moleko™
TESSENDERLO GROUP

Safety Data Sheet
Sodium Hydrosulfide Solution

SDS Number: 178 **Revision:** February 24, 2023

Section 1: IDENTIFICATION

1.1 Product Name: **Sodium Hydrosulfide Solution**

1.2 Other Identification:

Chemical Family: Inorganic salt solution.
Formula: NaHS

1.3 Recommended Use of Chemical: Flotation agent for mining ore separation.
Kraft paper production process.
Tanning process (hair removal).

1.4 Manufacturer: Tessenderlo Kerley, Inc.
2910 N. 44th Street, Suite 100
Phoenix, Arizona 85018

Information: (602) 889-8300

1.5 Emergency Contact:

Tessenderlo Kerley, Inc.	(800) 877-1737
CHEMTREC	(800) 424-9300 (Domestic)
	(703) 527-3887 (International)

Section 2: HAZARD(S) IDENTIFICATION

2.1 Hazard Classification:

Health	Acute Toxicity-Oral	Category 3
	Acute Toxicity-Inhalation	Category 2
	Skin Corrosion/Irritation	Category 1B
	Eye Damage/Irritation	Category 1
Physical	None	

2.2 Signal Word: **DANGER**

2.3 Hazard Statement(s):
Toxic if swallowed.
Fatal if inhaled.
Causes severe skin burns and eye damage.
Causes serious eye damage.

2.4 Symbol(s):

2.5 Precautionary Statement(s):

If swallowed: Rinse mouth. Do NOT induce vomiting. Immediately call a poison center, doctor/regional medical center.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Immediately call a poison center, doctor or regional medical center. Wash contaminated clothes before reuse.
If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center, doctor or regional medical center.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. Immediately call a poison center, doctor or regional medical center.
Wash hands and face thoroughly after handling. Do not eat, drink or smoke when using this product.
Do not breathe gas/mist/vapors.
Wear neoprene rubber gloves, chemical suit, boots and chemical goggles and full-face shield.
Use only outdoors or in a well-ventilated area. Store locked up in a well-ventilated place. Keep container tightly closed.
In case of inadequate ventilation, wear self-contained breathing apparatus (SCBA).
Dispose of contents/container in to chemical waste facility in accordance with local, state and federal regulations.
Do not allow release to aquatic waterways.

2.6 Unclassified Hazard(s): Aquatic toxicity

2.7 Unknown Toxicity Ingredient: None

Section 3: COMPOSITION/INFORMATION on INGREDIENTS

3.1 Chemical Ingredients: (See Section 8 for exposure guidelines)

Chemical	Synonym Common Name	CAS No.	EINECS No.	% by Wt.
Sodium sulfanide	Sodium hydrosulfide	16721-80-5	240-778-0	40 to 49
Di-sodium sulphide	Sodium sulfide	1313-82-2	215-211-5	<1.0, Typical
Sodium carbonate	Sodium carbonate	497-19-8	207-838-8	<3.0, Typical
Water	Water	7732-18-5	231-791-2	Remaining %

Section 4: FIRST AID MEASURES

4.1 Symptoms/Effects:

Acute: Eye contact may cause serious eye damage. Skin contact may cause damage to skin

tissue. Ingestion may cause severe damage to the gastrointestinal tract.

Chronic: No known chronic effects.

4.2 Eyes: Immediately flush with large quantities of water for 15 minutes. Hold eyelids apart during irrigation to ensure thorough flushing of the entire area of the eye and lids. Obtain immediate medical attention.

4.3 Skin: Immediately flush with large quantities of water. Remove contaminated clothing under a safety shower. Obtain immediate medical attention.

4.4 Ingestion: DO NOT INDUCE VOMITING. Give 2 to 4 glasses of water. If vomiting does occur, repeat giving fluids. Obtain immediate medical attention.

4.5 Inhalation: Remove victim from contaminated atmosphere. If breathing is labored, administer Oxygen. If breathing has ceased, clear airway and start CPR. Obtain immediate medical attention.

Section 5: FIRE FIGHTING MEASURES

5.1 Flammable Properties: (See Section 9, for additional flammable properties)

NFPA: Health - 3 Flammability - 2 Reactivity - 1

5.2 Extinguishing Media:

5.2.1 Suitable Extinguishing Media: Solution is not flammable; use media suitable for combustibles involved in fire.

5.2.2 Unsuitable Extinguishing Media: Not applicable

5.3 Protection of Firefighters:

5.3.1 Specific Hazards Arising from the Chemical:

Physical Hazards: Solution is not flammable. However, if solutions of this product are exposed to excessive heat Hydrogen sulfide vapors will be released and may form flammable mixtures with air (4.3 to 46% H_2S).

