Section 1. Product and Company Identification

Product Identification: ICP-MSCS
MSDS Number: ICP-MSCS
Recommended Use: For Laboratory Use.
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. Hazard Identification

Classification:
Skin Corrosion/Irritation, Category 1
Serious Eye Damage/ Eye Irritation, Category 1
Labeling:

Symbol:
Signal Word: Danger.
Hazard Statement: Causes severe skin burns and eye damage.
Precautionary Statement: Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling.

Section 3. Composition

Component	CAS/EINECS Registry #	Percent Concentration
Aluminum	7429-90-5/231-072-3	0.001
Antimony	7440-36-0/231-146-5	0.001
Arsenic	7440-38-2/231-148-6	0.001
Barium Carbonate ($BaCO_3$)	513-77-9/208-167-3	0.001 (as Ba)
Barium Nitrate ($Ba(NO_3)_2$)	10022-31-8/233-020-5	
Beryllium Acetate ($Be_4O(C_2H_3O_2)_6$)	19049-40-2/242-785-4	0.001 (as Be)
Boric Acid (H_3BO_3)	10043-35-3/233-139-2	0.001 (as B)
Cadmium	7440-43-9/231-152-8	0.001
Calcium Carbonate ($CaCO_3$)	471-34-1/207-439-9	0.001 (as Ca)
Chromium	7440-47-3/231-157-5	0.001
Cobalt	7440-48-4/231-158-0	0.001
Copper	7440-50-8/231-159-6	0.001
Europium Oxide (Eu_2O_3)	1308-96-9/215-165-6	0.001 (as Eu)
Holmium Oxide (Ho_2O_3)	12055-62-8/235-015-3	0.001 (as Ho)

Lanthanum Oxide (La_2O_3)	1312-81-8/215-200-5	0.001 (as La)
Lead	7439-92-1/231-100-4	0.001
Lithium Carbonate (Li_2CO_3)	554-13-2/209-062-5	0.001 (as Li)
Magnesium	7439-95-4/231-104-6	0.001
Manganese Acetate Tetrahydrate $(Mn(CH_3CO_2)_2)*4H_2O$	6156-78-1/211-334-3	0.001 (as Mn)
Molybdenum	7439-98-7/231-107-2	0.001
Nickel	7440-02-0/231-111-4	0.001
Scandium Oxide (Sc_2O_3)	12060-08-1/235-042-0	0.001 (as Sc)
Selenium	7782-49-2/231-957-4	0.001
Silver	7440-22-4/231-131-3	0.001
Sodium Carbonate (Na_2CO_3)	497-19-8/207-838-8	0.001 (as Na)
Strontium Nitrate ($Sr(NO_3)_2$)	10042-76-9/233-131-9	0.001 (as Sr)
Thallium	7440-28-0/231-138-1	0.001
Thorium Oxide (ThO_2)	1314-20-1/215-225-1	0.001 (as Th)
Uranium Oxide (U_3O_8)	1344-59-8/215-702-4	0.001 (as U)
Ammonium Metavanadate (NH_4VO_3)	7803-55-6/232-261-3	0.001 (as V)
Ytterbium Oxide (Yb_2O_3)	1314-37-0/215-234-0	0.001 (as Yb)
Zinc	7440-66-6/231-175-3	0.001
Nitric Acid	7697-37-2/ 231-714-2	2
Hydrofluoric Acid	7664-39-3/231-634-8	0.05
Water, deionized	7732-18-5/ 231-791-2	Balance

**Note: Barium is derived from either Barium carbonate or Barium Nitrate. For this reason both sources are listed on the SDS. Refer to the product's Certificate of Analysis to determine which source was used in the production of the lot number received.*

Section 4. First Aid Measures

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Rub calcium gluconate gel immediately to skin. Obtain medical assistance. Wash contaminated clothing before reuse.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER doctor/physician.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
Target Organs: Eyes, skin, respiratory system, teeth, and skeletal system.

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; however, it is present in limited quantities in this solution. NO_x compounds can be released in case 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. Do not allow to enter drainage systems or water ways. Dike area and dilute spill with water and neutralize with soda ash, limestone, etc. 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.

Section 8. Exposure Controls and Personal Protection

Engineering Controls: Provide exhaust ventilation or other engineering controls to keep any buildup of airborne contaminants below their respective threshold limit value. Ensure the availability of eyewash stations and safety showers.

