

# SAFETY DATA SHEET

## Ag/AgCl Reference Electrode (RE)

### Section 1: Identification

**Product Name:** Caltrode +400

**Chemical Name/Synonyms:** Reference Electrode

**Company:** CALTRODE PTE. LTD.

**In emergency call 911.**

**For information about this SDS, use this department contact phone#:** +1 520 3987850

### Section 2: Hazard(s) Identification

**Hazard Classification:** Not classified

**Signal Word(s):** Warning

**Hazard Statements:** H302, H312, H319, H332, H410

**Pictograms:**



**Precautionary Statements:** Do not inhale

**Description of other hazards:** Not applicable

### Section 3: Composition/ Information on Ingredients

Chemical Name	Synonym	CAS#	Conc.
Silver Powder	Ag	7440-22-4	
Silver Chloride	AgCl	7783-90-6	
Potassium Chloride	KCl	7447-40-7	

#### Section 4: First-Aid Measures

**After skin contact:** Wash skin with soap and water during at least 15 minutes

**After eye contact:** Rinse eyes with plenty of water during at least 15 minutes, raising the eyelids several times

**After inhalation:** In the event of inhalation of vapors or dust, bring the person into a ventilated place. If the respiration is difficult, give him oxygen. If the person is not breathing give him artificial respiration. Do not give mouth to mouth respiration. Call a doctor

**After swallowing:** In the event of ingestion, do not induce vomiting. If the victim is conscious and alert, give him 2 to 4 cups of water or milk. Never give anything to a person who is unconscious. Ask for medical help immediately.

#### Section 5: Fire-Fighting Measures

**Suitable extinguishing agents:** Not applicable

**Special protective equipment for firefighters:** Not applicable

#### Section 6: Accidental Release Measures

**Personal precautions:** Dust-proof safety goggles

**Measures for environmental protection:** Sufficient to keep dust air levels below the workplace exposure limits. Fume hood

**Measures for cleaning/collecting:** 8-inch minimum face shield, gloves and other clothing to protect exposed skin from prolonged or repeated contact. Use rubber for all contact points

#### Section 7: Handling and Storage

**Handling:** Avoid contact with the eyes, skin, clothing, ingestion and inhalation. Wear ocular protection, and in the event of insufficient ventilation, a suitable breathing apparatus. Minimize the production and the accumulation of dust. Keep containers well closed.

**Storage:** Store in a cool, dark, well ventilated place, away from any source of ignition, light or any combustible materials. Store in hermetic containers

#### Section 8: Exposure Controls/Personal Protection

Chemical Name	OSHA PEL	OSHA PEL (ceiling)	ACGIH OEL (TWA)	ACGIH OEL (STEL)
Silver Powder	0.01 mg/m <sup>3</sup>	N/E	0.1 mg/m <sup>3</sup>	N/E
Silver Chloride	0.01 mg(Ag)/m <sup>3</sup>	N/E	0.1 mg(Ag)/m <sup>3</sup>	N/E
Potassium Chloride	N/E	N/E	N/E	N/E

**General protective and hygienic measures:** Wash hands, forearms and face after handling chemical products, before eating and using the lavatory and at the end of the work period. Appropriate techniques should be used to remove potentially contaminated clothing. Ensure that eyewash stations and safety showers are close to the workstation location.

**Breathing equipment:** Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator

**Protection of hands:** Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary

**Eye protection:** Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to mists, gases or dust. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection

### Section 9: Physical and Chemical Properties

#### Silver Chloride (AgCl)

**Form:** Solid

**Odor:** Odorless

**Odor threshold:** Not available

**pH:** Not available

**Melting point/melting range:** 455 C

**Boiling point/boiling range:** 1550.00 C

**Flash point:** Not available

**Evaporation rate:** Not available

**Flammability:** Not flammable

**Upper/lower flammability or explosive limits:** Not available

**Auto ignition temperature:** Not available

**Danger of explosion:** Not available

**Vapor pressure:** 1 mm Hg at 1,674 F (912 C)

**Vapor density:** Not available

**Relative density:** 5.59

**Solubility in/Miscibility with water:** Insoluble

#### Silver Powder (Ag)

**Form:** Solid

**Odor:** Odorless

**Odor threshold:** Not available

**pH:** Not available

**Melting point/melting range:** 961.78 C

**Boiling point/boiling range:** 2162 C

**Flash point:** Not available

**Evaporation rate:** Not available

**Flammability:** Not flammable

**Upper/lower flammability or explosive limits:** Not available

**Auto ignition temperature:** Not available

**Danger of explosion:** Not available

**Vapor pressure:** Not available

**Vapor density:** Not available  
**Relative density:** 10.5 g/cc @ 20 C  
**Solubility in/Miscibility with water:** Insoluble

