



## PHYSICAL DESCRIPTION / PROPERTIES



### APPEARANCE

White powder with a pungent chlorine odour; soluble in water. Powerful oxidising agent; unstable to heat, friction or direct sunlight. Wetting of solid material can cause heating and decomposition, giving off oxygen and highly toxic chlorine gas.

Boiling Point	Not applicable
Melting Point	100 decomposes
Vapour Pressure (kPa)	Not applicable
Specific Gravity	2.35
Flash Point (deg C)	Non flammable
Lower Explosive Limit (%)	Not available
Upper Explosive Limit (%)	Not available
Solubility in Water (g/L)	Miscible

### INGREDIENTS

NAME	CAS RN	%
Calcium Hypochlorite, dry	7778-54-3	94 app
May contain		
Calcium Hydroxide Hypochlorite	12394-14-8	(< 6 ^
Calcium Chloride	10043-52-4	( ^
Calcium Hydroxide	1305-62-0	(
(Available chlorine >39%)		
Decomposes when wet and gives off toxic chlorine	7782-50-5	

## HEALTH HAZARD



### ACUTE HEALTH EFFECTS

#### **SWALLOWED**

The solid/dust is extremely discomforting to the gastro-intestinal tract and toxic if swallowed. Ingestion may cause burning in the mouth and throat, abdominal cramps, nausea, vomiting, diarrhoea and shock. May lead to convulsion, coma and death. Considered an unlikely route of entry in commercial/industrial environments.

#### **EYE**

The dust is discomforting and harmful to the eyes and is capable of causing severe damage with loss of sight. Chlorine vapour from wet material causes severe irritation to the eyes.

#### **SKIN**

The material may be highly discomforting to the skin and is capable of causing burns if exposure is prolonged and skin reactions, which may lead to dermatitis.

#### **INHALED**

Generated dust may be highly discomforting if inhaled and may be harmful to the upper respiratory tract. Exposure to high concentrations causes bronchitis and is characterised by the onset of haemorrhagic pulmonary oedema. Chlorine vapour given off from wet material is extremely irritating to the upper respiratory tract and lungs. Symptoms may include coughing, breathing difficulty, headache, vomiting, lung congestion, bronchitis, pulmonary oedema, pneumonia. Effects may be delayed.

## **CHRONIC HEALTH EFFECTS**

Principal routes of exposure are usually by skin contact with the material, with the material in solution and inhalation of generated dust. Hypochlorite in pool water at concentrations of 1 ppm chlorine or less is non irritating to eyes if the pH is higher than 7.2 (slightly alkaline); At lower pH sensation of stinging, smarting of eyes with transient reddening may occur but generally no injury. Ingestion irritates the mouth, throat, and stomach. The hypochlorous acid liberated in the stomach can cause wall perforation, toxemia, haemorrhage and death. As with any chemical product, contact with unprotected bare skin; inhalation of vapour, mist or dust in work place atmosphere; or ingestion in any form, should be avoided by observing good occupational work practice.

## **FIRST AID**

### **SWALLOWED**

- 1: 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.
- 2: Observe the patient carefully.
- 3: Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- 4: Give water (or milk) to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- 5: Transport to hospital or doctor without delay.

### **EYE**

If this product comes in contact with the eyes:

- 1: Immediately hold the eyes open and wash continuously for at least 15 minutes with fresh running water.
- 2: 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.
- 3: Transport to hospital or doctor without delay.
- 4: Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

### **SKIN**

If product comes in contact with the skin:

- 1: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
- 2: Wash affected areas thoroughly with water (and soap if available).
- 3: Seek medical attention in event of irritation.

### **INHALED**

If fumes or combustion products are inhaled:

- 1: Remove to fresh air.
- 2: Lay patient down. Keep warm and rested.
- 3: If breathing is shallow or has stopped, ensure clear airway and apply resuscitation, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- 4: Transport to hospital, or doctor.

### **ADVISE TO THE DOCTOR**

For acute or repeated exposures to hypochlorite solutions:

1. Release of small amounts of hypochlorous acid and acid gases from the stomach following ingestion, is usually too low to cause damage but may be irritating to mucous membranes. Buffering with antacid may be helpful if discomfort is evident.
2. Evaluate as potential caustic exposure.
3. Decontaminate skin and eyes with copious saline irrigation. Check exposed eyes for corneal abrasions with fluorescein staining.
4. Emesis or lavage and catharsis may be indicated for mild caustic exposure.
5. Chlorine exposures require evaluation of acid/base and respiratory status.
6. Inhalation of vapours or mists may result in pulmonary oedema.

ELLENHORN and BARCELOUX: Medical Toxicology.

