

Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue: 21.02.2007
Supersedes edition of 20.05.2006

1. Identification of the substance/preparation and of the company/undertaking

Identification of the product

Catalogue No.: 114555
Product name: COD Cell Test
Method: photometric
500 - 10000 mg/l
Spectroquant®
Reaction Cells

Use of the substance/preparation

Reagent for analysis

Company/undertaking identification

Company: Merck KGaA * 64271 Darmstadt * Germany * Phone: +49 6151 72-0
Emergency telephone No.: Please contact the regional Merck representation in your country.

2. Composition/information on ingredients

Sulfuric acid solution.

The percent content of the mercury compound mentioned below refers to the amount of the pure mercury therein.

The percent content of the chromium compound mentioned below refers to the amount of the pure chromium therein.

Hazardous ingredients:

Name according to EC Directives:

| CAS-No. | EC No. | EC-Index-No. | Classification | Content: |
|-----------------------------------|-----------|--------------|--|------------------|
| Mercury(II) sulphate 7783-35-9 | 231-992-5 | 080-002-00-6 | T+; R26/27/28 R33 N; R50/53 | ≥ 0.5 - < 1 % |
| potassium dichromate 7778-50-9 | 231-906-6 | 024-002-00-6 | O; R8 Carc. Cat. 2; R45 Repr. Cat. 2; R60-61 Muta. Cat. 2; R46 T+; R26 T; R25-48/23 Xn; R21 C; R34 R42/43 N; R50/53 | ≥ 0.25 - < 0.5 % |
| Sulphuric acid 7664-93-9 | 231-639-5 | 016-020-00-8 | C; R35 | ≥ 50 % |

(Full text of R-Phrases in heading 16)

Merck Safety Data Sheet

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3. Hazards identification

May cause cancer. May cause heritable genetic damage. Also toxic by inhalation, in contact with skin and if swallowed. Danger of cumulative effects. Causes severe burns. May cause sensitization by inhalation and skin contact. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Restricted to professional users. Attention -
Avoid exposure - obtain special instructions before use.

4. First aid measures

First-aid personnel: ensure self-protection!

After inhalation: fresh air.

If breathing stops: immediately apply mechanical ventilation, if necessary oxygen mask.
Immediately call in physician.

After skin contact: wash off with plenty of water. Dab with polyethylene glycol 400.

Immediately remove contaminated clothing. Immediately call in physician.

After eye contact: rinse out with plenty of water with the eyelid held wide open. Immediately call in ophthalmologist.

After swallowing: make victim drink plenty of water, induce vomiting. Immediately call in physician. Do not attempt to neutralize.

5. Fire-fighting measures

Suitable extinguishing media:

In adaption to materials stored in the immediate neighbourhood.

Special risks:

Non-combustible. Ambient fire may liberate hazardous vapours. The following may develop in event of fire: sulfur oxides, mercury vapours.

Special protective equipment for fire fighting:

Do not stay in dangerous zone without self-contained breathing apparatus. In order to avoid contact with skin, keep a safety distance and wear suitable protective clothing.

Other information:

Cool container with spray water from a safe distance. Contain escaping vapours with water. Prevent fire-fighting water from entering surface water or groundwater.

6. Accidental release measures

Person-related precautionary measures:

Do not inhale vapours/aerosols. Avoid substance contact. Ensure supply of fresh air in enclosed rooms.

Environmental-protection measures:

Do not allow to enter sewerage system.

Procedures for cleaning / absorption:

Take up with liquid-absorbent and neutralizing material (e.g. Chemizorb® H⁺, Merck Art. No. 101595). Forward for disposal. Clean up affected area.

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7. Handling and storage

Handling:

Notes for safe handling:

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

Storage:

Tightly closed in a well-ventilated place. Accessible only for authorised persons. At +15°C to +25°C.

The data apply to the entire pack.

8. Exposure controls/personal protection

Specific control parameter

EC

| | |
|---------------|---|
| Name | potassium dichromate |
| Carcinogenic | C 2:should be regarded as if it is carcinogenic to man |
| mutagenic | M 2:substance which should be regarded as if mutagenic to man |
| Fertility | R(F) 2:should be regarded as if impairing fertility in humans |
| Embryotoxic | R(E) 2:should be regarded as if it impaire developmental toxicity |
| Sensitization | Sah Danger of sensitization of the airways and the skin |

Personal protective equipment:

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.

