

Safety Data Sheet

Material Name: Hydrogen Selenide

SDS ID: 00244337

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name

Hydrogen Selenide

Synonyms

Selenium hydride; Hydrogen selenide, anhydrous; Hydroselenic acid, anhydrous; Dihydrogen selenide; Selenium dihydride; Selane; H₂Se

Chemical Family

Acids, inorganic, hydride

Product Use

Industrial and Specialty Gas Applications.

Restrictions on Use

None known.

Details of the supplier of the safety data sheet

MATHESON TRI-GAS, INC.

3 Mountainview Road

Warren, NJ 07059

General Information: 1-800-416-2505

Emergency #: 1-800-424-9300 (CHEMTREC)

Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.

Flammable Gases - Category 1

Gases Under Pressure - Liquefied gas

Acute Toxicity - Oral - Category 3

Acute Toxicity - Inhalation - Gas - Category 1

Skin Corrosion/Irritation - Category 2

Serious Eye Damage/Eye Irritation - Category 2A

Specific Target Organ Toxicity - Single Exposure - Category 1 (circulatory system , heart , liver , respiratory system , Hematopoietic System)

Specific Target Organ Toxicity - Repeated Exposure - Category 1 (respiratory system)

Specific Target Organ Toxicity - Repeated Exposure - Category 2 (Nervous System)

GHS Label Elements

Symbol(s)



Signal Word

Danger

Hazard Statement(s)

Extremely flammable gas.

Contains gas under pressure; may explode if heated.

Fatal if inhaled.

Causes skin irritation.

Causes serious eye irritation.

Causes damage to organs.

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Causes damage to organs through prolonged or repeated exposure.
 May cause damage to organs through prolonged or repeated exposure.

Precautionary Statement(s)

Prevention

Keep away from heat/sparks/open flame/hot surfaces - No smoking.
 Do not breathe dust/fume/gas/mist/vapors/spray.
 Use only outdoors or in a well-ventilated area.
 Wear protective gloves/protective clothing/eye protection/face protection.
 Wear respiratory protection.
 Wash thoroughly after handling.
 Do not eat, drink or smoke when using this product.
 Avoid release to the environment.

Response

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
 Eliminate all ignition sources if safe to do so.
 IF exposed.
 Call a POISON CENTER or doctor/physician.
 IF INHALED.
 Remove person to fresh air and keep comfortable for breathing.
 Immediately call a POISON CENTER or doctor/physician.
 Specific treatment is urgent, see first aid section of Safety Data Sheet.
 IF ON SKIN.
 Wash with plenty of water.
 If skin irritation occurs.
 Get medical advice/attention.
 Take off contaminated clothing and wash before reuse.
 IF IN EYES.
 Rinse cautiously with water for several minutes.
 Remove contact lenses, if present and easy to do.
 Continue rinsing.
 If eye irritation persists.
 Get medical advice/attention.

Storage

Store locked up.
 Protect from sunlight. Store in a well-ventilated place.
 Keep container tightly closed.
 Keep separated from incompatible substances.

Disposal

Dispose in accordance with all applicable regulations.

Other Hazards

May cause frostbite upon sudden release of liquefied gas.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
7783-07-5	Hydrogen Selenide	100

Section 4 - FIRST AID MEASURES

Inhalation

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IF INHALED: Remove person to fresh air and keep comfortable for breathing. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115°F; 41-46°C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

Eyes

Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

Ingestion

If swallowed, get medical attention.

Most Important Symptoms/Effects

Acute

Frostbite, respiratory tract irritation, skin irritation, eye irritation, blood damage, heart damage, liver damage, respiratory system damage

Delayed

respiratory system damage, nervous system damage

Note to Physicians

For inhalation, consider oxygen. Consider olive oil, epinephrine sulfate, local anesthetics, hot and cold compresses.

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Small fires: regular dry chemical, carbon dioxide, water spray, regular foam, Large fires: Use water spray, fog or regular foam.

Unsuitable Extinguishing Media

Do not use high-pressure water streams.

Special Hazards Arising from the Chemical

Extremely flammable gas. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive above flash point. Containers may rupture or explode if exposed to heat.

Hazardous Combustion Products

Hydrogen, selenium.

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck, evacuation radius: 1600 meters (1 mile).

Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8.

Methods and Materials for Containment and Cleaning Up

Avoid heat, flames, sparks and other sources of ignition. All equipment used when handling the product must be grounded. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Do not

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touch or walk through spilled material. Stop leak if possible without personal risk. Reduce vapors with water spray. Avoid allowing water runoff to contact spilled material. Let burn unless leak can be stopped immediately. Keep unnecessary people away, isolate hazard area and deny entry. Isolate area until gas has dispersed.

Environmental Precautions

Avoid release to the environment. Collect spillage.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Keep away from heat/sparks/open flame/hot surfaces - No smoking. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Do not breathe dust/fume/gas/mist/vapors/spray. Wear respiratory protection. Wash thoroughly after handling. Avoid release to the environment.

Conditions for Safe Storage, Including any Incompatibilities

Store locked up.

Protect from sunlight. Store in a well-ventilated place.

Keep container tightly closed.

Keep separated from incompatible substances.

Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Notify State Emergency Response Commission for storage or use at amounts greater than or equal to the TPQ (U.S. EPA SARA Section 302). SARA Section 303 requires facilities storing a material with a TPQ to participate in local emergency response planning (U.S. EPA 40 CFR 355.30).

Incompatible Materials

Acids, halo carbons, Hydrogen peroxide, oxidizing materials, nitric acid, peroxides, Water

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

Hydrogen Selenide	7783-07-5
ACGIH:	0.05 ppm TWA as Se
NIOSH:	0.05 ppm TWA ; 0.2 mg/m3 TWA
	1 ppm IDLH
Europe:	0.02 ppm TWA ; 0.07 mg/m3 TWA
	0.05 ppm STEL ; 0.17 mg/m3 STEL
OSHA (US):	0.05 ppm TWA as Se ; 0.2 mg/m3 TWA as Se
Mexico:	0.05 ppm TWA [VLE-PPT]

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)

There are no biological limit values for any of this product's components.

Engineering Controls

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

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Individual Protection Measures, such as Personal Protective Equipment

Eye/face protection

Wear splash resistant safety goggles with a faceshield. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin Protection

For the gas: Wear appropriate chemical resistant clothing. For the liquid: Wear appropriate protective, cold insulating clothing.

Respiratory Protection

The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA. 0.5 ppm. Any supplied-air respirator. 1 PPM. Any supplied-air respirator operated in a continuous-flow mode. Any self-contained breathing apparatus with a full facepiece. Any supplied-air respirator with a full facepiece. Emergency or planned entry into unknown concentrations or IDLH conditions -. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. Escape -. Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern. Only non-oxidizable sorbents are allowed (not charcoal). Any appropriate escape-type, self-contained breathing apparatus.

Glove Recommendations

For the gas: Wear appropriate chemical resistant gloves. For the liquid: Wear insulated gloves.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	colorless gas	Physical State	gas
Odor	decayed horseradish odor	Color	colorless
Odor Threshold	0.3 ppm	pH	(Acidic)
Melting Point	-64 °C (-83 °F)	Boiling Point	-42 °C (-44 °F)
Boiling Point Range	Not available	Freezing point	Not available
Evaporation Rate	Not available	Flammability (solid, gas)	Flammable gas
Autoignition Temperature	Not available	Flash Point	(Flammable)
Lower Explosive Limit	Not available	Decomposition temperature	Not available
Upper Explosive Limit	Not available	Vapor Pressure	7220 mmHg @ 21.1 °C
Vapor Density (air=1)	2.8	Specific Gravity (water=1)	2.12 at -42 °C
Water Solubility	(Forms a hydrate, Soluble)	Partition coefficient: n-octanol/water	Not available
Viscosity	Not available	Kinematic viscosity	Not available

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Solubility (Other)	Not available	Density	Not available
Physical Form	Liquified gas	Molecular Formula	H ₂ -Se
Molecular Weight	80.98		

Solvent Solubility

Soluble

carbonyl chloride, carbon disulfide, Phosgene

Section 10 - STABILITY AND REACTIVITY

Chemical Stability

Decomposes rapidly in air to form elemental selenium and water.

Possibility of Hazardous Reactions

Will not polymerize.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers.

