MERCURY
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MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
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(201) 796-7100

EMERGENCY NUMBER: (201) 796-7100
CHEMTREC ASSISTANCE: (800) 424-9300

SUBSTANCE IDENTIFICATION

CAS-NUMBER 7439-97-6

SUBSTANCE: **MERCURY**

TRADE NAMES/SYNONYMS:
COLLOIDAL MERCURY; METALLIC MERCURY; NCI-C60399; QUICK SILVER; INORGANIC MERCURY; RCRA U151; NA 2809; HYDRARGYRUM; ELEMENTAL MERCURY; M-139; M-140; M-141; UN 2809; HG; ACC14020

CHEMICAL FAMILY:
Metal

MOLECULAR FORMULA: HG

MOLECULAR WEIGHT: 200.59

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=U FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: MERCURY PERCENT: 100
CAS# 7439-97-6

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
MERCURY, ALL FORMS EXCEPT ALKYL (as Hg):
0.05 mg/m3 OSHA TWA (vapor) (skin); 0.1 mg/m3 OSHA ceiling (skin)
0.05 mg/m3 ACGIH TWA (vapor); 0.10 mg/m3 ACGIH TWA (aryl);
0.025 mg/m3 ACGIH TWA (metal & inorganic) (skin);
ACGIH A4-Not Classifiable as a Human Carcinogen (metal & inorganic).
0.05 mg/m3 NIOSH recommended 10 hour TWA (vapor) (skin);
0.1 mg/m3 NIOSH recommended ceiling (skin)
0.01 ppm (0.1 mg/m3) DFG MAK TWA;
0.1 ppm (1.0 mg/m3) DFG MAK 30 minute peak, average value, 1 time/shift

Measurement method: Hydrar(R) sorbent tube; acid; atomic absorption spectrometry (cold); (NIOSH III # 6009, Mercury).

Subject to SARA Section 313 Annual Toxic Chemical Release Reporting
Subject to California Proposition 65 cancer and/or reproductive toxicity warning and release requirements- (July 1, 1990)

MERCURY:
1 pound CERCLA Section 103 Reportable Quantity

OSHA revoked the final rule limits of January 19, 1989 in response to the 11th Circuit Court of Appeals decision (AFL-CIO v. OSHA) effective June 30, 1993. See 29 CFR 1910.1000 (58 FR 35338)

PHYSICAL DATA

DESCRIPTION: Odorless, silvery liqiud with a metalic luster.

BOILING POINT: 674 F (357 C) MELTING POINT: -38 F (-39 C)

SPECIFIC GRAVITY: 13.5939 VAPOR PRESSURE: 0.002 mmHg @ 25 C

SOLUBILITY IN WATER: insoluble VAPOR DENSITY: 7.0

SOLVENT SOLUBILITY: Soluble in boiling sulfuric acid, nitric acid, lipids; insoluble in alcohol, ether, hydrochloric acid, hydrogen bromide, hydrogen iodide

VISCOSITY: 1.55 cP @ 20 C

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
Negligible fire hazard when exposed to heat or flame.

FIREFIGHTING MEDIA:
Dry chemical, carbon dioxide, water spray or regular foam
(1993 Emergency Response Guidebook, RSPA P 5800.6).

For larger fires, use water spray, fog or regular foam
(1993 Emergency Response Guidebook, RSPA P 5800.6).

FIREFIGHTING:
Move container from fire area if you can do it without risk. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks (1993 Emergency Response Guidebook, RSPA P 5800.6, Guide Page 60).

Use agents suitable for type of fire; use water in flooding amounts as a fog. Avoid breathing corrosive and poisonous vapors, keep upwind.

