



SAFETY DATA SHEET

MOLYBDOVANADATE REAGENT F/ ORTHO-PO4

1. Identification

Product identifier	MOLYBDOVANADATE REAGENT F/ ORTHO-PO4
Other means of identification	None.
Version #	2.0
Prepared by	This SDS has been prepared by SUEZ Regulatory Department (1-215-355-3300).
L code	L2326
Revision date	Feb-16-2018
Supersedes date	Dec-23-2017
Recommended use	Field test reagent
Recommended restrictions	None known.

Company/undertaking identification

SUEZ Water Technologies & Solutions Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
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Emergency telephone

(800) 877-1940

2. Hazard(s) identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, inhalation	Category 4
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, repeated exposure (inhalation)	Category 1 (lung, respiratory system)

Label elements



Signal word

Danger

Hazard statement

May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage. Harmful if inhaled. Causes damage to organs (lung, respiratory system) through prolonged or repeated exposure by inhalation.

Precautionary statement

Prevention

Do not breathe mist or vapor. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Keep only in original packaging. Wash thoroughly after handling. Do not eat, drink or smoke when using this product.

Response	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Wash contaminated clothing before reuse. Absorb spillage to prevent material-damage.
Storage	Store locked up. Store in a corrosion resistant container with a resistant inner liner.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Other hazards	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

Components	CAS #	Percent (wt/wt)
Sulphuric acid	7664-93-9	40 - 60
Hexaammonium heptamolybdate	12027-67-7	2.5 - 10
Ammonium trioxovanadate	7803-55-6	0.1 - 1

Composition comments Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this SDS for our assessment of the potential hazards of this formulation.

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Call a POISON CENTER or doctor/physician if you feel unwell.
Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
Ingestion	Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Most important symptoms/effects, acute and delayed	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Coughing. Discomfort in the chest. Shortness of breath. Prolonged exposure may cause chronic effects.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Foam. Powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Cool containers / tanks with water spray.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
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Methods and materials for containment and cleaning up

Prevent entry into waterways, sewer, basements or confined areas.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb spillage to prevent material damage. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Acidic. Do not mix with alkaline material. Do not get in eyes, on skin, or on clothing. When using, do not eat, drink or smoke. Wash hands thoroughly after handling. Use care in handling/storage. Do not breathe mist or vapor. Avoid prolonged exposure. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in a cool, dry place out of direct sunlight. Store in corrosive resistant container with a resistant inner liner. Store in original tightly closed container. Keep only in the original container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Hexaammonium heptamolybdate (CAS 12027-67-7)	TWA	0.5 mg/m ³	Respirable fraction.
Sulphuric acid (CAS 7664-93-9)	TWA	0.2 mg/m ³	Thoracic fraction.

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value	Form
Hexaammonium heptamolybdate (CAS 12027-67-7)	TWA	0.5 mg/m ³	Respirable.
Sulphuric acid (CAS 7664-93-9)	STEL	3 mg/m ³	
	TWA	1 mg/m ³	

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
Hexaammonium heptamolybdate (CAS 12027-67-7)	TWA	0.5 mg/m ³	Respirable.
Sulphuric acid (CAS 7664-93-9)	TWA	0.2 mg/m ³	Mist.

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
Hexaammonium heptamolybdate (CAS 12027-67-7)	TWA	0.5 mg/m ³	Respirable fraction.
Sulphuric acid (CAS 7664-93-9)	TWA	0.2 mg/m ³	Thoracic fraction.

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value	Form
Hexaammonium heptamolybdate (CAS 12027-67-7)	TWA	0.5 mg/m ³	Respirable fraction.
Sulphuric acid (CAS 7664-93-9)	TWA	0.2 mg/m ³	Thoracic fraction.

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
Hexaammonium heptamolybdate (CAS 12027-67-7)	TWA	5 mg/m3
Sulphuric acid (CAS 7664-93-9)	STEL	3 mg/m3
	TWA	1 mg/m3

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.
Individual protection measures, such as personal protective equipment	
Eye/face protection	Wear safety glasses with side shields (or goggles). Face shield.
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. Glove selection must take into account any solvents and other hazards present.
Other	Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.
Respiratory protection	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	Liquid
Color	Yellow to green
Odor	None
Odor threshold	Not available.
pH in aqueous solution	1 (5% SOL.)
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	> 200 °F (> 93 °C) P-M(CC)
Evaporation rate	< 1 (Ether = 1)
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	18 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1 (Air = 1)
Relative density	1.38
Relative density temperature	70 °F (21 °C)
Solubility(ies)	
Solubility (water)	100 %

Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	4 cps
Viscosity temperature	70 °F (21 °C)
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Specific gravity	1.375

10. Stability and reactivity

Reactivity	May be corrosive to metals.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Metals.
Hazardous decomposition products	Elemental Oxides

11. Toxicological information

Information on likely routes of exposure

Inhalation	Harmful if inhaled. Causes damage to organs through prolonged or repeated exposure by inhalation.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.

Symptoms related to the physical, chemical and toxicological characteristics Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Coughing. Discomfort in the chest. Shortness of breath.

Information on toxicological effects

Acute toxicity Harmful if inhaled.