#### **Potassium Chloride (KCl)**

**Form:** Solid  
**Odor:** Odorless  
**Odor threshold:** Not available  
**pH:** Not available  
**Melting point/melting range:** 770 C  
**Boiling point/boiling range:** 1500 C  
**Flash point:** Not available  
**Evaporation rate:** Not available  
**Flammability:** Not flammable  
**Upper/lower flammability or explosive limits:** Not available  
**Auto ignition temperature:** Not available  
**Danger of explosion:** Not available  
**Vapor pressure:** Not available  
**Vapor density:** Not available  
**Relative density:** 1.98 g/cm<sup>3</sup>  
**Solubility in/Miscibility with water:** Soluble

### **Section 10: Stability and Reactivity**

#### **Silver Chloride (AgCl)**

**Reactivity:** 0  
**Chemical stability:** Stable if used and stored according to specifications  
**Conditions to avoid:** Light, extreme heat. Exposure to light slowly releases silver and chlorine (accumulation of chlorine in an enclosed space could be hazardous to people entering the area: highly irritating and corrosive to tissues)  
**Incompatible materials:** Aluminum, ammonium hydroxide, bromine trifluoride, alkali metals, sodium peroxide-charcoal, acetylene  
**Hazardous decomposition products:** Hydrogen chlorides

#### **Silver Powder (Ag)**

**Reactivity:** 0  
**Chemical stability:** Stable under recommended storage conditions  
**Conditions to avoid:** Dusting conditions  
**Incompatible materials:** Acids, halogens, sulfur  
**Hazardous decomposition products:** None expected

#### **Potassium Chloride (KCl)**

**Reactivity:** 0  
**Chemical stability:** Stable  
**Conditions to avoid:** None  
**Incompatible materials:** Bromine trifluoride, sulfuric acid + potassium permanganate, acids, oxidizing agents, water/moisture  
**Hazardous decomposition products:** Chlorine compounds, hydrogen chloride and K<sub>2</sub>O

## Section 11: Toxicological Information

### Silver Chloride (AgCl)

**Acute toxicity:** Not available

**Potential routes of exposure/potential health effects**

**Skin:** May cause irritation

**Eye:** May cause irritation

**Inhalation:** May cause bronchitis, kidney injury, and argyria (permanent blue-gray discoloration of the skin, conjunctive and internal organs)

**Ingestion:** May cause kidney injury and argyria

**Carcinogenic effects:** Not available

**Mutagenic effects:** Not available

**Reproductive toxicity:** Not available

**Sensitization:** Not available

**Target organs:** Not available

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**Eye:** May cause irritation

**Inhalation:** May cause irritation

**Ingestion:** May cause irritation

**Carcinogenic effects:** Not available

**Mutagenic effects:** Not available

**Reproductive toxicity:** Not available

**Sensitization:** Not available

**Target organs:** Not available

### Potassium Chloride (KCl)

**Acute toxicity:** Not available

**Potential routes of exposure/potential health effects**

**Skin:** May cause irritation

**Eye:** May cause irritation

**Inhalation:** May cause irritation to the respiratory tract and mucous membranes

**Ingestion:** Poison by ingestion. Large oral doses cause gastrointestinal irritation, purging, weakness, and circulatory problems

**Carcinogenic effects:** Not available

**Mutagenic effects:** Not available

**Reproductive toxicity:** Not available

**Sensitization:** Not available

**Target organs:** Not available

## Section 12: Ecological Information (non-mandatory)

### Silver Chloride (AgCl)

**Ecotoxicity:** Not available

**Mobility:** Not available

**Biodegradation:** Not available

**Bioaccumulation:** Not available

### Silver Powder (Ag)

**Ecotoxicity:** Not available

**Mobility:** Not available

**Biodegradation:** Not available

**Bioaccumulation:** Not available

### Potassium Chloride (KCl)

**Ecotoxicity:** Not available

**Mobility:** Not available

**Biodegradation:** Not available

**Bioaccumulation:** Not available

## Section 13: Disposal Considerations (non-mandatory)

**Steps to Be Taken in Case Material Is Released or Spilled:** Wear appropriate respiratory and protective gear specified in section VIII. Isolate spill area and provides ventilation. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Take care not to raise dust. **Waste Disposal Method:** In accordance with Local, State and Federal waste disposal regulations.

## Section 14: Transport Information (non-mandatory)

**DOT regulations:** N/A

- **Hazard class:** None
- **Land transport ADR/RID (cross-border):** N/A
- **ADR/RID class:** N/A
- **Maritime transport IMDG:** N/A

**Air transport ICAO-TI and IATA-DGR:** N/A

- **ICAO/IATA Class:** N/A

## Section 15: Regulatory Information (non-mandatory)

### US Federal Regulations

**SARA Section 355 (extremely hazardous substances):** N/A

**SARA Section 313 (specific toxic chemical listings):** N/A

**Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs):** N/A

**TSCA (Toxic Substances Control Act):** N/A

**Section 16: Other Information**

**SDS date of preparation/update:** 1/1/2019