SAFETY DATA SHEET

according to Occupational Safety And Health (Classification, Labelling And Safety Data Sheet Of Hazardous Chemicals) Regulations 2013 (CLASS 2013)

Revision Date 29.08.2018 Version 1.3

SECTION 1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Catalogue No.	109001
Product name	Folin-Ciocalteu's phenol reagent
REACH Registration Number	This product is a mixture. REACH Registration Number see section 3.

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

Identified uses	Reagent for analysis For additional information on uses please refer to the Merck Chemicals portal (www.merckgroup.com).

1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt *Germany* Telefon:+49 6151 72-0
Responsible Department	LS-QHC * e-mail: prodsafe@merckgroup.com
Regional representation	Merck Sdn. Bhd. (Co. No: 178145), No. 4, Jalan U1/26, Section U1, Hicom Glenmarie Industrial Park, 40150 Shah Alam, Selangor. Tel: 03-74943688 Fax: 03-74910850

1.4 Emergency telephone number

Customer Call Centre: + 62 0800 140 1253 (Toll Free)

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification according to CLASS regulations 2013

Corrosive to metals, Category 1, H290

Skin corrosion, Category 1A, H314

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according to CLASS regulations 2013

Hazard pictograms

Signal word

Danger

Hazard statements

H290 May be corrosive to metals.

H314 Causes severe skin burns and eye damage.

Precautionary statements

Prevention

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Reduced labelling (≤125 ml)

Hazard pictograms

Signal word

Danger

Hazard statements

H314 Causes severe skin burns and eye damage.

Precautionary statements

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

2.3 Other hazards

None known.

SECTION 3. Composition/information on ingredients

Chemical nature Aqueous solution of inorganic compounds.

3.1 Substance

Not applicable

3.2 Mixture

Hazardous components according to CLASS regulations 2013

Chemical name (Concentration)

CAS-No.	Registration number	Classification
lithium sulphate (>= 10 % - < 20 %)		
10377-48-7	*)	
		Acute toxicity, Category 4, H302

Eye irritation, Category 2, H319

Sodium tungstate (>= 1 % - < 10 %)
13472-45-2 *)

Acute toxicity, Category 4, H302

phosphoric acid (>= 5 % - < 10 %)
PBT/vPvB: Not applicable for inorganic substances
7664-38-2 01-2119485924-24-XXXX

Corrosive to metals, Category 1, H290
Skin corrosion, Category 1B, H314

asid hidroklorik (>= 1 % - < 5 %)
Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.
- *)

Corrosive to metals, Category 1, H290
Skin corrosion, Category 1B, H314
Specific target organ toxicity - single exposure, Category 3, H335

*) A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4. First aid measures

4.1 Description of first aid measures

General advice

First aider needs to protect himself.

After inhalation: fresh air. Call in physician.

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

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

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

4.2 Most important symptoms and effects, both acute and delayed

Diarrhoea, Vomiting

The following applies to lithium compounds in general: when handled or used inappropriately, the absorption of large quantities is followed by CNS disorders, agitation, spasms, ataxia (impaired locomotor coordination) due to disturbed electrolyte balance.

Irritation and corrosion, Cough, Shortness of breath

Risk of blindness!

4.3 Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5. Firefighting measures

5.1 Extinguishing media

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.

5.2 Special hazards arising from the substance or mixture

Not combustible.
Ambient fire may liberate hazardous vapours.
Fire may cause evolution of:
Sulphur oxides

5.3 Advice for firefighters

Special protective equipment for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

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.

SECTION 6. Accidental release measures

6.1 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:

Protective equipment see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 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.

6.4 Reference to other sections

Indications about waste treatment see section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Observe label precautions.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers

No metal containers.

Storage conditions

Tightly closed.

