, reducing agents, metal oxides, charcoal + heat, metals, organic sulfur compounds, sulfur (damp), turpentine and all sources of ignition. When involved in a fire, this product may generate irritating and highly toxic gases of hydrogen chloride gas, hydrochloric acid, calcium oxides, calcium chlorate, calcium hydroxide, calcium carbonate, and chlorine, oxygen gas, and dichlorine monoxide above 177°C.

Special Protective Precautions and Equipment for Fire Fighters 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). Clear fire area of all non-emergency personnel. Stay upwind. Keep out of low areas. Eliminate ignition sources.

Flammability Conditions Non combustible solid. Strong oxidiser and its heat of reaction with reducing agents, contaminants or combustibles may cause ignition. Explosions involving calcium hypochlorite have occurred. Product will cause a severe increase in the burning rate of combustible materials with which it comes into contact or that will undergo vigorous self-sustained decomposition due to contamination or exposure to heat. Additional Information

Hazchem Code 1W

6. ACCIDENTAL RELEASE MEASURES

Emergency Procedures Personnel involved in the clean up should wear full protective clothing. Evacuate all unnecessary personnel. Eliminate all sources of ignition. Increase ventilation. Avoid generating dust. Stop leak if safe to do so. Isolate the danger area. Do NOT let product reach drains or waterways. If product does enter a waterway, advise the Environmental Protection Authority or your local Waste Management. Use clean, non-sparking tools and equipment.

Methods and Materials for Containment and Clean Up Contain and sweep/shovel up spills with dust binding material or use an industrial vacuum cleaner. Transfer to a suitable, labelled container and dispose of promptly as hazardous waste.

7. HANDLING AND STORAGE

Precautions for Safe Handling Ensure an eye bath and safety shower are available and ready for use. Observe good personal hygiene practices and recommended procedures.

Wash thoroughly after handling. Take precautionary measures against static discharges by bonding and grounding equipment. Avoid contact with eyes, skin and clothing. Do not inhale product dust/fumes. Do NOT allow product to get damp. Do NOT mix with other chemicals. Do NOT add water to the product - add the product to the water. Use only clean utensils for handling as remnants of other products may cause a violent reaction leading to fire or explosion.

Conditions for Safe Storage (Including Any Incompatibles) Store in a cool, dry, well-ventilated area. Keep containers tightly closed when not in use. Inspect regularly for deficiencies such as damage or leaks. Protect against physical damage. Store away from incompatible materials such as flammable, organic and combustible materials, ammonia, primary amines, aromatic amines, and urea acids, ammonium chloride, different types of chlorinating chemicals, ethanol or methanol, hydroxy compounds, acetylene, acetic acid and potassium cyanide, reducing agents, metal oxides, charcoal + heat, metals, organic sulfur, compounds, sulfur (damp), turpentine and all sources of ignition. Protect from direct sunlight, moisture, food and feedstuffs. Avoid storage in wood floors. Store and transport in an upright container. The bulk material may ignite or explode in storage. Traces of water may initiate the reaction. Store in an area without drain or sewer access. Store below 50°C to avoid slow decomposition, room temperature recommended. This product has a UN Classification of 2880 and a Dangerous Goods Class 5.1 Oxidiser according to The Australian Code for the Transport of Dangerous Goods By Road and Rail.

Container Type Packaging must comply with requirements of Hazardous Substances (Packaging) Regulations 2001. Store in original packaging as approved by manufacturer. SUITABLE: A metallic or coated fibreboard drum using a strong polyethylene inner package.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

National Exposure Standards No exposure standard has been established for this product by the Australian Safety and Compensation Council (ASCC). However, the exposure standard for dust not otherwise specified is 10mg/m³ (for inspirable dust) and 3mg/m³ (for respirable dust). A time weighted average (TWA) has been established for chlorine (worksafe Aust) of 3mg/m³, (1ppm)(Peak Limitation). The exposure value at the TWA is the average airborne concentration of a particular substance when calculated over a normal 8hr working day for a 5 day working week. Peak Limitation: a ceiling concentration which should not be exceeded over a measurement period which should be as short as possible but not exceeding 15 minutes.

Biological Limit Values No information available on biological limits for this product.

