

Material Safety Data Sheet

Section 1. Product and Company Identification

Product Identification: ICP-MSCS-M
 MSDS Number: ICP-MSCS-M
 Company Identification: High-Purity Standards
 P.O. Box 41727
 Charleston, SC 29423
 Telephone: (843) 767-7900
 FAX: (843) 767-7906

In case of emergency call INFOTRAC: 800-535-5053

Section 2. Chemical Composition

Component	CAS/EINECS Registry #	Percent Concentration	ACGIH TLV	OSHA PEL
Aluminum	7429-90-5/ 231-072-3	0.001	10 mg/m ³	15 mg/m ³
Antimony	7440-36-0/ 231-146-5	0.001	0.5 mg/m ³	0.5 mg/m ³
Arsenic	7440-38-2/ 231-148-6	0.001	0.01 mg/m ³	10 µg/m ³
Barium Carbonate (BaCO ₃)	513-77-9/ 208-167-3	0.001 (as Ba)	0.5 mg/m ³	0.5 mg/m ³
Beryllium Acetate (Be ₄ O(C ₂ H ₃ O ₂) ₆)	19049-40-2/ 242-785-4	0.001 (as Be)	0.002 mg/m ³	0.002 mg/m ³
Bismuth	7440-69-9/ 231-177-4	0.001	Not Available	Not Available
Boric Acid (H ₃ BO ₃)	10043-35-3/ 233-139-2	0.001 (as B)	Not Available	Not Available
Calcium Carbonate (CaCO ₃)	471-34-1/ 207-439-9	0.001 (as Ca)	0.5 mg/m ³	0.5 mg/m ³
Cadmium	7440-43-9/ 231-152-8	0.001	0.002 mg/m ³ (respirable particulate)	0.005 mg/m ³
Chromium	7440-47-3/ 231-157-5	0.001	0.5 mg/m ³	1 mg/m ³
Cobalt	7440-48-4/ 231-158-0	0.001	0.02 mg/m ³	0.1 mg/m ³
Copper	7440-50-8/ 231-159-6	0.001	0.2 mg/m ³ (fumes)	0.1 mg/m ³ (fumes)
Europium Oxide (Eu ₂ O ₃)	1308-96-9/ 215-165-6	0.001 (as Eu)	Not Available	Not Available
Holmium Oxide (Ho ₂ O ₃)	12055-62-8/ 235-015-3	0.001 (as Ho)	Not Available	Not Available
Iron	7439-89-6/ 231-096-4	0.001	10 mg/m ³	5 mg/m ³
Lanthanum Oxide (La ₂ O ₃)	1312-81-8/ 215-200-5	0.001 (as La)	Not Available	Not Available

Material Safety Data Sheet ICP-MSCS-M	Date: October 12, 2006	
ICP-MSCS-M	Rev.: 001	Page 2 of 6