Recommended storage temperature see product label.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

Sodium tungstate (13472-45-2)

MY OEL	Time Weighted Average (TWA):	1 mg/m³	Expressed as: as W

phosphoric acid (7664-38-2)

MY OEL	Time Weighted Average (TWA):	1 mg/m³

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MY OEL	Ceiling Limit Value:	5 ppm 7.5 mg/m³

Disodium molybdate (7631-95-0)

MY OEL	Time Weighted Average (TWA):	5 mg/m³	Expressed as: as Mo

8.2 Exposure controls

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye/face protection

Tightly fitting safety goggles

Hand protection

full contact:

Glove material: Nitrile rubber

Glove thickness:	0.11 mm
Break through time:	> 480 min

splash contact:

Glove material:	Nitrile rubber
Glove thickness:	0.11 mm
Break through time:	> 480 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 741 Dermatril® L (full contact), KCL 741 Dermatril® L (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet<(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment
Acid-resistant protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Recommended Filter type: filter ABEK
The entrepeneur 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.

Environmental exposure controls
Do not let product enter drains.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form	liquid
Colour	yellow
Odour	slight
Odour Threshold	No information available.
pH	< 0.5 at 20 °C
Melting point	No information available.
Boiling point	No information available.
Flash point	Not applicable
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	Not applicable
Upper explosion limit	Not applicable
Vapour pressure	No information available.
Relative vapour density	No information available.
Density	ca.1.24 g/cm3 at 20 °C

Relative density	No information available.
Water solubility	at 20 °C soluble
Partition coefficient: n-octanol/water	Not applicable
Auto-ignition temperature	No information available.
Decomposition temperature	No information available.
Viscosity, dynamic	No information available.
Explosive properties	Not classified as explosive.
Oxidizing properties	none

9.2 Other data

Corrosion	May be corrosive to metals.

SECTION 10. Stability and reactivity

10.1 Reactivity

See section 10.3

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent reactions possible with:

The generally known reaction partners of water.

Generates dangerous gases or fumes in contact with:

Metals

Gives off hydrogen by reaction with metals.

10.4 Conditions to avoid

no information available

10.5 Incompatible materials

Metals

10.6 Hazardous decomposition products

in the event of fire: See section 5.

SECTION 11. Toxicological information

11.1 Information on toxicological effects

Mixture

Acute oral toxicity

Acute toxicity estimate: > 2,000 mg/kg

Calculation method

Symptoms: 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

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

Acute dermal toxicity

This information is not available.

Skin irritation

Mixture causes severe burns.

Eye irritation

Mixture causes serious eye damage. Risk of blindness!

Sensitisation

This information is not available.

Germ cell mutagenicity

This information is not available.

Carcinogenicity

This information is not available.

Reproductive toxicity

This information is not available.

Teratogenicity

This information is not available.

Specific target organ toxicity - single exposure

This information is not available.

Specific target organ toxicity - repeated exposure

This information is not available.

Aspiration hazard

This information is not available.

11.2 Further information

After absorption of large quantities:
disturbed electrolyte balance.
The following applies to lithium compounds in general: when handled or used inappropriately, the absorption of large quantities is followed by CNS disorders, agitation, spasms, ataxia (impaired locomotor coordination) due to disturbed electrolyte balance.
Other dangerous properties can not be excluded.
Handle in accordance with good industrial hygiene and safety practice.

Components

lithium sulphate

Acute oral toxicity
LD50 Rat: 613 mg/kg
(ECHA)

Acute inhalation toxicity
LC50 Rat: > 2 mg/l; 4 h ; dust/mist
OECD Test Guideline 403
The value is given in analogy to the following substances: Lithium carbonate

Acute dermal toxicity
LD50 Rabbit: > 3,000 mg/kg
OECD Test Guideline 402
The value is given in analogy to the following substances: Lithium carbonate

Skin irritation
Rabbit
Result: No skin irritation
OECD Test Guideline 404

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

Eye irritation
Rabbit
Result: Eye irritation
OECD Test Guideline 405

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

Sensitisation
Sensitisation test: Guinea pig
Result: negative
Method: OECD Test Guideline 406