Engineering Controls 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.

Personal Protection RESPIRATOR: Wear an approved positive pressure, full-facepiece SCBA where engineering controls are inadequate (AS1715/1716). EYES: Wear a full face shield or chemical goggles (AS1336/1337). HANDS: Vinyl gloves are recommended (AS2161). CLOTHING: Flame-retardant coveralls and anti-static footwear (AS3765/2210).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance White to Cream Powder or Crystalline Granule

Formula Ca₂ClHO

Odour Strong Chlorine Odour

Vapour Pressure Not applicable.

Vapour Density 6.9

Boiling Point Decomposes deg C

Melting Point Approx. 100°C deg C
Solubility in Water 21g/100mL (25°C)
Specific Gravity 2.35 (20°C) (Water = 1)
Flash Point Not applicable.
pH 10.8 (10% Solution)
Lower Explosion Limit Not applicable.
Upper Explosion Limit Not applicable.
Ignition Temperature Not applicable.
Specific Heat Value Not applicable.
Particle Size Not applicable.
Volatile Organic Compounds (VOC) Content Not applicable.
Evaporation Rate Not applicable.
Viscosity Not applicable.
Percent Volatile 0% Vol (21°C)
Octanol/Water partition coefficient Log P(oct) -2.46
Saturated Vapour Concentration Not applicable.
Additional Characteristics Not applicable.
Flame Propagation/Burning Rate of Solid Materials Not applicable.
Properties of Materials That May Initiate or Contribute to Fire Intensity Fire accelerant
Potential for Dust Explosion Not applicable.
Reactions that Release Flammable Gases Not applicable.
Fast of Intensely Burning Characteristics Will accelerate burning when involved in a fire.
Non-flammables That Could Contribute Unusual Hazards to a Fire Not applicable.
Release of Invisible Flammable Vapours and Gases Not applicable.
Decomposition Temperature 100°C (Decomposes exothermically > 177°C)
Additional Information Odour Threshold : 1-3ppm (Value for chlorine) Refractive Index : 1.545 (alpha), 1.69 (beta) Bulk Density : 0.8g/cm³ (loose granules) Moisture content : 5.5-10% Molecular Weight : 142.98 Solubility : Insoluble in ethanol

10. STABILITY AND REACTIVITY

Chemical Stability Thermically stable when stored and used as directed. May decompose violently if exposed to heat or direct sunlight. All hypochlorite solutions are unstable and slowly decompose on contact with air, especially if acidified, or contaminated. Decomposition may lead to spontaneous ignition through self- heating.

Conditions to Avoid Avoid excessive heat, elevated temperatures, sunlight, flame, sources of ignition and shock, dust generation, moisture/high humidity, contamination with combustible materials, acidic conditions, the presence of metals and other impurities.

Incompatible Materials Incompatible with flammable, organic and combustible materials, ammonia, primary amines, aromatic amines, and urea acids, ammonium chloride, different types of chlorinating chemicals, ethanol or methanol, hydroxy compounds, acetylene, acetic acid and potassium cyanide, reducing agents, metal oxides, charcoal + heat, metals, organic sulfur, compounds, sulfur (damp), turpentine and all sources of ignition.

Hazardous Decomposition Products In a fire, this product may generate irritating and highly toxic gases of hydrogen chloride gas, hydrochloric acid, calcium oxides, calcium chlorate, calcium hydroxide, calcium carbonate, and chlorine, oxygen gas, and dichlorine monoxide above 177°C. In contact with incompatible materials, the formation of extremely hazardous gases such as explosively unstable N-mono of Di-Chloramines, corrosive chlorine gas, explosive nitrogen trichloride, alkyl hypochlorites, and explosive chloroacetylenes.

