

SAFETY DATA SHEET

according to the OSHA
Hazard Communication Standard

Version 6.15
Revision Date 07/09/2026
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SECTION 1. IDENTIFICATION

1.1 Product identifiers

Product name : Folin & Ciocalteu's phenol reagent

Product Number : F9252
Brand : Sigma-Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Restrictions on use : This product is not intended for consumer use.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-
527-3887 CHEMTREC (International) 24
Hours/day; 7 Days/week

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Hazards for the product as supplied

Corrosive to metals : Category 1

Skin corrosion : Category 1

Serious eye damage : Category 1

Short-term (acute) : Category 3

aquatic hazard

Other hazards

None known.

GHS label elements

Hazard pictograms

:



Signal word

: Danger

Hazard statements

: H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H402 Harmful to aquatic life.

Precautionary statements :

Prevention:

P234 Keep only in original container.
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310 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.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.

Storage:

P405 Store locked up.
P406 Store in corrosive resistant container with a resistant inner liner.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Sigma-Aldrich - F9252

Page 2 of 27

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

MILLIPORE
SIGMA

Substance / Mixture : Mixture
CAS-No. : Not Assigned

Components

Chemical name	CAS No./Unique ID	Concentration (% w/w)	Trade secret
lithium sulphate	10377-48-7*	$\geq 7 - \leq 13$	TSC
Hydrochloric Acid	7647-01-0*	$\geq 7 - \leq 13$	TSC
Disodium wolframate dihydrate	10213-10-2*	$\geq 5 - \leq 10$	TSC
phosphoric acid	7664-38-2*	$\geq 5 - \leq 10$	TSC
Disodium molybdate dihydrate	10102-40-6*	$\geq 1 - \leq 5$	TSC
Bromine	7726-95-6*	$\geq 0.1 - \leq 1$	TSC

* Indicates that the identifier is a CAS No.

TSC- the actual concentration or concentration range is withheld as a trade secret

SECTION 4. FIRST AID MEASURES

General advice : First aiders need to protect themselves.
Show this safety data sheet to the doctor in attendance.

If inhaled : After inhalation: fresh air. Call in physician.

In case of skin contact : In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.
Call a physician immediately.

In case of eye contact : After eye contact: rinse out with plenty of water.
Immediately call in ophthalmologist.
Remove contact lenses.

If swallowed : After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation).
Call a physician immediately.
Do not attempt to neutralise.

Most important symptoms and effects, both acute and delayed : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

Protection of first-aiders : For personal protection see section 8.

Notes to physician : No data available

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media : For this substance/mixture no limitations of extinguishing agents are given.

Specific hazards during fire fighting : Not combustible.

Ambient fire may liberate hazardous vapours.

Hazardous combustion products : Sulphur oxides

Oxides of phosphorus

Hydrogen chloride gas

Sodium oxides

Lithium oxides

Tungsten oxide

Molybdenum oxides

Specific extinguishing methods : No data available

Further information : Suppress (knock down) gases/vapours/mists with a water spray jet.
Prevent fire extinguishing water from contaminating surface water or the ground water system.

Special protective equipment for fire- : Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	: Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. Advice for emergency responders: For personal protection see section 8. Render harmless: cause to react with excess of sodium thiosulphate solution.
Environmental precautions	: Do not let product enter drains.
Methods and materials for containment and cleaning up	: Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent and neutralising material (e.g. Chemizorb® H ⁺ , Merck Art. No. 101595). Dispose of properly. Clean up affected area.

SECTION 7. HANDLING AND STORAGE

For precautions see section 2.2.

