SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Revision Date 29.11.2017 Version 12.1

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

1.1 Product identifier

Catalogue No.	109773
Product name	COD Cell Test (Hg-free) Method: photometric 100 - 1500 mg/l Spectroquant®
	COD
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 Scientific research and development 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 * Phone:+49 6151 72-0
Responsible Department	LS-QHC * e-mail: prodsafe@merckgroup.com

1.4 Emergency telephone number

Please contact the regional company representation in your country.

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Corrosive to metals, Category 1, H290

Skin corrosion, Category 1A, H314

Germ cell mutagenicity, Category 1B, H340

Carcinogenicity, Category 1B, H350

Reproductive toxicity, Category 1B, H360FD

Acute aquatic toxicity, Category 1, H400

Chronic aquatic toxicity, Category 1, H410

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

2.2 Label elements

Labelling.(REGULATION (EC) No 1272/2008)

Hazard pictograms

Signal word

Danger

Hazard statements

H340 May cause genetic defects.

H350 May cause cancer.

H360FD May damage fertility. May damage the unborn child.

H290 May be corrosive to metals.

H314 Causes severe skin burns and eye damage.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention

P201 Obtain special instructions before use.

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.

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.

EUH208 - Contains:

potassium dichromate

May produce an allergic reaction.

Restricted to professional users.

Reduced labelling (≤125 ml)

Hazard pictograms

Signal word

Danger

Hazard statements

H340 May cause genetic defects.
H350 May cause cancer.
H360FD May damage fertility. May damage the unborn child.
H314 Causes severe skin burns and eye damage.

Precautionary statements

P201 Obtain special instructions before use.
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.

Contains: sulphuric acid, potassium dichromate

2.3 Other hazards

None known.

SECTION 3. Composition/information on ingredients

Chemical nature Sulfuric acid solution.

3.1 Substance

Not applicable

3.2 Mixture

Hazardous components (REGULATION (EC) No 1272/2008)

Chemical name (Concentration)

CAS-No.	Registration number	Classification
sulphuric acid *(>= 50 % - <= 100 %)*		
Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.		
7664-93-9	01-2119458838-20-XXXX	Corrosive to metals, Category 1, H290 Skin corrosion, Category 1A, H314
potassium dichromate *(>= 0,3 % - < 0,5 %)*		
7778-50-9	01-2119454792-32-XXXX	Oxidizing solid, Category 2, H272 Acute toxicity, Category 3, H301 Acute toxicity, Category 2, H330 Acute toxicity, Category 4, H312 Skin corrosion, Category 1B, H314 Respiratory sensitisation, Category 1, H334 Skin sensitisation, Category 1, H317 Germ cell mutagenicity, Category 1B, H340 Carcinogenicity, Category 1B, H350 Reproductive toxicity, Category 1B, H360FD Specific target organ toxicity - single exposure, Category 3, H335 Specific target organ toxicity - repeated exposure, Category 1, H372 Acute aquatic toxicity, Category 1, H400 Chronic aquatic toxicity, Category 1, H410 M-Factor: 1
silver sulfate *(>= 0,25 % - < 1 %)*		
10294-26-5	*)	Serious eye damage, Category 1, H318 Acute aquatic toxicity, Category 1, H400 Chronic aquatic toxicity, Category 1, H410 M-Factor: 1.000

*) 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. If breathing stops: immediately apply artificial respiration, if necessary oxygen. Immediately call in physician.

After skin contact: wash off with plenty of water. Immediately remove contaminated clothing. If available swab with polyethylene glycol 400. Get medical attention.

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

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

Irritation and corrosion, Allergic reactions
Chromium(VI) is highly toxic. It is absorbed via both the lungs and the gastrointestinal tract. Being strong oxidisers, chromates/ bichromates can cause burns and ulcerations on the skin and mucous membranes and also irritations in the upper respiratory tract. Poorly healing ulcers occur after wound contact. In predisposed persons the substance rapidly leads to sensitisation and allergic reactions of the respiratory tract (risk of pneumonia!) and damage to nasal mucous membranes (under given circumstances perforation of the septum). After swallowing severe symptoms in the gastrointestinal tract such as bloody diarrhoea, vomiting (aspiration pneumonia!), spasms, circulatory collapse, unconsciousness, formation of methaemoglobin. Absorption may result in hepatic and renal damage. Inhalable chromium(VI) compounds gave clear evidence to be carcinogenic in animal experiments. Lethal dose (man): 0.5g. Antidotes: chelating agents such as EDTA, DMPS (Demaval®)

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

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

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 empty into 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

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Observe label precautions.

Hygiene measures

Change contaminated clothing and immerse in water. Preventive skin protection Wash hands and face after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorised persons.

Recommended storage temperature see product label.

The data applies to the entire pack.

