

M501: MEASUREMENT OF HAZARDOUS SUBSTANCES INCLUDING RISK ASSESSMENT

CASE STUDY 3 - MSDS INFORMATION FOR HYDRATED LIME & SODIUM CYANIDE

PRODUCT NAME: Hydrated Lime

USES:

- Neutralising agent in water and sewage treatment plants
- Keeping cyanide solutions alkaline in gold processing
- A binder in mortars for bricklaying

PHYSICAL DESCRIPTION & PROPERTIES

Appearance:	White amorphous powder
Boiling Point/Melting Point:	Decomposes to oxide at 580°C
Vapour Pressure:	Not applicable
Specific Gravity:	2300 kg/m ³
Solubility in Water:	Sparingly soluble in water. Solution pH 13
Other:	Non combustible, not explosive, no odour

COMPOSITION

Chemical Name	CAS Number	Proportion
Calcium Hydroxide (Ca[OH] ₂)	1305-62-0	80 – 90%
Magnesium Hydroxide (Mg[OH] ₂)	1305-78-8	0 – 6%
Silicon Dioxide (SiO ₂)	14808-60-7	2 – 6%
Aluminium Oxide (Al ₂ O ₃)	1377-28-1	0.2 – 0.6%
Iron Oxide (Fe ₂ O ₃)		0.1 – 0.3%

HEALTH EFFECTS

Inhalation:	Corrosive. Over-exposure to powder – dust (when mixing) may result in severe mucous membrane irritation of nose and throat, coughing and bronchitis at high levels.
Ingestion:	Corrosive. Ingestion may result in ulceration and burns to the mouth and throat, nausea, vomiting, abdominal pain and diarrhoea.
Skin:	Corrosive. Prolonged and repeated contact with powder or wetted form may result in skin rash and dermatitis.
Eyes:	Corrosive. Severe irritant upon contact with powder/dust. Over-exposure may result in pain, redness, corneal burns and ulceration with possible permanent damage.

PRECAUTIONS FOR USE

EXPOSURE STANDARDS

Calcium Hydroxide = 5 mg/m³ TWA as inhalable dust

MANUFACTURERS' RECOMMENDATIONS

Keep exposure to dust as low as practicable.

If inhalable dust levels are kept below 5 mg/m³, health problems such as skin, eye and respiratory irritation will be minimised.

ENGINEERING CONTROLS

Avoid generating dust. All work with hydrated lime should be carried out in such a way as to minimise exposure to dust and repeated skin contact. Where dust could be generated whilst handling hydrated lime, use local mechanical ventilation or extraction in areas where dust could escape into the work environment. For bulk deliveries, closed pumping systems are recommended. For bagged deliveries follow personal protection instructions below if no local exhaust ventilation is available. Work areas

should be cleaned regularly by vacuuming. If generating dust cannot be avoided, see personal protection recommendations below.

PERSONAL PROTECTION

Skin:	Wear loose comfortable protective clothing and impervious boots. Apply barrier cream to hands or wear gloves. Wash thoroughly after handling. Wash work clothes regularly.
Eyes:	Tight fitting dust goggles are advised to be worn.
Respiratory:	If dust is generated wear a class P1 or P2 particulate respirator. Use only respirators that are approved by local authorities and are fitted correctly. Note that persons with facial hair will have difficulty in obtaining a satisfactory face seal.
Flammability:	Hydrated Lime is not flammable.
Hazardous Decomposition Product:	None.

SAFE HANDLING INFORMATION

Storage & Transport:	Hydrated Lime should be stored in a cool protected place, away from strong oxidants or acids. Transportation is usually in bulk rail or road tankers or in 500 and 1,000 kg bulker bags or in paper sacks.
Spills & Disposal:	Spills may be cleaned up by any dry method such as broom and shovel or vacuum device, by suitably attired personnel. Residual material may be washed into a drain with sufficient water, preferably recycled.
Fire/Explosion Hazard:	Non-combustible.
Other Information:	Hydrated Lime is non-combustible. Violent reaction with maleic anhydride, nitroethane, nitromethane, nitroparaffin, nitropropane and phosphorus.

PRODUCT NAME: Sodium Cyanide

USES: Gold Extraction

PHYSICAL DESCRIPTION & PROPERTIES

Appearance:	White deliquescent granular solid
Boiling Point/Melting Point:	1496°C / 564°C
Vapour Pressure:	Not applicable
Specific Gravity:	1600 kg/m ³
Solubility in Water:	480 g/L @ 10°C
Other:	Odour of bitter almonds

COMPOSITION

Chemical Name	CAS Number	Proportion
Sodium Cyanide (NaCN)	143-33-9	90 – 100%

HEALTH EFFECTS

Inhalation:	Corrosive to the respiratory tract. The substance inhibits cellular respiration and may cause blood, central nervous system and thyroid changes. May cause headache, weakness, dizziness, laboured breathing, nausea and vomiting, which can be followed by weak and irregular heart beat, unconsciousness, convulsions, coma and death.
Ingestion:	Highly Toxic! Corrosive to the gastro-intestinal tract with burning in the mouth and esophagus, and abdominal pain. Larger doses may produce sudden loss of consciousness and prompt death from respiratory arrest. Smaller but still lethal doses may prolong the illness for one or more hours. Bitter almonds odour may be noted on the breath or vomitus. Other symptoms may be similar to those noted for inhalation exposure.
Skin:	Corrosive. May cause severe pain and skin burns. Solutions are corrosive to the skin and eyes, and may cause deep ulcers which heal slowly. May be absorbed through the skin, with symptoms similar to those noted for inhalation.
Eyes:	Corrosive. Symptoms may include redness, pain, blurred vision and eye damage.

PRECAUTIONS FOR USE

EXPOSURE STANDARDS

Sodium cyanide (as CN) = 5 mg/m³ (ceiling/peak and skin)

ENGINEERING CONTROLS

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. 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

Respiratory:	If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus.
Skin Protection:	Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:	Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.
Flammability:	Not flammable.
Hazardous Decomposition Products:	Emits toxic fumes of cyanide and oxides of nitrogen when heated to decomposition.

SAFE HANDLING INFORMATION

Keep in a tightly closed container stored in a cool, dry, ventilated area. Protect against physical damage. Separate from incompatibles. Workers must carefully follow good hygienic practices, including no eating, drinking or smoking in workplace. Proper use and maintenance of protective equipment is essential. Workers using cyanide need pre-placement and annual medical exams.

Special training should be given to workers using cyanide. Containers of this material may be hazardous when empty since they retain produce residues (dust, solids); observe all warnings and precautions listed for the product. Do not store near combustibles or flammables because subsequent fire fighting with water could lead to cyanide solution runoff. Do not store under sprinkler systems. All persons with the potential for cyanide poisoning should be trained to provide immediate First Aid using oxygen and amyl nitrite. A cyanide antidote kit (amyl nitrite, sodium nitrite and sodium thiosulfate) should be readily available in cyanide workplaces. The antidotes should be checked annually to ensure they are still within their shelf-lives. Identification of community hospital resources and emergency medical squads in order to equip and train them on handling cyanide emergencies is essential.

Note: *These MSDS have been specially prepared for use in this case study and are not to be used for any other purpose.*