Components	Species	Test Results
Ammonium trixovanadate (CAS 7803-55-6)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	> 2500 mg/kg
<i>Inhalation</i>		
LC50	Rat	2.43 mg/l, 4 Hours
<i>Oral</i>		
LD50	Rat	141.4 mg/kg
Hexaammonium heptamolybdate (CAS 12027-67-7)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Inhalation</i>		
LC50	Rat	> 5 mg/l, 4 Hours
<i>Oral</i>		
LD50	Rat	3883 mg/kg
Sulphuric acid (CAS 7664-93-9)		
Acute		
<i>Inhalation</i>		
LC50	Rat	0.375 mg/l, 4 Hour

Components	Species	Test Results
Oral LD50	Rat	2140 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Causes severe skin burns and eye damage.	
Serious eye damage/eye irritation	Causes serious eye damage.	
Respiratory or skin sensitization		
Canada - Alberta OELs: Irritant		
Hexaammonium heptamolybdate (CAS 12027-67-7)	Irritant	
Respiratory sensitization	This product is not expected to cause respiratory sensitization.	
Skin sensitization	This product is not expected to cause skin sensitization.	
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.	
Carcinogenicity	Risk of cancer cannot be excluded with prolonged exposure. Strong inorganic mists containing sulfuric acid can cause cancer.	
ACGIH Carcinogens		
Hexaammonium heptamolybdate (CAS 12027-67-7)	A3 Confirmed animal carcinogen with unknown relevance to humans.	
Sulphuric acid (CAS 7664-93-9)	A2 Suspected human carcinogen.	
Canada - Alberta OELs: Carcinogen category		
Sulphuric acid (CAS 7664-93-9)	Suspected human carcinogen.	
Canada - Manitoba OELs: carcinogenicity		
Hexaammonium heptamolybdate (CAS 12027-67-7)	Confirmed animal carcinogen with unknown relevance to humans.	
Sulphuric acid (CAS 7664-93-9)	Suspected human carcinogen.	
IARC Monographs. Overall Evaluation of Carcinogenicity		
Sulphuric acid (CAS 7664-93-9)	1 Carcinogenic to humans.	
US. National Toxicology Program (NTP) Report on Carcinogens		
Sulphuric acid (CAS 7664-93-9)	Known To Be Human Carcinogen.	
Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.	
Specific target organ toxicity - single exposure	Not classified.	
Specific target organ toxicity - repeated exposure	Causes damage to organs (lung, respiratory system) through prolonged or repeated exposure by inhalation.	
Aspiration hazard	Based on available data, the classification criteria are not met.	
Chronic effects	Causes damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.	

12. Ecological information

Ecotoxicity	No ecotoxicity data noted for the ingredient(s).
Bioaccumulative potential	No data available.
Mobility in soil	No data available.
Other adverse effects	Not available.
Persistence and degradability	No data is available on the degradability of this product.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

TDG

UN number	UN3264
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULFURIC ACID)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	Not available.

The goods described above have been classified using a combination of testing, technical data, calculations and manufacturer knowledge in accordance with Part 2, Classification. TDG Classification is valid for road or rail transport only. For shipment by air or water, refer to IATA or IMDG regulations.

DOT

UN number	UN3264
UN proper shipping name	Corrosive liquid, acidic, inorganic, n.o.s. (SULFURIC ACID), RQ
Transport hazard class(es)	
Class	8
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
ERG number	154

Some containers may be exempt from Dangerous Goods/Hazmat Transport Regulations, please check BOL for exact container classification.

IMDG

UN number	UN3264
UN proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULFURIC ACID), RQ
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IATA

UN number	UN3264
UN proper shipping name	Corrosive liquid, acidic, inorganic, n.o.s. (SULFURIC ACID)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	II
Environmental hazards	No.
ERG Code	154
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

DOT





15. Regulatory information

Canadian regulations This product has been classified in accordance with the hazard criteria of the HPR and the SDS contains all the information required by the HPR.

Controlled Drugs and Substances Act

Not regulated.

Export Control List (CEPA 1999, Schedule 3)

Not listed.

Greenhouse Gases

Not listed.

Ontario. Toxic Substances. Toxic Reduction Act, 2009. Regulation 455/09 (July 1, 2011)

Ammonium trioxovanadate (CAS 7803-55-6)

Sulphuric acid (CAS 7664-93-9)

Precursor Control Regulations

Sulphuric acid (CAS 7664-93-9) Class B

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information

Issue date Mar-31-2016

Revision date Feb-16-2018

Version # 2.0

List of abbreviations

CAS: Chemical Abstract Service Registration Number
 TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.
 ACGIH: American Conference of Governmental Industrial Hygienists
 NOEL: No Observed Effect Level
 STEL: Short Term Exposure Limit
 LC50: Lethal Concentration, 50%
 LD50: Lethal Dose, 50%
 TWA: Time Weighted Average
 BOD: Biochemical Oxygen Demand
 COD: Chemical Oxygen Demand
 TOC: Total Organic Carbon
 IATA: International Air Transport Association
 IMDG: International Maritime Dangerous Goods Code
 TLV: Threshold Limit Value

References: No data available

Disclaimer The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision information This document has undergone significant changes and should be reviewed in its entirety.