Lead	7439-92-1/ 231-100-4	0.001	0.05 mg/m ³	0.05 mg/m ³
Lithium Carbonate (Li ₂ CO ₃)	554-13-2/ 209-062-5	0.001 (as Li)	Not Available	Not Available
Magnesium	7439-95-4/ 231-104-6	0.001	Not Available	Not Available
Manganese	7439-96-5/ 231-105-1	0.001	0.2 mg/m ³	C 5 mg/m ³
Molybdenum	7439-98-7/ 231-107-2	0.001	5 mg/m ³	5 mg/m ³
Nickel	7440-02-0/ 231-111-4	0.001	1.5 mg/m ³	1 mg/m ³
Selenium	7782-49-2/ 231-957-4	0.001	0.2 mg/m ³	0.2 mg/m ³
Silver	7440-22-4/ 231-131-3	0.01	0.1 mg/m ³	Not Available
Sodium Carbonate (Na ₂ CO ₃)	497-19-8/ 207-838-8	0.001 (as Na)	Not Available	Not Available
Strontium Carbonate (SrCO ₃)	1633-05-2/ 216-643-7	0.001 (as Sr)	Not Available	Not Available
Thallium	7440-28-0/ 231-138-1	0.001	0.1 mg/m ³	0.1 mg/m ³
Thorium Oxide (ThO ₂)	1314-20-1/ 215-225-1	0.001 (as Th)	Not Available	Not Available
Ammonium Metavanadate (NH ₄ VO ₃)	7803-55-6/ 232-261-3	0.001 (as V)	0.05 mg/m ³	Not Available
Uranium Oxide (U ₃ O ₈)	1344-59-8/ 215-702-4	0.001 (as U)	0.2 mg/m ³	0.05 mg/m ³
Ytterbium Oxide (Yb ₂ O ₃)	1314-37-0/ 215-234-0	0.001 (as Yb)	Not Available	Not Available
Zinc	7440-66-6/ 231-175-3	0.001	5 mg/m ³	1 mg/m ³
Nitric Acid (HNO ₃)	7697-37-2/ 231-714-2	2	2 mg/kg	5 mg/m ³
Hydrofluoric Acid (HF)	7664-39-3/ 231-634-8	<0.001	C: 3 mg/ml	2.5 mg/m ³ STEL: 6 mg/ml
Water, deionized	7732-18-5/ 231-791-2	Balance	Not Available	Not Available

Section 3. Hazard Identification

Emergency Overview: Mildly corrosive. May cause irritation to areas of contact. Wash areas of contact with water for at least 15 minutes. If ingested, do not induce vomiting. Dilute with water and call a physician. Potential symptoms of overexposure are irritation of the eyes, mucous membranes and skin, dental erosion, bronchitis, pneumonitis, delayed pulmonary edema. Thorium oxide is toxic and is known to be a human carcinogen. May cause cancer

Material Safety Data Sheet ICP-MSCS-M	Date: October 12, 2006	
ICP-MSCS-M	Rev.: 001	Page 3 of 6

Target Organs: Eyes, skin, respiratory system, immune system, nasal cavities, teeth, blood, bones. Arsenic increases risk of lung, liver, kidney, and bladder cancer with prolonged exposure.

Skin/eye Contact: Liquid may cause burns to skin and eyes. Hydrogen fluoride will penetrate the skin and attack the underlying tissue and bone.

Inhalation: May cause irritation. Inhalation of high concentrations of nickel may cause irritation of mucous membranes causing sore throat, coughing, and shortness of breath.

Ingestion: May cause nausea, vomiting, and diarrhea. Ingestion of arsenic compounds may be poisonous, leading to death. Cadmium is a poison that accumulates in the liver and kidneys. Animal studies indicate that prolonged ingestion of some soluble nickel compounds may affect the blood, bone marrow, thymus, spleen, kidneys, and immune system.

Section 4. First Aid Measures

Inhalation: Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen.

Skin/eye Contact: Flush eyes with plenty of water for at least 15 minutes. Remove contaminated shoes and clothing. Rinse affected area with large amount of water followed by washing the area with soap and water. Immediately apply calcium gluconate gel to areas of contact, preferably wearing gloves, until medical assistance is available.

Ingestion: CALL A PHYSICIAN. If swallowed rinse mouth, do NOT induce vomiting. If conscious give large quantities of water or milk.

Section 5. Fire Fighting Measures

Fire & Explosion hazards: While nitric acid is not combustible, it is a strong oxidizing agent that can react with combustible materials. NO_x compounds can be released in event of fire. Hydrofluoric acid may ignite or explode on contact with combustible materials.

Extinguishing Media: Use any extinguishing media that is suitable for the surrounding area. Use a water spray to dilute nitric acid and to absorb liberated nitrogen oxides.

Specific Methods: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode.

Section 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Cover the spill with sodium bicarbonate or a soda ash-slaked lime mixture (50:50) to neutralize the acid. Place the neutralized material into containers suitable for eventual disposal, reclamation, or destruction. Always dispose of in accordance with local regulations.

Section 7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Keep out of direct sunlight and away from heat, water, and incompatible materials. When diluting, the acid should always be added slowly to water and in small amounts. Refer to Section 8 for personal handling instructions. Wash exposed skin area thoroughly after handling.