TRANSPORTATION DATA

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
Mercury-UN 2890

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
8 - Corrosive material

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG III

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101 AND SUBPART E:
Corrosive

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING AUTHORIZATIONS:
EXCEPTIONS: 49 CFR 173.164
NON-BULK PACKAGING: 49 CFR 173.164
BULK PACKAGING: 49 CFR 173.240

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 35 kg
CARGO AIRCRAFT ONLY: 35 kg

TOXICITY

MERCURY:
TOXICITY DATA: 150 ug/m3/46 days inhalation-woman TCLo; 44300 ug/m3/8 hours inhalation-man TCLo; 29 mg/m3/30 hours inhalation-rabbit LCLo;
1 mg/m3/24 hours/5 weeks-continuous inhalation-rat TCLo;
8 ug/m3/6.5 hours/41 weeks-intermittent inhalation-rat TCLo;
17 mg/m3/2 hours/30 days-continuous inhalation-rat TCLo;
129 mg/kg/5 hours continuous skin-man TDLo; 43 mg/kg oral-man TDLo;
254 mg/kg subcutaneous-man TDLo; mutagenic data (RTECS);
reproductive effects data (RTECS); tumorigenic data (RTECS).
CARCINOGEN STATUS: Human Inadequate Evidence, Animal Inadequate Evidence (IARC Group-3).
LOCAL EFFECTS: Irritant- inhalation.
ACUTE TOXICITY LEVEL: Insufficient data.
TARGET EFFECTS: Sensitizer- respiratory, dermal; neurotoxin; nephrotoxin; poisoning may also affect the respiratory and gastrointestinal systems.
AT INCREASED RISK FROM EXPOSURE: Persons with chronic respiratory disease, nervous system disorders and kidney disease.

HEALTH EFFECTS AND FIRST AID

INHALATION:
MERCURY:
IRRITANT/SENSITIZER/NEUROTOXIN/NEPHROTOXIN.
28 mg/m3 Immediately Dangerous to Life or Health.
ACUTE EXPOSURE- Inhalation of high levels of mercury vapor may cause almost immediate dyspnea, cough, fever, nausea, vomiting, diarrhea, headache, stomatitis, salivation, gingivitis, a metallic taste, and cardiac abnormalities. Respiratory irritation may occur with chest pain and tightness. Symptoms may resolve or may progress to necrotizing bronchiolitis, pneumonitis, pulmonary edema, pneumothorax, interstitial fibrosis, and death. Acidosis and renal damage may also occur. Allergic reactions that may occur in previously exposed persons include dermatitis, encephalitis, and death. Loss of libido and impotence have been reported in men acutely exposed to metallic mercury vapor. Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns. Symptoms may be delayed 4-12 hours

and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours.
CHRONIC EXPOSURE- Inhalation of mercury vapor over a long period may cause mercurialism, which is characterized by fine tremors and erethism. Tremors may affect the hands first, but may also become evident in the face, arms, and legs. Erethism may be manifested by abnormal shyness, blushing, self-consciousness, depression or despondency, resentment of criticism, irritability or excitability, headache, fatigue, and insomnia. In severe cases, hallucinations, loss of memory, and mental deterioration may occur. Concentrations as low as 0.03 mg/m3 have induced psychiatric symptoms in humans. Renal involvement may be indicated by proteinuria, albuminuria, enzymuria, and anuria. Other effects may include salivation, gingivitis, stomatitis, loosening of the teeth, blue lines on the gums, diarrhea, weight loss, anorexia, speech and sensory disorders, unsteady gait, chronic pneumonitis and mild anemia. Repeated exposure to mercury and its compounds may result in sensitization. Women occupationally exposed have reported menstrual disturbances, reduced ovulation and an increased risk of spontaneous abortion. Intrauterine exposure may result in tremors and involuntary movements in the infants. Mercury is excreted in breast milk. Reproductive effects have been reported in animals.

FIRST AID- Remove from exposure area to fresh air immediately. Perform artificial respiration if necessary. Maintain airway, blood pressure and respiration. Keep warm and at rest. Treat symptomatically and supportively. Get medical attention immediately. Qualified medical personnel should consider administering oxygen.

