

Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue: 24.09.2004
Supersedes edition of 28.07.2004

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

Identification of the product

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-1

Use of the substance/preparation

Reagent for analysis

Company/undertaking identification

Company: Merck KGaA * 64271 Darmstadt * Germany * Tel: +49 (0)6151/72-0
Emergency telephone No.: +49 (0)6151/72112 * Fax: +49 (0)6151/72-7780

2. Composition/information on ingredients

Aqueous solution.

Hazardous ingredients:

Name according to EC Directives:

CAS-No.	EC No.	EC-Index-No.	Classification	Content:
Sulphuric acid 7664-93-9	231-639-5	016-020-00-8	C; R35	40 %

(Full text of R-Phrases in heading 16)

3. Hazards identification

Causes severe burns.

4. First aid measures

After inhalation: fresh air. Call in physician.
After skin contact: wash off with plenty of water. Dab with polyethylene glycol 400.
Immediately remove contaminated clothing.
After eye contact: rinse out with plenty of water for at least 10 minutes with the eyelid held wide open. Immediately call in ophthalmologist.
After swallowing: make victim drink plenty of water (if necessary several litres), avoid vomiting (risk of perforation!). Immediately call in physician. Do not attempt to neutralize.

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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.

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:
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⁺, Art. No. 101595). Forward for disposal. Clean up affected area.

7. Handling and storage

Handling:

No further requirements.

Storage:

Tightly closed in a well-ventilated place. Accesible 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

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TRGS 900

Name	Sulfuric acid
Kind of use	others
Value	0.1 mg/m ³ Inhalable fraction. The following regulation applies to the peak limit: short-term exposure duration: max. 15 minutes as mean value, frequency per shift: 4, time interval: min. 1 hour
Peak limit	1 Concentration must not exceed limit concentration.
Embryotoxic	Y Substances with which no foetotoxic risk is to be expected when observing the maximum allowable concentration (MAC Germany) and the biological tolerance value at the workplace (BAT Germany).

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 740 Dermatril® (full contact), 740 Dermatril® (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 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.

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9. Physical and chemical properties

Form:	liquid	
Colour:	colourless	
Odour:	odourless	
pH value	(20 °C)	strongly acid
Melting point		-68 °C
Boiling point		~ 119 °C
Ignition temperature		not available
Flash point		not available
Explosion limits	lower	not available
	upper	not available
Density	(20 °C)	1.30 g/cm ³
Solubility in water	(20 °C)	soluble (caution ! development of heat)

10. Stability and reactivity

Conditions to be avoided

Strong heating.

Substances to be avoided

water, alkali metals, alkali compounds, ammonia, alkaline earth metals, alkalis, acids, alkaline earth compounds, metals, metal alloys, phosphorus oxides, phosphorus, hydrides, halogen-halogen compounds, oxyhalogenic compounds, permanganates, nitrates, carbides, combustible substances, organic solvents, acetylidene, nitriles, nitrides, organic nitro compounds, anilines, peroxides, picrates, lithium silicide.

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

LC₅₀ (inhalation, rat): 510 mg/m³ /2 h (calculated on the pure substance).
LD₅₀ (oral, rat): 2140 mg/kg (Using 25 % solution).

Specific symptoms in animal studies:

Eye irritation test (rabbit): burns.

Skin irritation test (rabbit): burns.

Toxicologic values are not available due to other dangerous properties of the substance.

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Subacute to chronic toxicity

Applicable to partial component(s):

No teratogenic effect in animal experiments.
Bacterial mutagenicity: Ames test: negative.

Further toxicological information

Property that must be anticipated on the basis from the components of the preparation:
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.

Further data

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

12. Ecological information

Biologic degradation:
Methods for the determination of biodegradability are not applicable to inorganic substances.

Behavior in environmental compartments:
Concentration in organisms is not to be expected.

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

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).

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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According to EC Directive 91/155/EEC

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14. Transport information

Road & Rail ADR, RID
UN 1830 SCHWEFELSAEURE, 8, II

Inland waterway ADN, ADNR not tested

Sea IMDG-Code
UN 1830 SULPHURIC ACID, 8, II
Ems F-A S-B

Air CAO, PAX
SULPHURIC ACID, 8, UN 1830, 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:	C	Corrosive
R-phrases:	35	Causes severe burns.
S-phrases:	26-36/37/39-45	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: Sulphuric acid

German regulations

Water pollution class 1 (slightly polluting substance) VwVwS Anh. 4

Storage class VCI 8 B

Data sheet of the Chemical Professional Association M004 Irritant substances/corrosive substances

M051 Dangerous chemical substances

The employment restrictions for young workers in accordance with section 22 of the Youth Employment Protection Law (JArbSchG) are to be observed.

16. Other information

Text of any R phrases referred to under heading 2:

35 Causes severe burns.

Reason for alteration

General update.

Contact for information:

HSSE-C/CI * Tel: +49 (0)6151/722775 * Fax: +49 (0)6151/726433 * e-mail: prodsafe@merck.de

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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.

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Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests Spectroquant®
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Use of the substance/preparation

Reagent for analysis

Company/undertaking identification

Company: Merck KGaA * 64271 Darmstadt * Germany * Tel: +49 (0)6151/72-0
Emergency telephone No.: +49 (0)6151/72112 * Fax: +49 (0)6151/72-7780

2. Composition/information on ingredients

Preparation contains organic compounds.