Conditions for safe storage	: No metal containers.
Further information on storage conditions	: Tightly closed.
Storage class	: 8B, Non-combustible, corrosive hazardous materials
Recommended storage temperature	: Recommended storage temperature see product label.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Ingredients with workplace control parameters**

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible	Basis

			concentration	
Hydrochloric Acid	7647-01-0	C	2 ppm	ACGIH
		C	5 ppm 7 mg/m3	NIOSH REL
		C	5 ppm 7 mg/m3	OSHA Z-1
		C	5 ppm 7 mg/m3	OSHA P0
Disodium wolframate dihydrate	10213-10-2	TWA (Respirable particulate matter)	3 mg/m3 (Tungsten)	ACGIH
		TWA	1 mg/m3 (Tungsten)	NIOSH REL
		ST	3 mg/m3 (Tungsten)	NIOSH REL
phosphoric acid	7664-38-2	TWA	1 mg/m3	ACGIH
		STEL	3 mg/m3	ACGIH
		TWA	1 mg/m3	NIOSH REL
		ST	3 mg/m3	NIOSH REL
		TWA	1 mg/m3	OSHA Z-1
Disodium molybdate dihydrate	10102-40-6	TWA	5 mg/m3 (Molybdenum)	OSHA Z-1
		TWA (Respirable particulate matter)	0.5 mg/m3 (Molybdenum)	ACGIH
Bromine	7726-95-6	TWA	0.1 ppm	ACGIH
		STEL	0.2 ppm	ACGIH
		TWA	0.1 ppm 0.7 mg/m3	NIOSH REL
		ST	0.3 ppm 2 mg/m3	NIOSH REL
		TWA	0.1 ppm 0.7 mg/m3	OSHA Z-1

Engineering measures : No data available

Personal protective equipment

Respiratory protection : required when vapours/aerosols are generated.

Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: : Filter type ABEK

Sigma-Aldrich - F9252

Page 6 of 27

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Hand protection

Material	: Nitrile rubber
Break through time	: 480 min
Glove thickness	: 0.11 mm
Protective index	: Full contact
Manufacturer	: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)
Material	: Nitrile rubber
Break through time	: 480 min
Glove thickness	: 0.11 mm
Protective index	: Splash contact
Manufacturer	: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)
Manufacturer	: data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
Remarks	: Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.
Eye protection	: Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles
Skin and body protection	: Acid-resistant protective clothing
Hygiene measures	: Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: liquid
Colour	: yellow
Odour	: pungent
Odour Threshold	: No data available
pH	: < 0.5 (68 °F / 20 °C)
Melting point	: No data available
Boiling point/boiling range	: No data available
Flash point	: No data available
Evaporation rate	: No data available
Flammability (solid, gas)	: No data available
Flammability (liquids)	: No data available
Burning rate	: No data available
Upper explosion limit / Upper flammability limit	: No data available
Lower explosion limit / Lower flammability limit	: No data available
Vapour pressure	: No data available
Relative vapour density	: No data available
Relative density	: No data available
Density	: 1.240 g/cm ³ (68 °F / 20 °C)
Solubility(ies)	
Water solubility	: soluble
Partition coefficient: n- octanol/water	: No data available
Autoignition temperature	: No data available
Decomposition temperature	: No data available

Sigma-Aldrich - F9252

Page 8 of 27

Viscosity, dynamic	: No data available
Viscosity, kinematic	: No data available
Flow time	: No data available
Explosive properties	: Not classified as explosive.
Oxidizing properties	: none
Particle characteristics	
Particle size	: No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: No data available
Chemical stability	: The product is chemically stable under standard ambient conditions (room temperature) .
Possibility of hazardous reactions	: Risk of ignition or formation of inflammable gases or vapours with: Metals metal alloys Possible formation of: Hydrogen Violent reactions possible with: Bases metallic oxides
Conditions to avoid	: no information available
Incompatible materials	: Strong oxidizing agents Metals Metals
Hazardous decomposition products	: In the event of fire: see section 5

SECTION 11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Mixture

Acute toxicity

Oral: No data available

Inhalation: No data available

Acute toxicity estimate Inhalation - 4 h - > 20 mg/l - vapour(Calculation method)

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract

Dermal: No data available

Acute toxicity estimate Dermal - > 5,000 mg/kg
(Calculation method)

No data available

Skin corrosion/irritation

Remarks: No data available

Serious eye damage/eye irritation

Remarks: No data available

Remarks: Mixture causes serious eye damage.