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

Derived No Effect Level (DNEL)

sulphuric acid (7664-93-9)

Worker DNEL, acute	Local effects	inhalation	0,1 mg/m³
Worker DNEL, longterm	Local effects	inhalation	0,05 mg/m³

Predicted No Effect Concentration (PNEC)

sulphuric acid (7664-93-9)

PNEC Fresh water	0,0025 mg/l
PNEC Fresh water sediment	0,002 mg/kg
PNEC Marine water	0,00025 mg/l
PNEC Marine sediment	0,002 mg/kg
PNEC Sewage treatment plant	8,8 mg/l

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:	Viton (R)
Glove thickness:	0,70 mm
Break through time:	> 480 min

splash contact:

Glove material:	butyl-rubber
Glove thickness:	0,7 mm
Break through time:	> 120 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 890 Vitoject® (full contact), KCL 898 Butoject® (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 P 2 (acc. to DIN 3181) for solid and liquid particles of harmful substances
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 empty into drains.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form	liquid
Colour	dark orange
Odour	odourless
Odour Threshold	No information available.
pH	< 1 at 20 °C
Melting point	No information available.
Boiling point	No information available.
Flash point	No information available.
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	No information available.
Upper explosion limit	No information available.
Vapour pressure	No information available.
Relative vapour density	No information available.
Density	at 20 °C Not applicable
Relative density	No information available.
Water solubility	at 20 °C soluble, (caution ! development of heat)
Partition coefficient: n-octanol/water	No information available.
Auto-ignition temperature	No information available.
Decomposition temperature	No information available.
Viscosity, dynamic	No information available.
Explosive properties	No information available.
Oxidizing properties	No information available.

9.2 Other data

none

SECTION 10. Stability and reactivity

10.1 Reactivity

has a corrosive effect

10.2 Chemical stability

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

10.3 Possibility of hazardous reactions

A risk of explosion and/or of toxic gas formation exists with the following substances:

Violent reactions possible with:

nitrates, carbides, combustible substances, organic solvent, acetylidene, Nitriles, organic nitro compounds, anilines, Peroxides, picrates, nitrides, lithium silicide, iron(III) compounds, bromates, chlorates, Amines, perchlorates, hydrogen peroxide, Water, Alkali metals, alkali compounds, Ammonia, Aldehydes, acetonitrile, Alkaline earth metals, alkalines, alkaline earth compounds, Metals, metal alloys, Oxides of phosphorus, phosphorus, hydrides, halogen-halogen compounds, oxyhalogenic compounds, permanganates, acids

10.4 Conditions to avoid

Strong heating.

10.5 Incompatible materials

animal/vegetable tissues, Metals
Gives off hydrogen by reaction with 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

Acute inhalation toxicity
Acute toxicity estimate: > 5 mg/l; 4 h ; dust/mist
Calculation method

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
Mixture may cause an allergic skin reaction.

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.

CMR effects
Carcinogenicity:
Possible carcinogen.
Mutagenicity:
Possible mutagen
Teratogenicity:
May harm the unborn child.
Reproductive toxicity:
May impair fertility.

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

Quantitative data on the toxicity of this product are not available.
Further toxicological data:
After inhalation of aerosols: damage to the affected mucous membranes. After skin contact: severe burns with formation of scabs. After eye contact: burns, corneal lesions. After swallowing: severe pain (risk of perforation!), nausea, vomiting and diarrhoea. After a latency period of several weeks possibly pyloric stenosis.
Other information

Chromium(VI) is highly toxic. It is absorbed via both the lungs and the gastrointestinal tract. Being strong oxidisers, chromates/ bichromates can cause burns and ulcerations on the skin and mucous membranes and also irritations in the upper respiratory tract. Poorly healing ulcers occur after wound contact. In predisposed persons the substance rapidly leads to sensitisation and allergic reactions of the respiratory tract (risk of pneumonia!) and damage to nasal mucous membranes (under given circumstances perforation of the septum). After swallowing severe symptoms in the gastrointestinal tract such as bloody diarrhoea, vomiting (aspiration pneumonia!), spasms, circulatory collapse, unconsciousness, formation of methaemoglobin. Absorption may result in hepatic and renal damage. Inhalable chromium(VI) compounds gave clear evidence to be carcinogenic in animal experiments. Lethal dose (man): 0.5g. Antidotes: chelating agents such as EDTA, DMPS (Demaval®)

Further data:
Other dangerous properties can not be excluded.
This substance should be handled with particular care.

Components

sulphuric acid

Germ cell mutagenicity
Genotoxicity in vitro
Ames test
Salmonella typhimurium
Result: negative
(HSDB)

potassium dichromate

Acute oral toxicity
LD50 Rat: 90,5 mg/kg
OECD Test Guideline 401

Acute inhalation toxicity
LC50 Rat: 0,083 mg/l; 4 h ; dust/mist
OECD Test Guideline 403

Acute dermal toxicity
LD50 Rat: 1.170 mg/kg (IUCLID)

Skin irritation
Rabbit
Result: Causes burns.
OECD Test Guideline 404

Sensitisation
Sensitisation test (Magnusson and Kligman):
Result: positive
(IUCLID)

Patch test: human
Result: positive
(IUCLID)

