Section 1. Product and Company Identification

Product Identification: QCS-27
MSDS Number: QCS-27
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	0.01
Antimony	7440-36-0/231-146-5	0.01
Arsenic	7440-38-2/231-148-6	0.01
Barium Nitrate ($Ba(NO_3)_2$)	10022-31-8/233-020-5	0.01 (as Ba)
Barium Carbonate ($BaCO_3$)	513-77-9/208-167-3	
Beryllium Acetate ($Be_4O(C_2H_3O_2)_6$)	19049-40-2/242-785-4	0.01 (as Be)
Boric Acid (H_3BO_3)	10043-35-3/233-139-2	0.01 (as B)
Calcium Carbonate ($CaCO_3$)	471-34-1/207-439-9	0.01 (as Ca)
Cadmium	7440-43-9/231-152-8	0.01
Chromium	7440-47-3/231-157-5	0.01
Cobalt	7440-48-4/231-158-0	0.01
Copper	7440-50-8/231-159-6	0.01
Iron	7439-89-6/231-096-4	0.01
Lead	7439-92-1/231-100-4	0.01

Magnesium	7439-95-4/231-104-6	0.01
Manganese	7439-96-5/231-105-1	0.01
Molybdenum	7439-98-7/231-107-2	0.01
Nickel	7440-02-0/231-111-4	0.01
Potassium Nitrate (KNO_3)	7757-79-1/231-818-8	0.01 (as K)
Sodium Carbonate (Na_2CO_3)	497-19-8/207-838-8	0.01 (as Na)
Selenium	7782-49-2/231-957-4	0.01
Ammonium Hexafluorosilicate ($(NH_4)_2SiF_6$)	16919-19-0/240-968-3	0.01 (as Si)
Silver	7440-22-4/231-131-3	0.01
Strontium Nitrate ($Sr(NO_3)_2$)	10042-76-9/233-131-9	0.01 (as Sr)
Thallium	7440-28-0/231-138-1	0.01
Titanium	7440-32-6/231-142-3	0.01
Ammonium Metavanadate (NH_4VO_3)	7803-55-6/232-261-3	0.01 (as V)
Zinc	7440-66-6/231-175-3	0.01
Nitric Acid (HNO_3)	7697-37-2/231-714-2	4
Hydrofluoric Acid	7664-39-3/231-634-8	<0.001
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.

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

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
Calcium Carbonate	0.5 mg/m^3	0.5 mg/m^3
Cadmium	0.002 mg/m^3 (respirable particulate)	0.005 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)
Iron	10 mg/m^3	5 mg/m^3
Lead	0.05 mg/m^3	0.05 mg/m^3
Magnesium	Not Available	Not Available
Manganese	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
Potassium Nitrate	Not Available	Not Available
Sodium Carbonate	Not Available	Not Available

Selenium	0.2 mg/m^3	0.2 mg/ m^3
Ammonium Hexafluorosilicate	Not Available	Not Available
Silver	0.1 mg/m^3	Not Available
Strontium Nitrate	Not Available	Not Available
Thallium	0.1 mg/m^3	0.1 mg/m^3
Titanium	Not Available	Not Available
Ammonium Metavanadate	0.05 mg/m^3	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
Water, deionized	Not Available	Not Available

Section 9. Physical and Chemical Properties

Physical State: Liquid
Color: Light gray
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.

RTECS#

HNO_3-QU5775000	HF- MW7875000
Al-BD0330000	Sb-CC4025000
As-CG0525000	$Be_4O(C_2H_3O_2)_6$ – DS29750000
H_3BO_3 -ED450000	$CaCO_3$-FF9335000
Cd-EU9800000	Cr-GB4200000
Co-GF8750000	Cu-GL5325000
Fe-NO4565500	Pb-OF7525000
Mg-OM2100000	Mn-OO9275000
Mo-QA4680000	Ni-QR5950000
KNO_3-TT3700000	Se-VS7700000
Na_2CO_3-VZ4050000	$(NH_4)_2SiF_6$-VV7800000
Ag-VW3500000	Tl-XG3425000
V-YW0875000	Zn-ZG8600000
$Sr(NO_3)_2$- WK9800000	
$BaCO_3$; CQ8600000	$Ba(NO_3)_2$- 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: (Iron) 30 g/kg
TD_{50} Oral, Woman: (Lead) 450 mg/kg/6 year
LD_{50} Oral, Rat: (Manganese) 9 g/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; LD_{LO} Oral, Rat: (Ammonium Hexafluorosilicate) 100 mg/kg
LD_{50}, Intravenous, Mouse: (Silver) 11 g/kg
TD_{LO} Oral, Man: (Thallium) 5,714 μg/kg
TD_{LO} Implant, Rat: (Tin) 395 gm/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. 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 (U-134) and Ammonium Metavanadate (P119)
SARA: Subject to the reporting requirements of Section 313 or SARA Title III and of 40 CFR 372
Risk Phrases: R20/21/22, R45, R48 Harmful by inhalation or skin contact or if swallowed; 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

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.