Risk of blindness!

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

No data available

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

11.2 Additional Information

Large doses of lithium ion have caused dizziness and prostration, and can cause kidney damage if sodium intake is limited. Dehydration, weight loss, dermatological effects, and thyroid disturbances have been reported. Central nervous system effects that include slurred speech, blurred vision, sensory loss, ataxia, and convulsions may occur. Diarrhea, vomiting, and neuromuscular effects such as tremor, clonus, and hyperactive reflexes may occur as a result of repeated exposure to lithium ion., Lithium and its compounds are possible teratogens by analogy to lithium carbonate which has equivocal human teratogenic data and positive animal teratogenic data.

Exposure to high concentrations can cause:

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

Components

lithium sulphate

Acute toxicity

LD50 Oral - Rat - 613 mg/kg

Remarks: (ECHA)

LC50 Inhalation - Rat - male and female - 4 h - > 2 mg/l - dust/mist
(OECD Test Guideline 403)

The value is given in analogy to the following substances: Lithium carbonate

LD50 Dermal - Rabbit - male and female - > 3,000 mg/kg
(OECD Test Guideline 402)

The value is given in analogy to the following substances: Lithium carbonate

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: Eye irritation
(OECD Test Guideline 405)

Remarks: (ECHA)

The value is given in analogy to the following substances: Lithium carbonate

Respiratory or skin sensitization

Buehler Test - Guinea pig

Result: negative
(OECD Test Guideline 406)

The value is given in analogy to the following substances: Lithium carbonate

Germ cell mutagenicity

Test Type: Ames test

Test system: Escherichia coli/Salmonella typhimurium

Result: negative

The value is given in analogy to the following substances: Lithium hydroxide

Test Type: Chromosome aberration test in vitro

Test system: Human lymphocytes

Result: negative

The value is given in analogy to the following substances: Lithium hydroxide

Test Type: In vitro mammalian cell gene mutation test

Test system: mouse lymphoma cells

Result: negative

The value is given in analogy to the following substances: Lithium hydroxide

Carcinogenicity

No data available

Reproductive toxicity

Lithium and its compounds are possible teratogens by analogy to lithium carbonate which has equivocal human teratogenic data and positive animal teratogenic data.

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

Hydrochloric Acid**Acute toxicity**

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.

Inhalation: Cough Difficulty in breathing

Inhalation: Corrosive to respiratory system.

Symptoms: mucosal irritations, Cough, Shortness of breath, Inhalation may lead to the formation of oedemas in the respiratory tract., Possible damages:, damage of respiratory tract, tissue damage

Dermal: No data available

Skin corrosion/irritation

Skin - reconstructed human epidermis (RhE)

Result: Corrosive

(OECD Test Guideline 431)

Serious eye damage/eye irritation

Eyes - Bovine cornea

Result: Causes serious eye damage. - 10 min

(OECD Test Guideline 437)

Respiratory or skin sensitization

Maximisation Test - Guinea pig

Result: negative

(OECD Test Guideline 406)

Germ cell mutagenicity

Test Type: Chromosome aberration test in vitro

Test system: Chinese hamster ovary cells

Result: Positive results were obtained in some in vitro tests.

Remarks: (ECHA)

Test Type: mitotic recombination assay

Test system: *Saccharomyces cerevisiae*

Result: negative

Remarks: (ECHA)

Test Type: Ames test
Test system: mouse lymphoma cells
Result: positive
Remarks: (ECHA)

Carcinogenicity

No data available

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

May cause respiratory irritation. - Respiratory system

Acute oral toxicity - If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.