Material Safety Data Sheet ICP-MSCS-M	Date: October 12, 2006	
ICP-MSCS-M	Rev.: 001	Page 4 of 6

Section 8. Exposure Controls and Personal Protection

Engineering Controls: No specific controls are needed. Normal room ventilation is adequate.

Respiratory Protection: Normal room ventilation is adequate.

Personal Protection: Wear proper gloves, safety glasses with side shields, lab coat/apron.

Section 9. Physical and Chemical Properties

Molecular Weight: N/A

Boiling Point: Approximately 100°C

Freezing Point: N/A

Vapor Pressure (mm): N/A

Vapor Density (air+1): N/A

Specific Gravity (H₂O = 1): Approximately 1

Solubility in H₂O: Complete

Appearance: Clear, colorless to light grey liquid

Odor: Odorless to a faint pungent odor

pH: <1

Section 10. Stability and Reactivity

Stability Indicator: YES

Conditions to Avoid: Metals, chlorine, organic materials, strong alkali, cyanides.

Incompatibles: Strong reducing agents.

Hazardous Decomposition Products: HF and NO_x compounds including nitric oxide (NO), nitrogen dioxide (NO₂), nitrous oxide (N₂O) and nitric acid mist or vapor.

Hazardous Polymerization: Will not occur.

Section 11. Toxicological Information

Toxicity Data:

May affect skin, mucous membranes and eyes. Swallowing may lead to a negative effect on mouth and throat and to the risk of perforation or the corrosion of esophagus and stomach.

Thorium oxide and uranium are known to be human carcinogens. This solution contains depleted radioactive thorium oxide and uranium oxide at 0.001% concentration. Thorium oxide and uranium oxide are weakly radioactive and emit alpha particles which are harmful to the body. For the energy range of alpha particles usually encountered, a fraction of a millimeter of any ordinary material is sufficient for absorbance. Thin rubber, acrylic, stout paper, or cardboard will suffice.

Beryllium, cadmium, and nickel are investigated as a tumorigens.

HNO ₃ - RTECS# QU5775000	HF- RTECS# MW7875000	
Al-RTECS# BD0330000	Sb-RTECS# CC4025000	As-RTECS# CG0525000
BaCO ₃ -RTECS# CQ8600000	Be ₄ O(C ₂ H ₃ O ₂) ₆ DS2900000	Bi-RTECS# EB2600000
H ₃ BO ₃ -RTECS# ED450000	CaCO ₃ -RTECS# EV9580000	Cd-RTECS# EU9800000
Cr-RTECS# GB4200000	Co-RTECS# GF8750000	Cu-RTECS# GL5325000
Eu ₂ O ₃ RTECS# 1008530EO	La ₂ O ₃ -RTECS OE5330000	Pb-RTECS# OF7525000

Material Safety Data Sheet ICP-MSCS-M	Date: October 12, 2006	
ICP-MSCS-M	Rev.: 001	Page 5 of 6

Li₂CO₃-RTECS# OJ5800000 Mn-RTECS# OO9275000 Mo-RTECS# QA4680000
 Ni-RTECS# QR5950000 Se-RTECS# VS7700000 Ag-RTECS# VW3500000
 Na₂CO₃ -RTECS# VZ4050000 Tl-RTECS# XG3425000 Th-RTECS# XO6950000
 U₈O₃ - RTECS# YR3490000 NH₄VO₃ RTECS# YW0875000
 Y₂O₃ - RTECS# ZG3850000 Zn-RTECS# ZG8600000