SKIN CONTACT:
MERCURY:
SENSITIZER/NEUROTOXIN/NEPHROTOXIN.
ACUTE EXPOSURE- Direct contact with liquid may cause irritation and redness. Small amounts of mercury may be absorbed through intact skin. Allergic reactions that may occur in previously exposed persons include dermatitis, encephalitis, and death. Subcutaneous introduction, from handling broken thermometers, may result in local inflammation, granulomatous skin reactions, and slight signs of mercury poisoning including digestive disorders, metallic taste in the mouth, and neuropsychic disorders.
CHRONIC EXPOSURE- Prolonged or repeated exposure may result in dermal sensitization and systemic effects as detailed in chronic inhalation exposure.

FIRST AID- Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

EYE CONTACT:
MERCURY:
ACUTE EXPOSURE- Direct contact with liquid may cause irritation and redness. Animal studies indicate diffusion and absorption of mercury into the tissues of the eye may occur. No clinical signs of conjunctivitis or inflammation occurred.
CHRONIC EXPOSURE- Mercury exposure from inhalation, ingestion, or skin contact may be indicated by mercurialentis, discoloration of the crystalline lens, on slit lamp examination of the eye.

FIRST AID- Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

INGESTION:
MERCURY:
NEUROTOXIN/NEPHROTOXIN.
ACUTE EXPOSURE- May cause burning of the mouth and throat, thirst, nausea and vomiting. Metallic mercury is not usually absorbed sufficiently from the gastrointestinal tract to induce an acute toxic response. Rarely, a large single dose may result in signs and symptoms of chronic inhalation if sufficient amounts of mercury are retained in the body.
CHRONIC EXPOSURE- Repeated ingestion of small amounts of mercury may result in the absorption of sufficient amounts to produce toxic effects as detailed in chronic inhalation exposure.

FIRST AID- Remove by gastric lavage or emesis. Maintain blood pressure and airway. Give oxygen if respiration is depressed. Do not perform gastric lavage or emesis if victim is unconscious. Get medical attention immediately (Dreisbach, Handbook of Poisoning, 12th Ed.). Administration of gastric lavage or oxygen should be performed by qualified medical personnel.

ANTIDOTE:
The following antidote has been recommended. However, the decision as to whether the severity of poisoning requires administration of any antidote and actual dose required should be made by qualified medical personnel.

MERCURY POISONING:
Give dimercaprol, 3 mg/kg (or 0.3 mL/10 kg) every 4 hours for the first 2 days and then 2 mg/kg every 12 hours for a total of 10 days if necessary. Dimercaprol is available as a 10% solution in oil for intramuscular administration. Hemodialysis will speed the removal of the mercury-dimercaprol complex. Penicillamine is also effective. Give up to 100 mg/kg/day (maximum 1 gm/day) divided into 4 doses for no longer than 1 week. If a longer administration period is warranted, dosage should not exceed 40 mg/kg/day. Give the drug orally half an hour before meals. A chelating agent should be continued until the urine-mercury level falls below 50 ug/24 hours (Dreisbach, Handbook of Poisoning, 12th Ed.). Antidote should be administered by qualified medical personnel.

REACTIVITY

REACTIVITY:
Stable under normal temperatures and pressures.

INCOMPATIBILITIES:
MERCURY:
ACETYLENE: Formation of explosive compound.
ACETYLINIC COMPOUNDS: Formation of explosive compound.
ALUMINUM: Corrodes.
AMINES: May form explosive compounds.
AMMONIA + MOISTURE: Forms explosive compound.
BORON DIIODPHOSPHIDE: Ignites in contact with mercury vapors.
BROMINE: Violent reaction.
3-BROMOPROPYNE: Explosion hazard.
CALCIUM: Amalgam formation @ 390 C is violent.
CHLORINE: Ignites @ 200-300 C.
CHLORINE DIOXIDE: Explodes.
COPPER (AND ALLOYS): May be attacked.
ETHYLENE OXIDE + TRACES OF ACETYLENE: May form explosive acetylides.
LITHIUM: Amalgam formation is violently exothermic and may be explosive.
METHYL AZIDE: Produces shock sensitive mixture.
METHYLSILANE + OXYGEN: Produces shock sensitive mixture.
NITRIC ACID + ALCOHOLS: Forms fulminates capable of detonation.
OXALIC ACID: Forms shock sensitive compound.
OXIDANTS: Violent reaction.
PEROXYFORMIC ACID: Explosive reaction.
POTASSIUM: Amalgam formation is vigorously exothermic and may be explosive.
RUBIDIUM: Violent exothermic reaction.
SILVER PERCHLORATE + 3-HEXYNE: Explodes.
SILVER PERCHLORATE + 2-PENTYNE: Explodes.
SODIUM: Amalgam formation is violently exothermic.
SODIUM CARBIDE: Vigorous reaction.
SULFURIC ACID (HOT): Reacts.
TETRACARBONYLNICKEL + OXYGEN: Produces shock sensitive mixture.