Germ cell mutagenicity

Genotoxicity in vitro
Ames test
Salmonella typhimurium
Result: positive
(National Toxicology Program)

silver sulfate

Acute oral toxicity
LD50 Rat: > 5.000 mg/kg
OECD Test Guideline 401

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

Eye irritation
Rabbit
Result: Corrosive
OECD Test Guideline 405

Germ cell mutagenicity
Genotoxicity in vitro
Mutagenicity (mammal cell test): micronucleus.
Human lymphocytes
Result: negative
Method: OECD Test Guideline 487

SECTION 12. Ecological information

Mixture

12.1 Toxicity
No information available.

12.2 Persistence and degradability
No information available.

12.3 Bioaccumulative potential
No information available.

12.4 Mobility in soil
No information available.

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

12.6 Other adverse effects
Discharge into the environment must be avoided.

Components

sulphuric acid

Toxicity to fish
static test LC50 Lepomis macrochirus (Bluegill sunfish): > 16 - < 28 mg/l; 96 h
Analytical monitoring: yes(ECHA)

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 EC50 Desmodesmus subspicatus (green algae): > 100 mg/l; 72 h
Analytical monitoring: yes
OECD Test Guideline 201

Toxicity to fish (Chronic toxicity)
flow-through test NOEC Cyprinodon sp. (minnow): 0,025 mg/l; 65 d

Analytical monitoring: yes(ECHA)

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

potassium dichromate

Toxicity to fish
LC50 Lepomis macrochirus (Bluegill sunfish): 0,131 mg/l; 96 h (External MSDS)

Toxicity to daphnia and other aquatic invertebrates
Immobilization EC50 Daphnia magna (Water flea): 0,62 mg/l; 48 h
OECD Test Guideline 202

Toxicity to algae
EC50 Pseudokirchneriella subcapitata (green algae): 0,31 mg/l; 72 h (External MSDS)

IC50 Chlorella vulgaris (Fresh water algae): 0,16 - 0,59 mg/l; 96 h (IUCLID)

Toxicity to bacteria
microtox test EC50 Photobacterium phosphoreum: 58 mg/l; 30 min

Toxicity to fish (Chronic toxicity)
NOEC Pimephales promelas (fathead minnow): 6 mg/l; 7 d
(External MSDS)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
NOEC Daphnia (water flea): 0,016 - 0,064 mg/l; 7 d
(External MSDS)

Biodegradability

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

Bioaccumulation
Bioconcentration factor (BCF): 17,4
Oncorhynchus mykiss (rainbow trout) ((External MSDS))

M-Factor
1

silver sulfate

Toxicity to fish
semi-static test LC50 Pimephales promelas (fathead minnow): 0,0017 mg/l; 96 h
Analytical monitoring: yes
US-EPA

Toxicity to daphnia and other aquatic invertebrates
semi-static test LC50 Daphnia magna (Water flea): 0,00032 mg/l; 48 h
Analytical monitoring: yes(Lit.)

Toxicity to algae
flow-through test EC10 Pseudokirchneriella subcapitata (green algae): 0,00059 mg/l; 24 h
Analytical monitoring: yes(ECHA)

Toxicity to fish (Chronic toxicity)
flow-through test NOEC Pimephales promelas (fathead minnow): 0,00051 mg/l; 32 d

Analytical monitoring: yes(ECHA)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
semi-static test EC10 Daphnia magna (Water flea): 0,00308 mg/l; 21 d

Analytical monitoring: yes
(ECHA)

M-Factor
1.000

SECTION 13. Disposal considerations

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

SECTION 14. Transport information

Land transport (ADR/RID)

14.1 UN number	UN 3316
14.2 Proper shipping name	CHEMICAL KIT
14.3 Class	9
14.4 Packing group	II
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 3316
14.2 Proper shipping name	CHEMICAL KIT
14.3 Class	9
14.4 Packing group	II
14.5 Environmentally hazardous	--
14.6 Special precautions for user	no

Sea transport (IMDG)

14.1 UN number	UN 3316
14.2 Proper shipping name	CHEMICAL KIT
14.3 Class	9
14.4 Packing group	II
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
EmS	F-A S-P

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not relevant

THIS TRANSPORT DATA APPLIES TO THE ENTIRE PACK!

SECTION 15. Regulatory information

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

EU regulations

Major Accident Hazard Legislation	96/82/EC Dangerous for the environment 9a Quantity 1: 100 t Quantity 2: 200 t SEVESO III ENVIRONMENTAL HAZARDS E1 Quantity 1: 100 t Quantity 2: 200 t
Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work. Take note of Dir 92/85/EEC on the safety and health at work of pregnant workers.
Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated

Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated
Substances of very high concern (SVHC)	This product does contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 59 above the respective regulatory concentration limit of > 0.1 % (w/w). Contains: potassium dichromate

National legislation
Storage class 6.1 D
The data applies to the entire pack.

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.

H272	May intensify fire; oxidizer.
H290	May be corrosive to metals.
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H330	Fatal if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H360FD	May damage fertility. May damage the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Training advice

Provide adequate information, instruction and training for operators.

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

This information is given on the authorised Safety Data Sheet for your country.

Catalogue No.	109773
Product name	COD Cell Test (Hg-free) Method: photometric 100 - 1500 mg/l Spectroquant® COD

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.