LD_{LO} Oral, Human: (Nitric Acid) 430 mg/kg; LC_{LO} Inhalation, Human: (Hydrofluoric Acid) 50 mg/kg/30 min; LD₅₀ Oral, Rat: (Aluminum) >5000 mg/kg; LD₅₀ Oral, Rat: (Antimony) 7g/kg; LD₅₀, Oral, Rat: (Arsenic) 763 mg/kg; LD_{LO} Oral, Human: (Barium Carbonate) 17 mg/kg; TD_{LO} Intratracheal, Rat: (Beryllium Acetate) 13 mg/kg; LD₅₀ Oral, Rat: (Bismuth) 5 g/kg; LD₅₀ Oral, Rat: (Boric Acid) 2660 mg/kg; LD_{LO}, Oral, Woman: (Boric Acid) 400 mg/kg, behavioral and gastrointestinal effects noted; LD_{LO} Oral, Human: (Cadmium) 2330 mg/kg; LD₅₀ Unreported Route, Rat: (Chromium) 27.5 mg/kg; LD_{LO} Oral, Rabbit: (Cobalt) 750 mg/kg; TD_{LO} Oral, Human: (Copper) 120 µg/kg; LD₅₀ Oral, Rat: (Lanthanum Oxide) >9968 mg/kg; TD₅₀ Oral, Woman: (Lead) 450 mg/kg/6 year; LD₅₀ Oral, Rat: (Lithium Carbonate) 525 mg/kg; LD₅₀ Oral, Rat: (Manganese) 9 g/kg; LD₅₀, Intravenous; TD_{LO} Oral, Mouse: (Molybdenum) 448 mg/kg (multigenerations); Mouse: (Nickel) 50 mg/kg; LD₅₀, Oral, Rat: (Selenium) 6700 mg/kg; TD_{LO} Implant; Mouse: (Silver) 11 g/kg; TD_{LO} Oral, Man: (Thallium) 5,714 µg/kg; LD₅₀ Oral, Rat: (Ammonium Metavanadate) 58,100 µg/kg; LD_{LO} Oral, Duck: (Zinc) 388 mg/kg.

Section 12. Ecological Information

Ecotoxicological information: Do not allow material to reach ground water, water bodies, or sewage system. Beryllium and its compounds are considered to have high acute and chronic toxicity to aquatic life. Beryllium is more toxic in soft water than in hard water. High concentrations of zinc have been shown to be detrimental to aquatic life.

Section 13. Disposal Considerations

Follow federal, state and local regulations for waste.

Section 14. Transport Information

D.O.T. Classification: Not Hazardous by DOT regulations (based on concentration of acid).

Section 15. Regulations (Not meant to be all inclusive-selected regulation listed)

OSHA Status: This item meets the OSHA Hazard Communication Standard (29 CFR 1910.1200) definition of a hazardous material.

TSCA Status: Components of this solution are listed on the TSCA Inventory.

RCRA Status: 7664-39-3 (Hydrofluoric Acid); 7803-55-6 (NH₄VO₃).

SARA: Subject to the reporting requirements of Section 313 or SARA Title III and of 40 CFR 372

Risk Phrases: R20, R21, R22, R24, R25, R34, R45, R48 Harmful by inhalation or skin contact;
 Toxic in contact with the skin and if swallowed; Causes burns; May cause cancer;
 Danger of serious damage to health by prolonged exposure; Danger of cumulative effects.

Material Safety Data Sheet ICP-MSCS-M	Date: October 12, 2006	
ICP-MSCS-M	Rev.: 001	Page 6 of 6

Safety Phrases: S24, S25, S36/37/39, S53 Avoid contact with the skin. Avoid contact with eyes.
Wear suitable protective clothing, gloves and eye/face protection; Avoid exposure-
obtain special instruction before use.

WHMIS Information (Canada): E: Corrosive

ICP-MSCS-M contains a limited quantity radioactive material that is exempt from radioactive labeling requirements under 49CFR section 173.421. The massic activity of ICP-MSCS-M is less than 500 Bq/g.

Section 16. Other Information

HPS products are intended for laboratory use only. All products should be handled and used by trained professional personnel only. The responsibility for the safe handling and use of these products rest solely with the buyer and/or user. The MSDS was prepared carefully and represents the best data currently available to us; however, HPS does not certify the data on the MSDS. Certified values for this material are given only on the Certificate of Analysis.

Theodore C. Rains, Ph.D.