DECOMPOSITION:
Thermal decomposition products may include highly toxic vapors of mercury and mercury oxides.

POLYMERIZATION:
Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

STORAGE AND DISPOSAL

Observe all federal, state and local regulations when storing or disposing of this substance.

Storage

Store away from incompatible substances.

Disposal

Disposal must be in accordance with standards applicable to generators of hazardous waste, 40 CFR 262. EPA Hazardous Waste Number U151.

Mercury - Regulatory level: 0.2 mg/l (TCLP-40 CFR 261 Appendix II) materials which contain the above substance at or above the TCLP regulatory level meet the EPA toxicity characteristic, and must be disposed of in accordance with 40 CFR part 262. EPA Hazardous Waste Number D009.

CONDITIONS TO AVOID

May burn but does not ignite readily. Flammable, poisonous gases may accumulate in tanks and hopper cars. May ignite combustibles (wood, paper, oil, etc.).

SPILL AND LEAK PROCEDURES

WATER SPILL:
The California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) prohibits contaminating any known source of drinking water with substances known to cause cancer and/or reproductive toxicity.

OCCUPATIONAL SPILL:
Do not touch spilled material. Stop leak if you can do it without risk. For small spills, take up with sand or other absorbent material and place into containers for later disposal. A mercury spill kit may also be used for small spills in the workplace. For larger spills, dike far ahead of spill for later disposal. Keep unnecessary people away. Isolate hazard area and deny entry.

Reportable Quantity (RQ): 1 pound
The Superfund Amendments and Reauthorization Act (SARA) Section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local emergency planning committee and the state emergency response commission (40 CFR 355.40). If the release of this substance is reportable under CERCLA Section 103, the National Response Center must be notified immediately at (800) 424-8802 or (202) 426-2675 in the metropolitan Washington, D.C. area (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
Provide local exhaust ventilation system to meet published exposure limits.

RESPIRATOR:
The following respirators and maximum use concentrations are recommendations by the U.S. Department of Health and Human Services, NIOSH Pocket Guide to Chemical Hazards; NIOSH criteria documents or by the U.S. Department of Labor, 29 CFR 1910 Subpart Z.
The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA).

MERCURY, ELEMENTAL:

0.5 mg/m3- Any chemical cartridge respirator with cartridge(s) providing protection against mercury.*
Any supplied-air respirator.
Any self-contained breathing apparatus.

1.25 mg/m3- Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with a canister providing protection against mercury.*

2.5 mg/m3- Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode.
Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against mercury.*
Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against mercury.*
Any powered, air-purifying respirator with a tight-fitting facepiece and a canister providing protection against mercury.

28 mg/m3- Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode.

Escape- Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against mercury.
Any appropriate escape-type, self-contained breathing apparatus.

* End of service life indicator (ESLI) required.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH 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 that has a full facepiece and 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.

CLOTHING:
Employee must wear appropriate protective (impervious) clothing and equipment to prevent any possibility of skin contact with this substance.

GLOVES:
Employee must wear appropriate protective gloves to prevent contact with this substance.

EYE PROTECTION:
Employee must wear splash-proof or dust-resistant safety goggles and a faceshield to prevent contact with this substance.

Emergency wash facilities:
Where there is any possibility that an employee's eyes and/or skin may be exposed to this substance, the employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.

AUTHORIZED - FISHER SCIENTIFIC, INC.
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