Respiratory protection: required when vapours/aerosols are generated.

Eye protection: required

Merck Safety Data Sheet

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Hand protection:

In full contact:

Glove material: viton
Layer thickness: 0.70 mm
Breakthrough time: > 480 Min.

In splash contact:

Glove material: nitrile rubber
Layer thickness: 0.40 mm
Breakthrough time: > 30 Min.

The protective gloves to be used must comply with the specifications of EC directive 89/686/EEC and the resultant standard EN374, for example KCL 890 Vitoject® (full contact), 730 Camatril® -Velours (splash contact).

This recommendation applies only to the product stated in the safety data sheet and supplied by us as well as to the purpose specified by us. 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.

Industrial hygiene:

Change contaminated clothing and immerse in water. Apply skin-protective barrier cream. Wash hands and face after working with substance. Work under hood. Do not inhale substance. Under no circumstances eat or drink at workplace.

9. Physical and chemical properties

| | |
|-----------------------|--|
| Form: | liquid |
| Colour: | orange |
| Odour: | odourless |
| pH value | (20 °C) < 0.5 |
| Melting point | not available |
| Boiling point | not available |
| Ignition temperature | not available |
| Flash point | not available |
| Explosion limits | lower not available upper not available |
| Density | (20 °C) ~ 1.5 g/cm ³ |
| Solubility in water | (20 °C) soluble (development of heat) |
| Thermal decomposition | > 338 °C |

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

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10. Stability and reactivity

Conditions to be avoided

Strong heating.

Substances to be avoided

A risk of explosion and/or of toxic gas formation exists with the following substances: /
Violent reactions possible with: combustible substances, reducing agents, water, metals, metal alloys, alkali metals, alkali hydroxides, alkali oxides, alkaline earth compounds, alkaline earth metals, alkalis, ammonia, nitrates, sodium carbonate, lithium silicide, halogen-halogen compounds, salts of oxyhalogenic acids, carbides; bromates, chromates/perchromates, perchlorates, nitric acid, perchloric acid, permanganates, permanganic acid, organic nitro compounds, nonmetals, nonmetallic oxides, picrates, hydrogen peroxide, nitramide, mercury nitride, ammonium iron(III) sulfate dodecahydrate.

Hazardous decomposition products

in the event of fire: See chapter 5.

Further information

hygroscopic; has a corrosive effect;
incompatible with metals, animal/vegetable tissues.
Hydrogen may form upon contact with metals (danger of explosion!).

11. Toxicological information

Acute toxicity

Quantitative data on the toxicity of this product are not available.

Subacute to chronic toxicity

Applicable to partial component(s):

Animal experiments performed under conditions comparable with the workplace situation have shown the substance to be carcinogenic.

Based on clear evidence from animal experiments there is a high risk of teratogenic effects.

Pregnant women must not be exposed to the product.

There is sufficient evidence to assume that reproductive performance in man is impaired. These properties have been clearly demonstrated in animal experiments.

A mutagenic effect has been demonstrated in animal studies on mammals, justifying the assumption that exposure of humans to the substance produces hereditary damage.

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Further toxicological information

Applicable to the main component:

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.

Applicable to partial component(s):

Risk of airways and skin sensitization.

Danger of skin absorption.

Other notes: Danger of cumulative effects.

Mercury compounds have a cytotoxic and protoplasmatoxic effect. Intoxication symptoms: acute: contact with eye causes severe lesions. Swallowing and inhalation of dusts damages mucous membranes of gastrointestinal and respiratory tract (metallic taste, nausea, vomiting, abdominal pain, bloody diarrhoea, intestinal burns, glottal oedema, aspiration pneumonia); drop in blood pressure, cardiac dysrhythmia, circulatory collapse, and renal failure; chronic: inflammation of the mouth with loss of teeth and mercurial line. The principal signs manifest themselves in the CNS (impaired speech, vision, hearing, and sensitivity, loss of memory, irritability, hallucinations, delirium inter alia).