Respiratory Protection: Provide approved respiratory apparatus for non-routine or emergency use. Use an approved vapor respirator when the vapor or mist concentrations are high. If necessary, refer to the NIOSH document Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84 for selection and use of respirators certified by NIOSH.

Personal Protection: Wear appropriate gloves impermeable to HF, safety glasses with face shield, and lab coat/apron to avoid any direct skin contact.

Exposure Limits:

Component	ACGIH TLV	OSHA PEL
Aluminum	10 mg/m^3	15 mg/m^3
Antimony	0.5 mg/m^3	0.5 mg/m^3
Arsenic	0.01 mg/m^3	10 $\mu g/ m^3$
Barium	0.5 mg/m^3	0.5 mg/m^3
Beryllium Acetate	0.002 mg/m^3	0.002 mg/m^3
Boric Acid	Not Available	Not Available

Cadmium	0.002 mg/m^3 (respirable particulate)	0.005 mg/m^3
Calcium Carbonate	0.5 mg/m^3	0.5 mg/m^3
Chromium	0.5 mg/m^3	1 mg/m^3
Cobalt	0.02 mg/m^3	0.1 mg/m^3
Copper	0.2 mg/m^3 (fumes)	0.1 mg/m^3 (fumes)
Europium Oxide	Not Available	Not Available
Holmium Oxide	Not Available	Not Available
Lanthanum Oxide	Not Available	Not Available
Lead	0.05 mg/m^3	0.05 mg/m^3
Lithium Carbonate	Not Available	Not Available
Magnesium	Not Available	Not Available
Manganese Acetate Tetrahydrate	0.2 mg/m^3	C 5 mg/m^3
Molybdenum	5 mg/m^3	5 mg/m^3
Nickel	1.5 mg/m^3	1 mg/m^3
Scandium Oxide	Not Available	Not Available
Selenium	0.2 mg/m^3	0.2 mg/ m^3
Silver	0.1 mg/m^3	Not Available
Sodium Carbonate	Not Available	Not Available
Strontium Nitrate	Not Available	Not Available
Thallium	0.1 mg/m^3	0.1 mg/m^3
Thorium Oxide	Not Available	Not Available
Uranium Oxide	0.2 mg/m^3	0.05 mg/m^3
Ammonium Metavanadate	0.05 mg/m^3	Not Available
Ytterbium Oxide	Not Available	Not Available
Zinc	5 mg/m^3	1 mg/m^3
Nitric Acid	2 mg/kg	5 mg/m^3
Hydrofluoric Acid	C: 3 mg/ml	2.5 mg/m^3 STEL: 6 mg/ml

Section 9. Physical and Chemical Properties

Physical State: Liquid
Color: Clear, colorless
Odor: Odorless to a faint pungent odor
Odor threshold: None
pH: <2
Melting point: N/A
Freezing Point: N/A
Boiling Point: Approximately 100°C
Flash point: N/A
Evaporation rate: N/A
Flammability: N/A
Explosion limits: N/A
Vapor Pressure (mm): N/A
Vapor Density (air+1): N/A

Relative density: (H_2O = 1): Approximately 1.0
Solubility in H_2O: Complete
Auto ignition temperature: N/A
Decomposition temperature: N/A
Molecular Weight: N/A

Section 10. Stability and Reactivity

Stability Indicator: YES
Conditions to Avoid: Avoid heat and contact with combustible and other incompatible materials.
Incompatibles: Strong reducing agents, metallic powders, strong bases, chlorine, calcium compounds, hydroxides, organic materials, strong alkali, cyanides.
Hazardous Decomposition Products: HF and NO_x compounds including nitric oxide (NO), nitrogen dioxide (NO_2), nitrous oxide (N_2O) and nitric acid mist or vapor.
Hazardous Polymerization: Will not occur.

Section 11. Toxicological Information

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.

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.