Chemical Hazards: Solution contact with acids or acidic materials will cause highly toxic Hydrogen sulfide vapors to be released.

5.3.2 Protective Equipment and Precautions for Firefighters:

Firefighters should wear self-contained breathing apparatus (SCBA) and full fire-fighting turnout gear. Keep containers/storage vessels in fire area cooled with water spray.

Section 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions: Use personal protective equipment specified in Section 8. Isolate the release area and deny entry to unnecessary, unprotected and untrained personnel.

6.2 Environmental Precautions: Keep out of "waters of the United States" because of product aquatic toxicity (See Section 12).

6.3 Methods of Containment:

Small Release: Confine and absorb small releases with sand, earth or inert absorbents.

Large Release: Shut off release if safe to do so. Dike spill area with earth, sand or other inert absorbents to prevent runoff into surface waterways (aquatic toxicity), sewers or storm drains.

6.4 Method for Cleanup:

Small Release: Spray a weak (3-5%) solution of Hydrogen peroxide over the spill area to stop the release of toxic Hydrogen sulfide (oxidation of reactive sulfides) and to help neutralize the spill area. Once neutralized spilled material can be shoveled up and placed in plastic drums for disposal as a chemical waste. Use non-sparking tools.

Large Release: Recover as much of the spilled product as possible using an air-operated diaphragm pump, hoses and non-sparking tools. If possible, use this material as originally intended. If the material is unusable it must be disposed of as a chemical waste. Treat the remaining material on the ground as a small release (above).

Section 7: HANDLING and STORAGE

7.1 Handling: Avoid contact with skin and eyes. Use only in a well-ventilated area. Wash thoroughly after handling. Avoid breathing of product vapors.

7.2 Storage: Store in cool, dry well-ventilated areas. Do not store combustibles or incompatible materials in product storage areas or loading/unloading areas. Keep away from heat or flames. Storage in drums or totes is not recommended due to possible product degradation if containers are not properly handled and are allowed to overheat or come in contact with incompatible materials. Product degradation can cause toxic gas release. (See Section 10.5, for materials of construction)

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Exposure Guidelines:

Chemical	OSHA PELs		ACGIH TLVs	
	TWA	STEL	TWA	STEL

Hydrogen sulfide	None	20 ppm (Ceiling)	1 ppm	5 ppm
Sodium sulfanide	None	None	None	None
Di-sodium sulphide	None	None	None	None
Sodium carbonate	None	None	None	None
Water	None	None	None	None

8.2 Engineering Controls: Use adequate exhaust ventilation to prevent inhalation of product vapors. Keep eye wash/safety showers in areas where product is used.

8.3 Personal Protective Equipment (PPE):

8.3.1 Eye/Face Protection: Chemical goggles and a full face shield.

8.3.2 Skin Protection: Sodium hydrosulfide solutions are highly alkaline. Neoprene rubber gloves/boots and chemical suit should be worn to prevent liquid contact.

8.3.3 Respiratory Protection: Respiratory protection is based on potential exposure to H_2S vapors. Hydrogen sulfide is a highly toxic gas. Respiratory protection requirements should be based on a hazard assessment of the specific operation. If use conditions generate vapor, mist or aerosol and adequate ventilation (e.g., outdoor or well-ventilated are) is not available, use a NIOSH-approved gas mask respirator with hydrogen sulfide canister/cartridge to reduce potential for inhalation exposure. Where exposure potential necessitates a higher level of protection, use a NIOSH-approved, positive-pressure/pressure-demand, air-supplied respirator. When using respirator cartridges or canisters, they must be changed frequently (following each use or at the end of the work shift) to assure breakthrough exposure does not occur.

8.3.4 Hygiene Considerations: Common good industrial hygiene practices should be followed, such as washing thoroughly after handling and before eating or drinking.