Chromium (VI) is highly toxic. It is absorbed via both the lungs as well as the gastrointestinal tract. Being strong oxidants, chromates/ bichromates can cause burns and ulcerations on the skin and mucous membranes and also irritations in the upper respiratory tract. Poor tendency for ulcers to heal following penetration of substance into the wound. In predisposed persons the substance rapidly leads to sensitization 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 have clearly shown themselves to be carcinogenic in animal experiments. Lethal dose (man): 0.5 g. Antidotes: chelating agents such as EDTA, DMPS (Demaval(R)).

Further data

Further hazardous properties cannot be excluded.

This substance should be handled with particular care.

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12. Ecological information

Ecotoxic effects:

Quantitative data on the ecological effect of this product are not available.

Biological effects:

Harmful effect on aquatic organisms. May cause long-term adverse effects in the aquatic environment. Harmful effect due to pH shift. Caustic even in diluted form. Endangers drinking-water supplies if allowed to enter soil and/or waters in large quantities. Does not cause biological oxygen deficit.

Further ecologic data:

The following applies to sulfuric acid: biological effects: harmful effect on aquatic organisms. Harmful effect due to pH shift. Toxic effect on fish and algae. Caustic even in diluted form. Does not cause biological oxygen deficit. Endangers drinking-water supplies if allowed to enter soil and/or waters in large quantities. Neutralization possible in waste water treatment plants.

Daphnia toxicity: Daphnia magna EC₅₀: 29 mg/l/24 h (calculated on the pure substance).

The following applies to the water-soluble matter contained in inorganic Hg compounds in general (tested with mercury(II) chloride): Leuciscus idus LC₅₀: 0.5 mg/l (48h), Daphnia magna EC₅₀: 0.005-3.6 mg/l (48h), Chlorella pyrenoidosa EC₅₀: 0.3 mg/l (5h), Pseudomonas fluorescens IC₅₀: 0.005 mg/l. The toxicity of mercury(II) ions for water organisms depends on the water hardness [source: IPCS].

The following applies to chromium ions in general: biological effects: fish: toxic from 52 mg/l up; LC₅₀: 29 mg/l; algae: toxic from 5 mg/l up; arthropods: Daphnia toxic from 0.32 mg/l up, calculated as sodium chromate.

Do not allow to enter waters, waste water, or soil!

13. Disposal considerations

Product:

Chemicals must be disposed of in compliance with the respective national regulations. Under www.retrologistik.de you will find country- and substance-specific information as well as contact partners.

Packaging:

Merck product packaging must be disposed of in compliance with the country-specific regulations or must be passed to a packaging return system. Under www.retrologistik.de you will find special information on the respective national conditions as well as contact partners.

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14. Transport information

Road & Rail ADR, RID

UN 3316 CHEMIE-TESTSATZ, 9, II

Inland waterway ADN, ADNR not tested

Sea IMDG-Code

UN 3316 CHEMICAL KIT, 9, II

Ems F-A S-P

Air CAO, PAX

UN 3316 CHEMICAL KIT, 9, II

The transport regulations are cited according to international regulations and in the form applicable in Germany. Possible national deviations in other countries are not considered.
THESE TRANSPORT DATA APPLY TO THE ENTIRE PACK !

15. Regulatory information

Labelling according to EC Directives

| | | |
|------------|--|---|
| Symbol: | T | Toxic |
| R-phrases: | 45-46-23/24/25-33-35-42/43-52/53 | May cause cancer. May cause heritable genetic damage. Also toxic by inhalation, in contact with skin and if swallowed. Danger of cumulative effects. Causes severe burns. May cause sensitization by inhalation and skin contact. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |
| S-phrases: | 53-26-36/37/39-45 | Avoid exposure - obtain special instructions before use. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). |
| contains: | potassium dichromate Sulphuric acid Mercury(II) sulphate | |

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16. Other information

Text of any R phrases referred to under heading 2:

- 8 Contact with combustible material may cause fire.
- 21 Harmful in contact with skin.
- 25 Toxic if swallowed.
- 26 Very toxic by inhalation.
- 26/27/28 Very toxic by inhalation, in contact with skin and if swallowed.
- 33 Danger of cumulative effects.
- 34 Causes burns.
- 35 Causes severe burns.
- 42/43 May cause sensitization by inhalation and skin contact.
- 45 May cause cancer.
- 46 May cause heritable genetic damage.
- 48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.
- 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- 60 May impair fertility.
- 61 May cause harm to the unborn child.