Acute inhalation toxicity - mucosal irritations, Cough, Shortness of breath,

Inhalation may lead to the formation of oedemas in the respiratory tract., Possible damages:, damage of respiratory tract, tissue damage

Specific target organ toxicity - repeated exposure

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard

No aspiration toxicity classification

Disodium wolframate dihydrate

Acute toxicity

Oral: absorption

LD50 Oral - Rat - male and female - 1,453 mg/kg

(OECD Test Guideline 401)

The value is given in analogy to the following substances: Sodium tungstate

LC50 Inhalation - Rat - male and female - 4 h - > 5.01 mg/l - dust/mist

(OECD Test Guideline 403)

LD50 Dermal - Rat - male and female - > 2,000 mg/kg

(OECD Test Guideline 402)

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation - 4 h

(OECD Test Guideline 404)

Serious eye damage/eye irritation

Eyes - Rabbit

Result: slight irritation

(OECD Test Guideline 405)

Respiratory or skin sensitization

Maximisation Test - Guinea pig

Result: negative

(OECD Test Guideline 406)

The value is given in analogy to the following substances: Sodium tungstate

Germ cell mutagenicity

Test Type: Mutagenicity (mammal cell test): chromosome aberration.

Test system: Chinese hamster ovary cells

Result: negative

Test Type: In vitro mammalian cell gene mutation test

Test system: Mouse lymphoma test

Result: negative

Test Type: Ames test

Test system: Escherichia coli/Salmonella typhimurium

Result: negative

Method: OECD Test Guideline 474

Species: Mouse - male - Bone marrow

Result: negative

Carcinogenicity

No data available

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

phosphoric acid**Acute toxicity**

LD50 Oral - Rat - 1,250 mg/kg

Remarks: Lungs, Thorax, or Respiration: Acute pulmonary edema.

Liver: Changes in liver weight.

(RTECS)

Inhalation: No data available

Dermal: No data available

Skin corrosion/irritation

Skin - Rabbit

Result: Causes burns. - 24 h

Remarks: (ECHA)

Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Serious eye damage/eye irritation

Remarks: Causes serious eye damage.

Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

Test Type: Ames test

Test system: Escherichia coli/Salmonella typhimurium

Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration.

Test system: Human lymphocytes

Result: negative

Test Type: In vitro mammalian cell gene mutation test

Test system: mouse lymphoma cells

Result: negative

Carcinogenicity

No data available

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure**Aspiration hazard**

No data available

Disodium molybdate dihydrate**Acute toxicity**

LD50 Oral - Rat - male and female - 4,040 mg/kg

(OECD Test Guideline 401)

Remarks: The value is given in analogy to the following substances: disodium molybdate

LC50 Inhalation - Rat - male and female - 4 h - > 1.93 mg/l - dust/mist

(OECD Test Guideline 403)

Remarks: The value is given in analogy to the following substances: disodium molybdate

LD50 Dermal - Rat - male and female - > 2,000 mg/kg

(OECD Test Guideline 402)

Remarks: The value is given in analogy to the following substances: disodium molybdate

Skin corrosion/irritation

Skin - Rabbit

Result: No skin irritation

(OECD Test Guideline 404)

Remarks: The value is given in analogy to the following substances: disodium molybdate

Serious eye damage/eye irritation

Eyes - Rabbit

Result: No eye irritation

(OECD Test Guideline 405)

Remarks: The value is given in analogy to the following substances: disodium molybdate

Respiratory or skin sensitization

Sensitisation test: - Guinea pig

Result: negative

(OECD Test Guideline 406)

Remarks: The value is given in analogy to the following substances: disodium molybdate

Germ cell mutagenicity

Test Type: Micronucleus test

Test system: Human lymphocytes

Result: negative

Test Type: Ames test

Test system: Salmonella typhimurium

Result: negative

Test Type: In vitro mammalian cell gene mutation test

Test system: Mouse lymphoma test

Result: negative

Method: OECD Test Guideline 474

Species: Rat - Red blood cells (erythrocytes)

Result: negative

Carcinogenicity

No data available

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

Oral - Kidney

Aspiration hazard

No data available

Bromine**Acute toxicity**

LD50 Oral - Rat - 2,600 mg/kg

LC50 Inhalation - Mouse - female - 4 h - 0.1427 mg/l - vapour

Remarks: (ECHA)

Dermal: No data available

Skin corrosion/irritation

Remarks: Causes severe burns.

Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Serious eye damage/eye irritation

Remarks: Causes serious eye damage.

Respiratory or skin sensitization

No data available

Germ cell mutagenicity

In vivo tests did not show mutagenic effects

Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Result: positive
Test system: mouse lymphoma cells
Result: positive
Method: US-EPA
Species: Mouse - male and female - Bone marrow
Result: negative

Carcinogenicity

No data available

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure

No data available

Specific target organ toxicity - repeated exposure

No data available

Aspiration hazard

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish : Remarks: No data available

Components:

lithium sulphate:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 30.3 mg/l
End point: mortality
Exposure time: 96 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 203
GLP: yes
The value is given in analogy to the following substances: Lithium carbonate

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 33.2 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 202
GLP: yes
The value is given in analogy to the following

Sigma-Aldrich - F9252

Page 17 of 27

substances: Lithium carbonate

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): > 400 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes

Toxicity to fish (Chronic toxicity) : NOEC (Danio rerio (zebra fish)): 17.35 mg/l
End point: mortality
Exposure time: 34 d
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 210
GLP: yes

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 1.7 mg/l
End point: mortality
Exposure time: 21 d
Test Type: semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 211
GLP: yes
The value is given in analogy to the following substances: lithium

Toxicity to microorganisms : EC50 (activated sludge): 180.8 mg/l
Exposure time: 3 h
Test Type: static test
Method: OECD Test Guideline 209
GLP: yes

Ecotoxicology Assessment

Chronic aquatic toxicity : This product has no known ecotoxicological effects.

Hydrochloric Acid:

Toxicity to fish : LC50 (Gambusia affinis (Mosquito fish)): 282 mg/l
Exposure time: 96 h
Remarks: (IUCLID)

Disodium wolframate dihydrate:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 200 mg/l
Exposure time: 96 h
Test Type: static test
Method: OECD Test Guideline 203
GLP: yes

Toxicity to daphnia and : (Daphnia magna (Water flea)): > 163 mg/l

Sigma-Aldrich - F9252

Page 18 of 27

other aquatic
invertebrates

Exposure time: 48 h
Test Type: static test
Method: OECD Test Guideline 202
GLP: yes

Toxicity to algae/aquatic
plants

: ErC50 (*Pseudokirchneriella subcapitata* (green
algae)): > 17.7 mg/l

Exposure time: 72 h
Test Type: static test
Method: OECD Test Guideline 201
GLP: yes
Remarks: The value is given in analogy to the
following substances:
The value is given in analogy to the following
substances: Sodium tungstate

EC10 (*Pseudokirchneriella subcapitata* (green algae)):
5.76 mg/l

Exposure time: 72 h
Test Type: static test
Method: OECD Test Guideline 201
GLP: yes
Remarks: The value is given in analogy to the
following substances:
The value is given in analogy to the following
substances: Sodium tungstate

Toxicity to fish (Chronic
toxicity)

: NOEC (*Danio rerio* (zebra fish)): > 9.8 mg/l

Exposure time: 38 d
Test Type: flow-through test
Method: OECD Test Guideline 210
GLP: yes
Remarks: The value is given in analogy to the
following substances:
The value is given in analogy to the following
substances: Sodium tungstate

Toxicity to daphnia and
other aquatic
invertebrates (Chronic
toxicity)

: NOEC (*Daphnia magna* (Water flea)): >= 44.2 mg/l

Exposure time: 21 d
Test Type: static test
Method: OECD Test Guideline 211
GLP: yes