Section 9: PHYSICAL and CHEMICAL PROPERTIES

9.1 Appearance: May be yellow to red to dark green to black liquid.
9.2 Odor: Rotten egg odor.
9.3 Odor Threshold: 4.7 ppb (Hydrogen sulfide)
9.4 pH: 11.5 to 12.5
9.5 Melting Point/Freezing Point: 42 to 64°F (16.6 to 17.8°C)
9.6 Boiling Point: 234 to 243°F (112.2 to 117.2°C)
9.7 Flash Point: Not determined
9.8 Evaporation Rate: Not determined
9.9 Flammability: Not applicable
9.10 Upper/Lower Flammability Limits: 4.3 to 46% in air (Hydrogen sulfide)
9.11 Vapor Pressure: 17 mm Hg @ 68°F
9.12 Vapor Density: 1.17 (Air = 1.0)
9.13 Relative Density: 1.27 to 1.33 (10.6 to 11.1 lbs/gal)
9.14 Solubility: Complete
9.15 Partition Coefficient: Not applicable
9.16 Auto-ignition Temperature: Not applicable

9.17 Decomposition Temperature: Not determined
9.18 Viscosity: 7 cP @ 100°F (literature)

Section 10: STABILITY and REACTIVITY

10.1 Reactivity: Sodium hydrosulfide solution reacts with all acids, including weak organic acids, liberating highly toxic Hydrogen sulfide gas. The solution also reacts with oxidizing agents which may precipitate elemental Sulfur.

10.2 Chemical Stability: This product is stable under normal (ambient) temperature and pressure.

10.3 Possibility of Hazardous Reactions: See Section 10.5.

10.4 Conditions to Avoid: See Section 10.5.

10.5 Incompatible Materials: Acids will cause the release of highly toxic Hydrogen sulfide. Sodium hydrosulfide reacts violently with diazonium salts. **Sodium hydrosulfide solution is not compatible with Copper, Zinc, Aluminum or their alloys (i.e. bronze, brass, galvanized metals, etc.). Sodium hydrosulfide is corrosive to carbon steel above 150° F (65.5° C)**. These materials of construction should not be used in handling systems or storage containers for this product. Dilution of NaHS with water will increase the evolution of Hydrogen sulfide. Dilution should be done in an enclosed container.

10.6 Hazardous Decomposition Products: Heating this product will evolve Hydrogen sulfide gas. Fire conditions will also cause the production of Sulfur dioxide. Hydrogen sulfide may form flammable mixtures (4.3 to 46% H_2S) with air. Heating to decomposition emits fumes of sulfoxides and Sodium sulfide.

Section 11: TOXICOLOGICAL INFORMATION

11.1 Oral: Ingestion Rat LD_{50}: 0.5 to 5 gm/kg (sodium hydrosulfide)
Intraperitoneal Rat LD_{50}: 14.6 mg/kg (sodium hydrosulfide)
Intraperitoneal Mus LD_{50}: 18 mg/kg (sodium hydrosulfide)
Intraperitoneal Rat TD_{LO}: 67.5 mg/kg intermittent (sodium hydrosulfide)
Intraperitoneal Mus TD_{LO}: 35 mg/km intermittent (sodium hydrosulfide)

11.2 Dermal: Subcutaneous Mouse LD_{50}: 200 mg/km (sodium hydrosulfide)

11.3 Inhalation: Inhalation-Rat LC_{50}: 444 ppm (hydrogen sulfide)
Inhalation-Mus LC_{50}: 1,500 mg/m^3 18 minutes (hydrogen sulfide)
Inhalation-Rat LC_{50}: 1,500 mg/m^3 14 minutes (hydrogen sulfide)

11.4 Eyes: Sodium sulfide in contact with human eye has been noted to cause burns which may be slow to heal owing presumably to strong alkalinity.

11.5 Chronic/Carcinogenicity: Not listed in NTP, IARC or by OSHA.

11.6 Teratology: No data available.

11.7 Reproduction: No data available.

11.8 Mutagenicity: No data available.

Section 12: ECOLOGICAL INFORMATION

12.1 Ecotoxicity: Static acute 96 hour-LC_{50} for mosquito fish is 206 mg/L (Tl_m - fresh water)
LC_{50} Fly inhalation 1,500 mg/m^3, 7 minutes
LC_{50} Fathead minnow: 0.55 mg/L, 96 hours (sodium hydrosulfide)
TL_m Gammarus 0.84 mg/L, 96 hours (hydrogen sulfide)
TL_m Ephemera 0.316 mg/L, 96 hours (hydrogen sulfide)
TL_m Fathead minnow 0.071 – 0.55 mg/L @ 6-24ºC, 96 hour flow through bioassay (hydrogen sulfide)
TL_m Bluegill 0.0090 – 0.0140 mg/L @ 20-22ºC, 96 hour flow through bioassay (hydrogen sulfide)
TL_m Brook trout 0.0216 – 0.0308 mg/L @ 8-12.5ºC, 96 hour flow through bioassay (hydrogen sulfide).
LC_{50} Fathead minnow: 1.38 mg/L, 48 hours (sodium sulfide)