Reduced labelling on the container due to small quantity.

Reason for alteration

General update.

Regional representation:

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

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

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500 - 10000 mg/l
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Blank Cell

Use of the substance/preparation

Reagent for analysis

Company/undertaking identification

Company: Merck KGaA * 64271 Darmstadt * Germany * Phone: +49 6151 72-0
Emergency telephone No.: Please contact the regional Merck representation
in your country.

2. Composition/information on ingredients

Aqueous solution of organic compounds.

3. Hazards identification

No hazardous product as specified in Directive 67/548/EEC.

4. First aid measures

After inhalation: fresh air.
After skin contact: wash off with plenty of water. Remove contaminated clothing.
After eye contact: rinse out with plenty of water with the eyelid held wide open.
After swallowing: immediately make victim drink plenty of water. Consult doctor if feeling unwell.

5. Fire-fighting measures

Suitable extinguishing media:
In adaption to materials stored in the immediate neighbourhood.

Special risks:
Non-combustible.

6. Accidental release measures

Person-related precautionary measures:
Do not inhale vapours/aerosols. Avoid substance contact.

Procedures for cleaning / absorption:
Take up with liquid-absorbent material (e.g. Chemizorb®). Forward for disposal. Clean up affected area.

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7. Handling and storage

Handling:

No further requirements.

Storage:

Tightly closed in a well-ventilated place. Accessible only for authorised persons. At +15°C to +25°C.

The data apply to the entire pack.

8. Exposure controls/personal protection

Personal protective equipment:

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.

Respiratory protection: required when vapours/aerosols are generated.

Eye protection: required

Hand protection:

In full contact:

Glove material: nitrile rubber
Layer thickness: 0.11 mm
Breakthrough time: > 480 Min.

In splash contact:

Glove material: nitrile rubber
Layer thickness: 0.11 mm
Breakthrough time: > 480 Min.

The protective gloves to be used must comply with the specifications of EC directive 89/686/EEC and the resultant standard EN374, for example KCL 741 Dermatril® L (full contact), 741 Dermatril® L (splash contact).

This recommendation applies only to the product stated in the safety data sheet and supplied by us as well as to the purpose specified by us. 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).

Industrial hygiene:

Change contaminated clothing. Wash hands after working with substance.

9. Physical and chemical properties

Form: liquid
Colour: light blue
Odour: odourless
pH value (25 °C) ~ 7

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| | | |
|----------------------|---------|------------------------|
| Melting point | | not available |
| Boiling point | | not available |
| Ignition temperature | | not available |
| Flash point | | not available |
| Explosion limits | lower | not available |
| | upper | not available |
| Density | (20 °C) | 1.00 g/cm ³ |
| Solubility in water | (25 °C) | soluble |

10. Stability and reactivity

Conditions to be avoided
no information available

Substances to be avoided

The generally known reaction partners of water.

Hazardous decomposition products

not known to date

11. Toxicological information

Acute toxicity

Quantitative data on the toxicity of this product are not available.

Further toxicological information

No toxic effects are to be expected when the product is handled appropriately.

Further data

The product should be handled with the care usual when dealing with chemicals.

12. Ecological information

Ecotoxic effects:

Quantitative data on the ecological effect of this product are not available.

Further ecologic data:

No ecological problems are to be expected when the product is handled and used with due care and attention.

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13. Disposal considerations

Product:

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Packaging:

Merck product packaging must be disposed of in compliance with the country-specific regulations or must be passed to a packaging return system. Under www.retrologistik.de you will find special information on the respective national conditions as well as contact partners.

14. Transport information

Road & Rail ADR, RID

UN 3316 CHEMIE-TESTSATZ, 9, II

Inland waterway ADN, ADNR not tested

Sea IMDG-Code

UN 3316 CHEMICAL KIT, 9, II

Ems F-A S-P

Air CAO, PAX

UN 3316 CHEMICAL KIT, 9, II

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Symbol: ---

R-phrases: ---

S-phrases: ---

16. Other information

Reason for alteration

General update.

Regional representation:

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