RTECS#

HNO_3- QU5775000
Al - BD0330000
$BaCO_3$ - CQ8600000
H_3BO_3- ED450000
Cd - EU9800000
Cr-GB4200000
Eu_2O_3 LE8053000
Pb – OF7525000
Mg – FW6475100
Mo- QA4680000
Se - VS7700000
Na_2CO_3 - VZ4050000
Sb - CC4025000
ThO_2 - XO6950000
Zn - ZG8600000
HF- MW7875000
As - CG0525000
$Be_4O(C_2H_3O_2)_6$ – DS2900000
$CaCO_3$ – FF9335000
Co- GF8750000
Cu - GL5325000
La_2O_3- OE5330000
Li_2CO_3 – OJ5800000
Mn - AI5775000
Ni- QR5950000
Ag- VW3500000
$Sr(NO_3)_2$– WK9800000
Tl – XG3425000
NH_4VO_3- YW0875000
$Ba(NO_3)_2$- CQ9625000

Toxicity Data:

LD_{LO} Oral, Human: (Nitric Acid) 430 mg/kg
LC_{LO} Inhalation, Human: (Hydrofluoric Acid) 50 mg/kg/30 min
LD_{50} Oral, Rat: (Aluminum) >5000 mg/kg
LD_{50} Oral, Rat: (Antimony) 7g/kg
LD_{50}, Oral, Rat: (Arsenic) 763 mg/kg
LD_{LO} Oral, Human: (Barium Carbonate) 17 mg/kg
LD_{50} Oral, Rat: ($Ba(NO_3)_2$) 355 mg/kg.

TD_{LO} Intratracheal, Rat: (Beryllium Acetate) 13 mg/kg
LD_{50} 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
LD_{50} Unreported Route, Rat: (Chromium) 27.5 mg/kg
LD_{LO} Oral, Rabbit: (Cobalt) 750 mg/kg
TD_{LO} Oral, Human: (Copper) 120 μg/kg
LD_{50} Oral, Rat: (Europium Oxide) 5g/kg
LD_{50} Oral, Rat: (Lanthunum Oxide) >9968 mg/kg
LD_{50} Oral, Rat: (Lithium Carbonate) 525 mg/kg
TD_{50} Oral, Woman: (Lead) 450 mg/kg/6 year
LD_{50} Oral, Rat: (Manganese) 3730mg/kg
TD_{LO} Oral, Mouse: (Molybdenum) 448 mg/kg (multigenerations)
LD_{50}, Intravenous, Mouse: (Nickel) 50 mg/kg
LD_{50}, Oral, Rat: (Selenium) 6700 mg/kg
TD_{LO} Implant; TD_{LO} Implant, Mouse: (SIlver) 11 g/kg
$LD_{50;}$ Oral, Mouse: (Sodium Carbonate) 6600 mg/kg
TD_{LO} Oral, Man: (Thallium) 5,714 μg/kg
TD_{LO} Intraarterial, Human: (Thorium Oxide) 490 mg/kg
TD_{50} Unreported Route, Rat: (Uranium Oxide) 750 mg/kg
LD_{50} 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. High concentrations of zinc have been shown to be detrimental to aquatic life. 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.

Section 13. Disposal Considerations

General: Follow Federal, state and local regulations for waste.

Section 14. Transport Information

D.O.T. Classification: Hazardous by IATA and 49CFR regulations (based on concentration of acid).
D.O.T. Shipping Name: Corrosive liquid, Acidic, Inorganic, n.o.s. (Nitric Acid Solution)
D.O.T. Hazard Class: 8
U.N./N.A. Number: 3264
Packing Group: II
D.O.T. Label: Corrosive (8)

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

TSCA Status: Components of this solution are listed on the TSCA Inventory.
RCRA Status: Yes (Hydrofluoric Acid-U134), Ammonium metavanadate (P119)
SARA: Subject to the reporting requirements of Section 313 or SARA Title III and of 40 CFR

Risk Phrases: R20/21/22. R24/25. R34. R45. R48. Harmful by inhalation, skin contact, or ingestion. Toxic in contact with the skin and ingestion. Cause burns. May cause cancer. Danger of serious damage to health by prolonged exposure. Danger of cumulative effects.

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 contains a limited quantity radioactive material that is exempt from radioactive labeling requirements under 49CFR section 173.421. The massic activity of ICP-MSCS 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 rests solely with the buyer and/or user. The SDS was prepared carefully and represents the best data currently available to us; however, HPS does not certify the data on the SDS. Certified values for this material are given only on the Certificate of Analysis.

Theodore C. Rains, Ph.D.