12.2 Persistence & Degradability: No data available.

12.3 Bioaccumulative Potential: This product is not bioaccumulative.

12.4 Mobility in Soil: No data available.

12.5 Other Adverse Effects: None

Section 13: DISPOSAL CONSIDERATIONS

Consult federal, state and local regulations for disposal requirements.

Section 14: TRANSPORT INFORMATION

14.1 Basic Shipping Description:

- **14.1.1 Proper Shipping Name:** Corrosive liquids, toxic, n.o.s. (sodium hydrosulfide solution)
- **14.1.2 Hazard Classes:** 8, (6.1)
- **14.1.3 Identification Number:** UN2922
- **14.1.4 Packing Group:** II
- **14.1.5 Hazardous Substance:** Yes
- **14.1.6 Marine Pollutant:** No (domestic)

14.2 Additional Information:

- **14.2.1 Other DOT Requirements:**

14.2.1.1 Reportable Quantity:	Yes	5,000 lbs (2,268 kg)
14.2.1.2 Placard(s):	Corrosive	
14.2.1.3 Label(s):	Corrosive, toxic	
14.2.2 USCG Classification:	Class – caustics	Chris Code: SHR

14.2.3 International Transportation:

14.2.3.1 IMO:	Corrosive liquids, toxic, n.o.s. (sodium hydrosulphide solution – Marine Pollutant)
14.2.3.2 IATA:	Corrosive liquids, toxic, n.o.s. (sodium hydrosulphide)
14.2.3.3 TDG (Canada):	Corrosive liquids, toxic, n.o.s. (sodium hydrosulphide)
14.2.3.4 ADR (Europe):	Corrosive liquids, toxic, n.o.s. (sodium hydrosulphide)
14.2.3.5 ADG (Australia):	Corrosive liquids, toxic, n.o.s. (sodium hydrosulphide)

14.2.4 Emergency Response Guide: 154

14.2.5 ERAP - Canada: Yes

14.2.6 Special Precautions: Not applicable

Section 15: REGULATORY INFORMATION

15.1 U.S. Federal Regulations:

15.1.1 OSHA: This product is considered hazardous under the criteria of the Federal OSHA Hazard Communication Standard (29 CFR 1910.1200).

15.1.2 TSCA: Product is contained in USEPA Toxic Substance Control Act Inventory.

15.1.3 CERCLA:	Reportable Quantity	Yes	5,000 lbs (2,268 kg)

15.1.4 SARA Title III:

15.1.4.1 Extremely Hazardous Substance (EHS): No

15.1.4.2 Section 312 (Tier II) Ratings:

Immediate (acute)	Yes
Fire	Yes
Sudden Release	No
Reactivity	Yes
Delayed (chronic)	No

15.1.4.3 Section 313 (FORM R): No, however a release of NaHS may include a release of hydrogen sulfide which is reportable.

15.1.5 RCRA: Possible D002, D003 waste

15.1.6 CAA (Hazardous Air Pollutant/HAP): Not applicable

15.2 International Regulations:

15.2.1 Canada:

15.2.1.1 WHMIS: E, D1

15.2.1.2 DSL/NDSL: Yes, DSL Record No. 10481

15.3 State Regulations:

15.3.1 CA Proposition 65: ⚠**WARNING:** This product can expose you to chemicals including benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65.Warnings.ca.gov.

Section 16: OTHER INFORMATION

REVISIONS: This SDS was reformatted to comply with the new Hazard Communication Standard dated March 26, 2012, by the Regulatory Affairs Department of Tessenderlo Kerley, Inc. 9/26/2014
Revised sections 2, 5.3, 8, 10 and 15. 6/10/2016; Revised section 15. 8/6/2018; Revised Section 1. 1/3/2020; Revised logo. 10/4/2021; Revised Section 7.2. 2/24/2023