## PRECAUTIONS FOR USE



### EXPOSURE STANDARDS

No exposure limits set by NOHSC or ACGIH.

#### **CALCIUM HYDROXIDE**

TLV TWA: 5 mg/m<sup>3</sup>

ES TWA: 5 mg/m<sup>3</sup>

OES TWA: 5 mg/m<sup>3</sup>

In the absence of reports of adverse effects from exposure and the recognised lesser alkalinity of the alkaline earths compared with the alkali hydroxides the relatively high value of TLV-TWA is recommended. This value corresponds in total alkalinity to 5 mg/m<sup>3</sup> of sodium hydroxide or 2.5 times the TLV-TWA of sodium hydroxide.

#### **CHLORINE**

TLV TWA: 0.5 ppm, 1.5 mg/m<sup>3</sup>; STEL: 1 ppm, 2.9 mg/m<sup>3</sup> A4

NOTE: This substance has been classified by the ACGIH as A4 NOT classifiable as causing Cancer in humans.

ES Peak: 1 ppm, 3 mg/m<sup>3</sup> OES TWA: 0.5 ppm, 1.5 mg/m<sup>3</sup>; STEL: 1 ppm, 2.9 mg/m<sup>3</sup>

MAK value: 0.5 ppm, 1.5 mg/m<sup>3</sup>

MAK Category I Peak Limitation: For local irritants Allows excursions of twice the MAK value for 5 minutes at a time, 8 times per shift.

MAK Group C: There is no reason to fear risk of damage to the developing embryo when MAK and BAT values are observed.

MAK values, and categories and groups are those recommended within the Federal Republic of Germany.

IDLH Level: 10 ppm

Odour Threshold Value: 0.08 ppm (detection) - olfactory fatigue may develop

NOTE: Detector tubes for chlorine, measuring in excess of 0.2 ppm, are commercially available. Long-term measurements (8 hrs) may be conducted to detect concentrations exceeding 0.13 ppm. Smell is not a good indicator of severity of exposure in the range 0.5 to 2 ppm. In this range subjects found exposure unpleasant with itching and burning of the throat reported and occasionally an urge to cough. Significant differences in the responses of males and females were also recorded with females often reporting headache and drowsiness. Exposure at 1 ppm chlorine for 8 hours produced significant changes in pulmonary function and increased subjective irritation. Similar 8 hour exposures at 0.5 ppm produced no significant pulmonary function changes and less severe subjective irritation. Exposures for 2 hours at 2 ppm chlorine produced no significant changes in pulmonary irritation. An 8 hour exposure at 1.5 ppm produced increased mucous secretion from the nose and increased mucous in the hypopharynx. Exposure at or below the TLV-TWA and STEL is thought to protect the worker against annoying symptoms in nose, throat and conjunctiva and declines in pulmonary function.

#### **ODOUR SAFETY FACTOR (OSF)**

OSF=1.6

Exposed individuals are NOT reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class C, D or E.

The Odour Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm Classification into classes follows:

CLASS	OSF	DESCRIPTION
A	550	Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV-TWA for example) is being reached, even when distracted by working activities
B	26-550	Idem for 50-90% of persons being distracted
C	1-26	Idem for less than 50% of persons being distracted
D	0.18-1	10-50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached
E	<0.18	Idem for less than 10% of persons aware of being tested

Amoore and Hautala \* have determined that it is only at an OSF value of 26 that 50% of distracted persons can detect the substance at the Exposure Standard value. In the case of alerted persons, an OSF of 26 means that 99% of them can detect the odour at the Exposure Standard value. It is ONLY for substances belonging to Class A and B that there is a reasonable chance of being warned in time, that the Exposure Standard is being exceeded.

\* Journal Applied Toxicology: Vol 3, 1983, p272

NOTE: The use of the OSF may be inappropriate for mixtures where substances mask the odour of others.

## **ENGINEERING CONTROLS**

DO NOT handle directly. Wear gloves and use scoop / tongs / tools Use in a well-ventilated area. Provide adequate ventilation in warehouse or closed storage areas. If exposure to workplace dust is not controlled, respiratory protection is required; wear SAA approved dust respirator.

## **PERSONAL PROTECTION**

### **EYES**

Chemical goggles.

Full face shield.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

### **HANDS / FEET**

Impervious, gauntlet length gloves or Elbow length PVC gloves.

Neoprene gloves.

Protective footwear or PVC boots.

### **OTHER**

Cotton washable overalls buttoned to the neck and wrist and washable hat and PVC apron.

Ensure there is ready access to an emergency shower.

Ensure that there is ready access to eye wash unit.

Impervious protective clothing.

In case of emergency:, Full protective suit.