Toxicity to
microorganisms

: (activated sludge): > 1,000 mg/l

Exposure time: 30 min
Test Type: static test
Method: OECD Test Guideline 209
GLP: yes

Ecotoxicology Assessment

Chronic aquatic toxicity : This product has no known ecotoxicological effects.

phosphoric acid:

- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 100 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 202
GLP: yes
- Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes
- NOEC (Desmodesmus subspicatus (green algae)): 100 mg/l
End point: Growth inhibition
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 201
GLP: yes
- Toxicity to microorganisms : EC50 (activated sludge): > 1,000 mg/l
Exposure time: 3 h
Test Type: static test
Method: OECD Test Guideline 209
GLP: yes

Disodium molybdate dihydrate:

- Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 609.1 mg/l
End point: mortality
Exposure time: 96 h
Test Type: semi-static test
Method: OECD Test Guideline 203
Remarks: (ECHA)
- NOEC (Pimephales promelas (fathead minnow)): 143.8 mg/l
Exposure time: 32 d
Remarks: (ECHA)
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 130.9 mg/l
Exposure time: 48 h
Test Type: static test

Method: OECD Test Guideline 202

GLP: yes

Remarks: (ECHA)

Toxicity to algae/aquatic plants : NOEC (Isochrysis galbana (salt water algae)): ≥ 9.5 mg/l

Exposure time: 72 h

Test Type: static test

Method: OECD Test Guideline 201

Remarks: (ECHA)

ErC50 (Pseudokirchneriella subcapitata (green algae)): 289.2 mg/l

Exposure time: 72 h

Test Type: static test

Method: OECD Test Guideline 201

Remarks: (ECHA)

Toxicity to microorganisms : EC50 (activated sludge): 820 mg/l

Exposure time: 3 h

Test Type: static test

Method: OECD Test Guideline 209

GLP: yes

Remarks: The value is given in analogy to the following substances:

The value is given in analogy to the following substances: disodium molybdate

Bromine:

Toxicity to fish : LC50 (Lepomis macrochirus (Bluegill sunfish)): 0.54 mg/l

End point: mortality

Exposure time: 96 h

Test Type: static test

Remarks: (ECOTOX Database)

M-Factor (Acute aquatic toxicity) : 10

Toxicity to daphnia and : NOEC (Daphnia magna (Water flea)): 0.46 mg/l

other aquatic End point: mortality

invertebrates (Chronic Exposure time: 48 h

toxicity) Test Type: static test

Remarks: (ECOTOX Database)

Ecotoxicology Assessment

Acute aquatic toxicity : Very toxic to aquatic life.

Chronic aquatic toxicity : This product has no known ecotoxicological effects.

Persistence and degradability

Product:

Biodegradability : Remarks: No data available

Components:

lithium sulphate:

Biodegradability : Remarks: The methods for determining the biological degradability are not applicable to inorganic substances.

Hydrochloric Acid:

Biodegradability : Remarks: The methods for determining the biological degradability are not applicable to inorganic substances.

Disodium wolframate dihydrate:

Biodegradability : Remarks: The methods for determining the biological degradability are not applicable to inorganic substances.

phosphoric acid:

Biodegradability : Remarks: The methods for determining the biological degradability are not applicable to inorganic substances.

Disodium molybdate dihydrate:

Biodegradability : Remarks: The methods for determining the biological degradability are not applicable to inorganic substances.

Bromine:

Biodegradability : Remarks: The methods for determining the biological degradability are not applicable to inorganic substances.