Incompatible Materials

Acids, halo carbons, Hydrogen peroxide, oxidizing materials, nitric acid, peroxides, Water

Hazardous decomposition products

oxides of selenium, selenium

Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Inhalation

Fatal if inhaled. May cause irritation of: upper respiratory tract, nose, eyes. May cause: nausea, vomiting, coughing, garlic breath, difficulty breathing, fatigue, diarrhea, metallic taste, weakness, dizziness, headache, bronchitis, pulmonary edema (effects may be delayed), death. Animal data: spleen damage, lung damage, liver damage.

Skin Contact

irritation (possibly severe), rash, burns, allergic reactions, frostbite.

Eye Contact

irritation (possibly severe), conjunctivitis, eye damage, frostbite.

Ingestion

Ingestion of a gas is unlikely.

Acute and Chronic Toxicity

Fatal if inhaled.

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and no selected endpoints have been identified.

Product Toxicity Data

Acute Toxicity Estimate

Oral	100 mg/kg
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Immediate Effects

Fatal if inhaled. Frostbite, respiratory tract irritation, skin irritation, eye irritation, blood damage, heart damage, liver damage, respiratory system damage.

Delayed Effects

respiratory system damage, nervous system damage

Irritation/Corrosivity Data

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May cause respiratory tract irritation, skin irritation, and eye irritation.

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Component Carcinogenicity

Hydrogen Selenide	7783-07-5
IARC:	Supplement 7 [1987] ; Monograph 9 [1975] (related to Selenium compounds) (Group 3 (not classifiable))
DFG:	Category 3 (could be carcinogenic for man)

Germ Cell Mutagenicity

No data available.

Tumorigenic Data

No data available

Reproductive Toxicity

No data available.

Specific Target Organ Toxicity - Single Exposure

Respiratory system, blood, heart, liver

Specific Target Organ Toxicity - Repeated Exposure

Respiratory system, nervous system

Aspiration hazard

No data available.

Medical Conditions Aggravated by Exposure

liver disorders, respiratory disorders

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity

Avoid release to the environment. Collect spillage.

Component Analysis - Aquatic Toxicity

No LOLI ecotoxicity data are available for this product's components.

Persistence and Degradability

No data available.

Bioaccumulative Potential

No data available.

Mobility

No data available.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose in accordance with all applicable regulations.

Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components.

Section 14 - TRANSPORT INFORMATION

ADR Information:

Shipping Name: HYDROGEN SELENIDE, ANHYDROUS

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Hazard Class: 2
UN#: UN2202
Required Label(s): 2.3, 2.1

US DOT Information:
Shipping Name: HYDROGEN SELENIDE, ANHYDROUS
Hazard Class: 2.3
UN/NA #: UN2202
Required Label(s): 2.3, 2.1

IMDG Information:
Shipping Name: HYDROGEN SELENIDE, ANHYDROUS
Hazard Class: 2.3
UN#: UN2202
Required Label(s): 2.1 2.3

International Bulk Chemical Code

This material does not contain any chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

Hydrogen Selenide	7783-07-5
SARA 302:	10 lb TPQ
SARA 313:	1 % de minimis concentration (includes any unique chemical substance that contains Selenium as part of that chemical's infrastructure) (related to Selenium compounds)
OSHA (safety):	150 lb TQ
SARA 304:	10 lb EPCRA RQ

SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories

Flammable; Gas Under Pressure; Acute toxicity; Skin Corrosion/Irritation; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
Hydrogen Selenide	7783-07-5	Yes	Yes	Yes	Yes	Yes

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

Not listed under California Proposition 65.

Component Analysis - Inventory

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US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	No	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW, CN	VN (Draft)
Yes	Yes	No	Yes	No	Yes	No

Section 16 - OTHER INFORMATION

NFPA Ratings

Health: 4 Fire: 4 Instability: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Summary of Changes

Updated: 01/05/2016

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC - European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; F - Background (for Venezuela Biological Exposure Indices); IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; KR REACH CCA - Korea Registration and Evaluation of Chemical Substances Chemical Control Act; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX - Mexico; Ne- Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL - Non-Domestic Substance List (Canada); NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL - Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH - Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA - Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TH-TECI - Thailand - FDA Existing Chemicals Inventory (TECI); TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW - Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada).

Other Information

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