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

Germ cell mutagenicity

Genotoxicity in vitro
Ames test
Escherichia coli/Salmonella typhimurium
Result: negative
Method: OECD Test Guideline 471

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

Mutagenicity (mammal cell test): chromosome aberration.
Human lymphocytes
Result: negative
Method: OECD Test Guideline 473

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

In vitro mammalian cell gene mutation test
Result: negative
Method: OECD Test Guideline 476

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

Sodium tungstate

Acute oral toxicity
Acute toxicity estimate: 500.1 mg/kg
Expert judgement

LD50 Rat: 1,373 mg/kg
OECD Test Guideline 401

Acute inhalation toxicity
LC50 Rat: > 5.01 mg/l; 4 h ; dust/mist
OECD Test Guideline 403

Acute dermal toxicity
LD50 Rat: > 2,000 mg/kg
OECD Test Guideline 402

Skin irritation
Rabbit
Result: No skin irritation
OECD Test Guideline 404

Eye irritation
Rabbit
Result: slight irritation
OECD Test Guideline 405

Sensitisation
Maximisation Test Guinea pig
Result: negative
Method: OECD Test Guideline 406

Germ cell mutagenicity
Genotoxicity in vivo
In vivo micronucleus test
Mouse
male
Oral
Result: negative
Method: OECD Test Guideline 474

Genotoxicity in vitro
Mutagenicity (mammal cell test): chromosome aberration.
Chinese hamster ovary cells
Result: negative
Method: OECD Test Guideline 473

In vitro mammalian cell gene mutation test
Mouse lymphoma test
Result: negative
Method: OECD Test Guideline 476

Ames test
Escherichia coli/Salmonella typhimurium
Result: negative
Method: OECD Test Guideline 473

phosphoric acid

Acute oral toxicity
LD50 Rat: ca. 2,600 mg/kg
OECD Test Guideline 423

Acute dermal toxicity
LD50 Rabbit: 2,740 mg/kg
(IUCLID)

Skin irritation
Rabbit
Result: Causes burns.
US-EPA

Eye irritation
Rabbit
Result: Causes burns.

(IUCLID)

Sensitisation
Patch test: human
Result: negative

(IUCLID)

Germ cell mutagenicity
Genotoxicity in vitro
Ames test
Escherichia coli/Salmonella typhimurium
Result: negative
Method: OECD Test Guideline 471

In vitro mammalian cell gene mutation test
Result: negative
Method: OECD Test Guideline 473

In vitro mammalian cell gene mutation test
Mouse lymphoma test
Result: negative
Method: OECD Test Guideline 476

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Skin irritation
Rabbit
Result: Corrosive
OECD Test Guideline 404

Eye irritation
Rabbit
Result: Irreversible effects on the eye
OECD Test Guideline 405

Sensitisation
Maximisation Test Guinea pig
Result: Does not cause skin sensitisation.
Method: OECD Test Guideline 406

SECTION 12. Ecological information

Mixture

12.1 Toxicity
No information available.

12.2 Persistence and degradability
No information available.

12.3 Bioaccumulative potential
Partition coefficient: n-octanol/water

Not applicable

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

Substance(s) in the mixture do(es) not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII, or a PBT/vPvB assessment was not conducted.

12.6 Other adverse effects

Additional ecological information

Biological effects:

Harmful effect due to pH shift. Does not cause biological oxygen deficit.

Discharge into the environment must be avoided.

Components

lithium sulphate

Toxicity to fish

static test LC50 Oncorhynchus mykiss (rainbow trout): 45 mg/l; 96 h
Analytical monitoring: yes
OECD Test Guideline 203
The value is given in analogy to the following substances: Lithium carbonate

Toxicity to daphnia and other aquatic invertebrates

static test EC50 Daphnia magna (Water flea): 49 mg/l; 48 h
Analytical monitoring: yes
OECD Test Guideline 202
The value is given in analogy to the following substances: Lithium carbonate