Hazardous Reactions Hazardous Polymerisation will not occur, however this product is a highly reactive oxidising chlorine compound. May cause fire or explosion. Readily ignites with flammable and combustible materials, in contact with anhydrous (dry) calcium hypochlorite. Reacts with ammonia, primary amines, aromatic amines, and urea to form explosive nitrogen trichloride. May explode upon contact with ethanol or methanol, due to the formation of the alkyl hypochlorites. Contact with hydroxy compounds causes ignition and may be explosive. Contact of acetylene may lead to formation of explosive chloroacetylenes. Reaction with acetic acid and potassium cyanide may be explosive. Reaction with reducing agents causes a violent reaction. Reaction with metal oxides can cause a violent oxygen-evolving decomposition of hypochlorites. A confined intimate mixture of calcium hypochlorite + finely divided charcoal exploded on heating. Metals catalyze the decomposition. Reaction with organic sulfur compounds may cause a flash fire/explosion. A mixture of damp sulfur and 'solid swimming pool chlorine' caused a violent exothermic reaction. May explode with turpentine.

11. TOXICOLOGICAL INFORMATION

Toxicity Data Oral LD50 Rat : 850mg/Kg Dermal LD50 Rabbit : >2000mg/Kg (40% water solution) Carcinogenicity : Hypochlorite salts are evaluated in the IARC monographs as Group 3: Not Classifiable as to carcinogenicity to Humans. Mutagenicity : Calcium Hypochlorite was mutagenic in bacteria and cultured mammalian cells. Mutation in microorganisms, Bacteria - Salmonella typhimurium: 1mg/plate Cytogenetic analysis, hamster fibroblast: 4mg/L Eye Irritation Test: Rabbit, dosage: equivalent to 0.1mg/volume-70mg sample: Results: Corrosive injury. Rabbit, dosage: 5% solution/30 seconds followed by rinsing with water. Results: Superficial injury. Within one day injury had healed almost completely. Skin Irritation : 0.5mg moistened with water/24hrs: Corrosive injury. Health Effects - Acute

Swallowed Harmful if swallowed. Corrosive. Calcium hypochlorite can react with organic material and stomach acids to release chlorine gas, which can cause vomiting, difficulty breathing and chemical injury to the respiratory tract and lungs. Ingestion of calcium hypochlorite solid or solutions can cause severe burns to the mouth, throat and stomach, sore throat, swelling of the throat, severe and permanent damage and perforation of the digestive tract and stomach with immediate pain, gastrointestinal symptoms, nausea, vomiting, diarrhoea, abdominal pain, convulsions, delirium, coma, respiratory collapse, and possible death. As little as 1 ounce may be lethal. Concentrations lower than 15% available chlorine can also be lethal.

Eye Solid and solutions are corrosive, and can cause permanent eye damage, including blindness. Dust may cause irritation of the inner eyelids and injury to the cornea (ulcers). Solutions release corrosive chlorine gas at normal temperatures. The amount of chlorine gas released depends on the concentration of the solution, pH, temperature, ionic strength, exposure to light and the presence of metals and other impurities. Airborne chlorine can produce severe eye irritation at concentrations of 1ppm and above. Prolonged or repeated eye contact may cause conjunctivitis. Effects may be delayed.

Skin Solutions are corrosive and can cause burns, blisters, and permanent scarring. Dusts will form concentrated solutions on wet or sweaty hands. The irritation hazard increases with increasing concentration of the solution and duration of contact. May be harmful if absorbed through the skin. With severe exposures, death could result. Prolonged or repeated skin contact may cause dry, red, itchy, cracked skin (dermatitis).

Inhaled May be harmful if inhaled. Dust may cause severe irritation and injury to the nasal passages including tissue death (necrosis) and injury to the throat (laryngeal oedema) and upper respiratory tract. Solid calcium hypochlorite decomposes and releases corrosive chlorine gas. Depending on the concentration, chlorine gas can cause nose throat and

respiratory tract irritation and or severe lung injury and death. Mists formed from solutions may be moderately to severely irritating. Symptoms of exposure include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Inhalation may be fatal as a result of spasm inflammation and oedema of the larynx and bronchi, chemical pneumonitis and pulmonary oedema.

12. ECOLOGICAL INFORMATION

Ecotoxicity Very toxic to aquatic organisms. Algae EC50/72hr: 2mg/L

Persistence and Degradability No information available on persistence/degradability for this product.

Mobility Soluble in water: 21g/100mL (25°C)

Environmental Fate (Exposure) Do NOT allow product to reach waterways, drains, or sewers.

Bioaccumulative Potential No information available on bioaccumulation for this product.

