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**MATERIAL
SAFETY
DATA SHEET**

No. 139

PRODUCT NAME Hydrogen Selenide	CAS # 7783-07-5
TRADE NAME AND SYNONYMS Hydrogen selenide, anhydrous (D.O.T.)	DOT I.D. No.: UN 2202 RO 10(4.54)
CHEMICAL NAME AND SYNONYMS Hydrogen Selenide; Selenium Hydride	DOT Hazard Class: Division 2.3
ISSUE DATES AND REVISIONS Revised May 1998	Formula H ₂ Se
	Chemical Family: Nonmetal Hydride

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT TWA (as Se) = 0.05 Molar PPM (ACGIH 1997). OSHA 1995 PEL (8 Hr. TWA) = (as Se) = 0.05 Molar PPM.
SYMPTOMS OF EXPOSURE Inhalation of low levels causes garlic odor of breath, metal taste, nausea, dizziness and extreme lassitude and general malaise. It is irritating to the skin, eyes and mucous membranes causing itching and a rash. Olfactory fatigue renders continued detection of low levels by odor unreliable. It reacts with the nasal passages and bronchiole resulting in pneumonitis. Exposure to very low toxic concentrations results in convulsive coma followed by death due to respiratory failure.
TOXICOLOGICAL PROPERTIES Hydrogen selenide is known to have a hemolytic effect. It is reported to be one of the most toxic substances known. It is known to cause damage to the liver and the spleen. Its toxicity affects the skin and eyes on exposure or contact. Hydrogen selenide is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen. Persons in ill health where such illness would be aggravated by exposure to hydrogen selenide should not be allowed to work with or handle this product.
RECOMMENDED FIRST AID TREATMENT PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO HYDROGEN SELENIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD. Inhalation: Extreme fire hazard when rescuing semiconscious or unconscious persons due to flammability of hydrogen selenide. Avoid use of rescue equipment which might contain ignition sources or cause static discharge. Move affected person to an uncontaminated area. If breathing has stopped, give assisted respiration. Oxygen or a mixture of 5% carbon dioxide in oxygen should be administered by a qualified person. Keep victim warm and calm. Seek immediate medical assistance. Further treatment should be symptomatic and supportive.

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HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Flammable over a wide range in air. It becomes dangerously reactive when mixed with nitric acid or other strong oxidizers.

PHYSICAL DATA

BOILING POINT -43.5°F (-41.4°C)	LIQUID DENSITY AT BOILING POINT 125.1 lb/ft ³ (2004 kg/m ³)
VAPOR PRESSURE @ 70°F (21.1°C) = 139 psia (960 kPa)	GAS DENSITY AT 70°F, 1 atm .2745 lb/ft ³ (4.398 kg/m ³)
SOLUBILITY IN WATER Reacts to form a hydrate	FREEZING POINT -86.3°F (-65.7°C)
EVAPORATION RATE N/A (Gas)	SPECIFIC GRAVITY (AIR=1) @ 70°F (21.1°C) = 3.66
APPEARANCE AND ODOR Colorless gas with a foul, penetrating odor	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A (Gas)	AUTO IGNITION TEMPERATURE Unknown	FLAMMABLE LIMITS % BY VOLUME (See Page 4) LE Unknown UEL Unknown
EXTINGUISHING MEDIA Carbon dioxide, dry chemical or water spray		ELECTRICAL CLASSIFICATION Unknown
SPECIAL FIRE FIGHTING PROCEDURES Shut off flow of gas. Cool surrounding fire-exposed containers with water spray. Fire fighters should use self-contained breathing apparatus.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Hydrogen selenide is heavier than air so may accumulate in low spots and may "travel" a considerable distance to a flame or other source of ignition.		

REACTIVITY DATA

STABILITY Unstable		CONDITIONS TO AVOID Avoid heat, flame or other sources of ignition
Stable	X	
INCOMPATIBILITY (Materials to avoid)	Concentrated nitric acid, chlorine, nitrogen trifluoride, oxygen difluoride or other strong oxidizing agents.	
HAZARDOUS DECOMPOSITION PRODUCTS	Begins to dissociate to its elements above 320°F (160°C)	
HAZARDOUS POLYMERIZATION May Occur		CONDITIONS TO AVOID
Will Not Occur	X	None

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Evacuate all personnel from a affected area. Use appropriate protective equipment. If leak is in use r's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location.
WASTE DISPOSAL METHOD Do not attempt to dispose of waste or unused quantities. Return in the shipping container <u>properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place</u> to your supplier for proper disposal. For emergency disposal, contact your closest supplier location.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)		Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.	
VENTILATION Hood with forced ventilation	LOCAL EXHAUST To prevent accumulation above the TWA	SPECIAL	N/A
	MECHANICAL (Gen.) N/A	OTHER	N/A
PROTECTIVE GLOVES Neoprene or butyl rubber, PVC, polyethylene			
EYE PROTECTION Safety goggles or glasses			
OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower, eyewash "fountain"			

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION	
DOT Shipping Name: Hydrogen selenide, anhydrous	DOT Hazard Class: Division 2.3
DOT Shipping Labels: Toxic Gas, Flammable Gas	I.D. No.: UN 2202; RQ 10(4.54)
SPECIAL HANDLING RECOMMENDATIONS	
<p>Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<350 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Close valve after each use and when empty.</p> <p>For additional handling recommendations, consult Compressed Gas Association's Pamphlet P-1.</p>	
SPECIAL STORAGE RECOMMENDATIONS	
<p>Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of noncombustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.</p> <p>For additional storage recommendations, consult Compressed Gas Association's Pamphlet P-1.</p>	
SPECIAL PACKAGING RECOMMENDATIONS	
<p>Hydrogen selenide is best handled in carbon steel, stainless steel, Monel®, and Hastelloy® A, B and C. Teflon® and Kel-F® are the preferred gasket materials; Viton® and Nylon® are satisfactory. The product can also be handled in ordinary glass, Pyrex® and quartz.</p>	
OTHER RECOMMENDATIONS OR PRECAUTIONS	
<p>Earth-ground and bond all lines and equipment associated with the hydrogen selenide system. All electrical equipment should be non-sparking or explosion proof. Do not rely on the olfactory sense to detect the presence of hydrogen selenide. Analytical devices and instrumentation are readily available for this purpose. Perform frequent analytical tests to be certain that the TWA is not being exceeded.</p>	
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*Various Government Agencies (i.e. Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

Hydrogen Selenide

HEALTH HAZARD DATA

RECOMMENDED FIRST AID TREATMENT: (Continued)

Eye Contact: PERSONS WITH POTENTIAL EXPOSURE TO HYDROGEN SELENIDE SHOULD NOT WEAR CONTACT LENSES.

Flush contaminated eye(s) with copious quantities of water. Part eyelids with fingers to assure complete flushing. Continue for at least 15 minutes.

Dermal Contact: Remove affected clothing and flush affected area with copious quantities of water. Continue for minimum of 15 minutes.

SPECIAL PRECAUTIONS

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).

Always secure cylinders in an upright position before transporting them. NEVER transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 No. for hydrogen selenide = 4 4 1 None