Bioaccumulative potential

Product:

Bioaccumulation : Remarks: No data available

Components:

lithium sulphate:

Partition coefficient: n-octanol/water : Remarks: Not applicable for inorganic substances

Hydrochloric Acid:

Partition coefficient: n-octanol/water : Remarks: Not applicable for inorganic substances

Disodium wolframate dihydrate:

Partition coefficient: n-octanol/water : Remarks: Not applicable for inorganic substances

phosphoric acid:

Partition coefficient: n-octanol/water : Remarks: Not applicable for inorganic substances

Disodium molybdate dihydrate:

Bioaccumulation : Species: Oncorhynchus tshawytscha
Remarks: No data available

Partition coefficient: n-octanol/water : Remarks: Not applicable

Bromine:

Partition coefficient: n-octanol/water : Remarks: Not applicable for inorganic substances

Mobility in soil**Product:**

Stability in soil : Remarks: No data available

Other adverse effects**Components:****Hydrochloric Acid:**

Results of PBT and vPvB assessment : Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

Additional ecological information : May be harmful to aquatic organisms due to the shift of the pH.
Do not empty into drains.

Harmful effect due to pH shift.

Discharge into the environment must be avoided.

Disodium wolframate dihydrate:

Additional ecological information : Discharge into the environment must be avoided.

phosphoric acid:

Results of PBT and vPvB assessment : PBT/vPvB: Not applicable for inorganic substances

Additional ecological information : May be harmful to aquatic organisms due to the shift of the pH.

Bromine:

Additional ecological information : Discharge into the environment must be avoided.

Endocrine disrupting properties

No data available

SECTION 13. DISPOSAL CONSIDERATIONS**Disposal methods**

Waste from residues : Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14. TRANSPORT INFORMATION**International Regulations****IATA-DGR**

UN/ID No. : UN 3264
Proper shipping name : Corrosive liquid, acidic, inorganic, n.o.s.
(Hydrochloric Acid, phosphoric acid)
Class : 8
Packing group : III
Labels : Class 8 - Corrosive substances
Packing instruction (cargo aircraft) : 856
Packing instruction (passenger aircraft) : 852

IMDG-Code

UN number : UN 3264
Proper shipping name : CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
(Hydrochloric Acid, phosphoric acid)
Class : 8
Packing group : III
Labels : 8
EmS Code : F-A, S-B
Marine pollutant : no

Transport in bulk according to IMO instruments

Not applicable for product as supplied.

National Regulations

49 CFR

UN/ID/NA number : UN 3264
Proper shipping name : Corrosive liquid, acidic, inorganic, n.o.s.
(Hydrochloric Acid, phosphoric acid)
Class : 8

Packing group : III
Labels : Class 8 - Corrosive substances
ERG Code : 154
Marine pollutant : no
Poison Inhalation Hazard : No

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

CERCLA Reportable Quantity

Listed substances in the product are at low enough levels to not be expected to exceed the RQ

SARA 304 Extremely Hazardous Substances Reportable Quantity

Listed substances in the product are at low enough levels to not be expected to exceed the RQ

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Hydrochloric Acid	7647-01-0	>= 5 - < 10 %
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US State Regulations

Massachusetts Right To Know

Hydrochloric Acid	7647-01-0
phosphoric acid	7664-38-2
Bromine	7726-95-6

Pennsylvania Right To Know

Sigma-Aldrich - F9252

Page 25 of 27

Hydrochloric Acid
phosphoric acid
Bromine

7647-01-0
7664-38-2
7726-95-6

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The components of this product are reported in the following inventories:

US TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

ACGIH	: USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	: USA. NIOSH Recommended Exposure Limits
OSHA P0	: USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
OSHA Z-1	: USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
ACGIH / TWA	: 8-hour, time-weighted average
ACGIH / STEL	: Short-term exposure limit
ACGIH / C	: Ceiling limit
NIOSH REL / TWA	: Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
NIOSH REL / ST	: STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
NIOSH REL / C	: Ceiling value not be exceeded at any time.
OSHA P0 / C	: Ceiling limit
OSHA Z-1 / TWA	: 8-hour time weighted average
OSHA Z-1 / C	: Ceiling

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide;

GHS - Globally Harmonised System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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