Toxicity to algae

static test ErC50 Desmodesmus subspicatus (green algae): > 596 mg/l; 72 h
Analytical monitoring: yes
OECD Test Guideline 201
The value is given in analogy to the following substances: Lithium carbonate

static test NOEC Desmodesmus subspicatus (green algae): 75 mg/l; 72 h
Analytical monitoring: yes
OECD Test Guideline 201
The value is given in analogy to the following substances: Lithium carbonate

Toxicity to fish (Chronic toxicity)
semi-static test NOEC Danio rerio (zebra fish): 22.73 mg/l; 34 d

Analytical monitoring: yes
OECD Test Guideline 210
The value is given in analogy to the following substances: Lithium Hydroxide, Monohydrate

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
semi-static test NOEC Daphnia magna (Water flea): 13.5 mg/l; 21 d

Analytical monitoring: yes

OECD Test Guideline 211
The value is given in analogy to the following substances: lithium

Biodegradability

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

Sodium tungstate

Toxicity to algae
static test ErC50 Pseudokirchneriella subcapitata (green algae): > 17.7 mg/l; 72 h
OECD Test Guideline 201

Toxicity to fish (Chronic toxicity)
flow-through test NOEC Danio rerio (zebra fish): > 9.8 mg/l; 38 d

OECD Test Guideline 210

Biodegradability

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

phosphoric acid

Toxicity to fish

LC50 Gambusia affinis (Mosquito fish): 138 mg/l; 96 h
(External MSDS)

Toxicity to daphnia and other aquatic invertebrates

static test EC50 Daphnia magna (Water flea): > 100 mg/l; 48 h
Analytical monitoring: yes
OECD Test Guideline 202

Toxicity to algae

static test ErC50 Desmodesmus subspicatus (green algae): > 100 mg/l; 72 h
Analytical monitoring: yes
OECD Test Guideline 201

Toxicity to bacteria

EC50 activated sludge: 270 mg/l
(IUCLID)

Biodegradability

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

Partition coefficient: n-octanol/water

log Pow: -0.77
(calculated)
(Lit.) Bioaccumulation is not expected.

PBT/vPvB: Not applicable for inorganic substances

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Toxicity to fish

Lepomis macrochirus (Bluegill sunfish): 20.5 mg/l; 96 h
OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates
EC50: 1.3 mg/l; 48 h
OECD Test Guideline 202

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

SECTION 13. Disposal considerations

Waste treatment methods

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.

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

According to Quality Environment Regulation (Scheduled Waste) 2005, waste need to be sent to designated premise for recycle, treatment or disposal. Please contact Kualiti Alam for waste classification and correct disposal method.

SECTION 14. Transport information

Land transport (ADR/RID)

14.1 UN number	UN 3264
14.2 Proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (HYDROCHLORIC ACID, PHOSPHORIC ACID)
14.3 Class	8
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
Tunnel restriction code	E

Inland waterway transport (ADN)

Not relevant

Air transport (IATA)

14.1 UN number	UN 3264
14.2 Proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (HYDROCHLORIC ACID, PHOSPHORIC ACID)
14.3 Class	8
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	no

Sea transport (IMDG)

14.1 UN number	UN 3264
14.2 Proper shipping name	CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (HYDROCHLORIC ACID, PHOSPHORIC ACID)
14.3 Class	8
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
EmS	F-A S-B

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not relevant

SECTION 15. Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

All national and local regulations, including Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013, if applicable to the use, should be observed.

National legislation

Storage class 8B

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

SECTION 16. Other information

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

Training advice

Provide adequate information, instruction and training for operators.

Labelling

Hazard pictograms

Signal word

Danger

Hazard statements

H290 May be corrosive to metals.

H314 Causes severe skin burns and eye damage.

Precautionary statements

Prevention

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Regional representation

Merck Sdn. Bhd. (Co. No: 178145), No. 4, Jalan U1/26, Section U1, Hicom Glenmarie Industrial Park, 40150 Shah Alam, Selangor. Tel: 03-74943688 Fax: 03-74910850

The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.