13. DISPOSAL CONSIDERATIONS

Disposal 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.

Special Precautions for Land Fill or Incineration Contact a specialist disposal company or the local waste regulator for advice. This should be done in accordance with 'The Hazardous Waste Act'. This material may be suitable for secure landfill.

14. TRANSPORT INFORMATION

Land Transport (Australia)

Regulation Name ADG Code

UN Number 2880

Shipping Name CALCIUM HYPOCHLORITE, HYDRATED

Dangerous Goods Class 5.1 Oxidising Agent (not an organic peroxide)

Subsidiary Risk Not applicable.

Pack Group II

Precaution for User OXIDIZING CORROSIVE DANGEROUS FOR THE ENVIRONMENT

Hazchem Code 1W

EPG 31 OXIDIZING SUBSTANCES

Special Provision Not applicable.



Land Transport (New Zealand)

Regulation Name NZS5433

UN Number 2880

Shipping Name CALCIUM HYPOCHLORITE, HYDRATED

Dangerous Goods Class 5.1 Oxidising Agent (not an organic peroxide)

Subsidiary Risk Not applicable.

Pack Group II

Precaution for User OXIDIZING CORROSIVE DANGEROUS FOR THE ENVIRONMENT

Hazchem Code 1W

EPG 31 OXIDIZING SUBSTANCES

Special Provision Not applicable.



Sea Transport

Regulation Name IMDG Code

UN Number 2880

Shipping Name CALCIUM HYPOCHLORITE, HYDRATED

Dangerous Goods Class 5.1 Oxidising Agent (not an organic peroxide)

Subsidiary Risk Not applicable.

Pack Group II

Precaution for User OXIDIZING CORROSIVE DANGEROUS FOR THE ENVIRONMENT

Hazchem Code No data available.

EPG 31 OXIDIZING SUBSTANCES

Special Provision Not applicable.



15. REGULATORY INFORMATION

Classified as hazardous according to The Australian Safety and Compensation Council (ASCC) and Annex I European Directive 67/548/EEC. EINECS No: 231-908-7 Calcium Hypochlorite

Poisons Schedule 6

EPG 31

AICS Name HYPOCHLOROUS ACID, CALCIUM SALT

NZ Toxic Substance 3

HSNO Hazard Classification 5.1.1B 6.1D 8.1A 8.2B 8.3A 9.1A 9.2A 9.3C

ERMA Approval Code HSR001317

16. OTHER INFORMATION

Literature References No data available.

Sources for Data No data available.

Legend to Abbreviations and Acronyms

< less than

> greater than

ADG Australian Dangerous Goods Code

AICS Australian Inventory of Chemical Substances

CAS Chemical Abstracts Service (Registry Number)

cm² square centimetres

CO₂ Carbon Dioxide

COD Chemical Oxygen Demand

deg C ('C) degrees Celsius

ERMA Environmental Risk Management Authority

g gram

g/cm³ grams per cubic centimetre

g/l grams per litre

HSNO Hazardous Substance and New Organism

IATA International Air Transport Association Dangerous Goods Regulations

IDLH Immediately Dangerous to Life and Health

IMDG International Maritime Dangerous Goods Code

immiscible liquids are insoluble in each other

kg kilogram

kg/m³ kilograms per cubic metre

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 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 miscible

miscible liquids form one homogeneous liquid phase regardless of the amount of either component present

mm millimetre

mPa.s milli Pascal per second

N/A Not Applicable

NOHSC National Occupational Health and Safety Commission

OECD Organization for Economic Co-operation and Development

PEL Permissible Exposure Limit

ppb parts per billion

ppm parts per million

ppm/2h parts per million per 2 hours

ppm/6h parts per million per 6 hours

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 (number)

wt weight

This MSDS summarises Price Chemicals Pty Ltd best knowledge of the health and safety hazard information of the selected substance and how to safely handle the selected substance in the workplace however Price Chemicals Pty Ltd expressly disclaims that the MSDS is a representation or guarantee of the chemical specifications for the substance.

Each user should read the MSDS and consider the information in the context of how the selected substance will be handled and used in the workplace including its use in conjunction with other substances.

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