### **RESPIRATOR**

Protection Factor	Half Face Respirator	Full Face Respirator	Powered Air Respirator
10 x ES	B P1 Air-line*	-	B PAPR-P1
50 x ES	Air-line**	-	-
100 x ES	-	B P2 B P3	B PAPR-P2
100+ x ES	-	Air-line* Air-line**	- B PAPR-P3

- Negative pressure demand

\*\* - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information, consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

## **SAFE HANDLING**



### **STORAGE AND TRANSPORT**

#### **SUITABLE CONTAINER**

- Packaging as recommended by manufacturer.
- Plastic drum or Metal can or Metal drum.
- Check that containers are clearly labelled.

#### **STORAGE INCOMPATIBILITY**

- Avoid storage with incompatible substances, strong acids, and combustible materials.
- Presence of rust (iron oxide), or other metal oxides catalyses decomposition.

#### **STORAGE REQUIREMENTS**

- Store in a cool, dry place.
- Store in a well-ventilated area.
- Store in a flame proof area.
- Keep storage area free of debris, waste and combustibles.
- Store away from incompatible materials.
- No smoking, naked lights, heat or ignition sources.
- Keep containers securely sealed.
- Protect containers against physical damage.

#### **TRANSPORTATION**

Class 5.1 - Oxidising agents shall not be loaded in the same vehicle or packed in the same freight container with:

Class 1 - Explosives;

Class 2.1 - Flammable gases;

Class 2.3 - Poisonous gases;

Class 3 - Flammable liquids;

Class 4.1 - Flammable solids;

Class 4.2 - Spontaneously combustible substances;

Class 4.3 - Dangerous when wet substances;

Class 5.2 - Organic peroxides;

Class 6 - Poisonous (toxic) substances (where the poisonous substances are capable of igniting and burning);

Class 7 - Radioactive substances;

Class 8 - Corrosives;

Class 9 - Miscellaneous dangerous substances (where the miscellaneous dangerous substances are capable of igniting and burning), and substances other than dangerous goods, capable of igniting and burning.

### **SPILLS AND DISPOSAL**

#### **MINOR SPILLS**

1. Clean up all spills immediately.
2. Remove all ignition sources.
3. Wear protective clothing, impervious gloves and safety glasses.
4. Avoid contact with skin and eyes.
5. Use dry clean up procedures and avoid generating dust.
6. Refer to major spills.

## MAJOR SPILLS

1. Restrict access to area.
2. Clear area of personnel and move upwind
3. DO NOT touch the spill material.
4. Alert Fire Brigade and tell them location and nature of hazard.
5. May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus.
6. Prevent, by any means available, spillage from entering drains or watercourse.
7. Consider evacuation.
8. Shut off all possible sources of ignition and increase ventilation.
9. Use dry clean up procedures and avoid generating dust.
10. Recover uncontaminated product in clean, dry containers
11. Cover remainder with a weak reducing agent to destroy available chlorine and mix with water.
12. Transfer sludge to suitable container and neutralise with soda ash.
13. Wash spill area with detergent, reducer and water.

## DISPOSAL

1. Recycle wherever possible.
2. Consult manufacturer for recycling options.
3. Consult State Land Waste Management Authority for disposal.
4. Dissolve, neutralize and decant as liquid.
5. Aqueous solutions of calcium hypochlorite may be neutralized with sodium sulphite, sodium bisulfate or dilute hydrogen peroxide. DO NOT use acids, as chlorine gas will be liberated. Only after there is no residual chlorine, neutralize the resulting solution with dilute hydrochloric or sulphuric acid.
6. Discharge neutral liquid to sewer, diluted with water.
7. Bury residue in an authorized landfill.
8. Return empty containers to supplier or bury empty containers at an authorized landfill.

## FIRE/EXPLOSION HAZARD

- Combustible. Will burn if ignited.
- Contact with water can cause heating and decomposition giving off chlorine and oxygen gases.
- Contact with acids produces toxic fumes of chlorine.
- Solid in contact with water or moisture may generate sufficient heat to ignite combustible materials.
- Thermal decomposition can be sustained in the absence of oxygen.
- Reacts violently with many incompatible materials including fuels, oils, wood, paper, etc, which become readily ignitable.
- Heating may cause expansion or decomposition leading to violent rupture of containers.

## CONTACT POINT



In the event of a chemical event or a chemical incident phone **0800 243 622** for immediate assistance.

### AUSTRALIAN POISONS INFORMATION CENTRE

24 HOUR SERVICE: 13 11 26  
POLICE, FIRE BRIGADE OR AMBULANCE: 000

### NEW ZEALAND POISONS INFORMATION CENTRE

24 HOUR SERVICE: 0800 POISON or +643 353 0199  
NZ EMERGENCY SERVICES: 111

End of Report

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