Hazardous ingredients:

Name according to EC Directives:

CAS-No.	EC No.	EC-Index-No.	Classification	Content:
Chloroform 67-66-3	200-663-8	602-006-00-4	Carc. Cat. 3; R40 Xn; R22-48/20/22 Xi; R38	≥ 50 %
2-Ethylhexane-1,3-diol 94-96-2	202-377-9	603-087-00-9	Xi; R41	≥ 5 - < 10 %

(Full text of R-Phrases in heading 16)

3. Hazards identification

Harmful if swallowed. Irritating to eyes and skin. Limited evidence of a carcinogenic effect.
Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

4. First aid measures

After inhalation: fresh air.
If breathing stops: mouth-to-mouth respiration or mechanical ventilation. Oxygen mask if necessary! Immediately call in physician. Keep airways free.
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. Call in ophthalmologist.
After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Immediately call in physician.
Laxative: Sodium sulfate (1 tablespoon/1/4 l water). Subsequently administer: activated charcoal (20 - 40 g in 10% slurry).

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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: hydrochloric acid.

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:
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 material (e.g. Chemizorb®). Forward for disposal. Clean up affected area. Do not inhale vapours.

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	Chloroform
Value	2 ml/m ³ 10 mg/m ³
Carcinogenic	C 3:owing possible carcinogenic effects for man
Skin resorption	Risk of skin absorption

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TRGS 900

Name	Chloroform
Kind of use	others
Value	0.5 ml/m ³ 2.5 mg/m ³
Peak limit	4 exceeding factor: 4-fold in 15 minutes
Embryotoxic	Y Substances with which no foetotoxic risk is to be expected when observing the maximum allowable concentration (MAC Germany) and the biological tolerance value at the workplace (BAT Germany).
Skin resorption	Risk of skin absorption

TRGS 905

Name	Trichloromethane
Carcinogenic	2 Category C: 2 (Substance which should be regarded as if they are carcinogenic to man) - deviation from the legal classification according to Annex I of Directive 67/548/EEC (see evaluation by the AGS www.baua.de/prax/)
Fertility	On the basis of the available data, a classification could not be made into categories 1 - 3 in accordance with Annex I of the "Gefahrstoff-Verordnung (GefStoffV)" (Hazardous Substances Regulation). (See evaluation by the AGS www.baua.de/prax/)
Embryotoxic	3 Category R(E): 3 (cause concern to humans owing to possible developmental toxic effects) - deviation from the legal classification according to Annex I of Directive 67/548/EEC (see evaluation by the AGS www.baua.de/prax/)
mutagenic	3 Category M: 3 (substance which cause concern for man owing possible mutagenic effects) - deviation from the legal classification according to Annex I of Directive 67/548/EEC (see evaluation by the AGS www.baua.de/prax/)

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. Filter AX (EN 371)

Eye protection: required

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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: viton
Layer thickness: 0.70 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 890 Vitoject® (full contact), 890 Vitoject® (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 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:

Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance. Work under hood . Do not inhale substance.

9. Physical and chemical properties

Form:	liquid
Colour:	colourless
Odour:	characteristic odour
pH value	not available
Melting point	not available
Boiling point	not available
Ignition temperature	not available
Flash point	not available
Explosion limits	lower not available
	upper not available
Vapour pressure	(20 °C) ~ 210 hPa
Density	(20 °C) 1.42 g/cm ³
Solubility in water	(20 °C) almost insoluble

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10. Stability and reactivity

Conditions to be avoided

Heating.

Substances to be avoided

ketones, alkali metals, alkaline earth metals, alkalis, aluminium, metals, halogens, air, nitrogen oxides, organic nitro compounds, peroxi compounds, amides.

Hazardous decomposition products

in the event of fire: See chapter 5.

Further information

heat-sensitive; light-sensitive;
incompatible with various plastics, artificial and/or natural resins (solvent).

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):

The carcinogenic potential requires further clarification.

Further toxicological information

Property that must be anticipated on the basis from the components of the preparation:

After inhalation of vapours: coughing, dyspnoea.

After skin contact: Irritations. Danger of skin absorption.

After eye contact: Irritations.

After absorption: agitation, spasms, narcosis.

Absorption can result in damage to: liver, kidneys.

Further data

Further hazardous properties cannot be excluded.

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

12. Ecological information

Biologic degradation:

Not degradable in water.

Ecotoxic effects:

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

Biological effects:

Harmfull effect on aquatic organisms. Endangers drinking-water supplies if allowed to enter soil and/or waters in large quantities.

Further ecologic data:

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

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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.

14. Transport information

Road & Rail ADR, RID
UN 1830 SCHWEFELSAEURE, 8, II

Inland waterway ADN, ADNR not tested

Sea IMDG-Code
UN 1830 SULPHURIC ACID, 8, II
Ems F-A S-B

Air CAO, PAX
SULPHURIC ACID, 8, UN 1830, 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:	Xn	Harmful
R-phrases:	22-40-48/20/22	Harmful if swallowed. Limited evidence of a carcinogenic effect. Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
S-phrases:	36/37	Wear suitable protective clothing and gloves.
contains:	Chloroform	

German regulations

Water pollution class 3 (highly polluting substance) VwVwS Anh. 4

Storage class VCI 10-13

Data sheet of the Chemical Professional Association M004 Irritant substances/corrosive substances
M040 Chlorinated hydrocarbons
M050 Dealing with harmful substances

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The employment restrictions for young workers in accordance with section 22 of the Youth Employment Protection Law (JArbSchG) are to be observed.

The employment restrictions for expectant and nursing mothers in accordance with sections 4 and 5 of the Maternity Protection Guideline (MuSchRiV) are to be observed.

16. Other information

Text of any R phrases referred to under heading 2:

22 Harmful if swallowed.
38 Irritating to skin.
40 Limited evidence of a carcinogenic effect.
41
48/20/22 Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

Reduced labelling on the container due to small quantity.

Reason for alteration

Chapter 8: specific control parameter.

General update.

Contact for information:

HSSE-C/CI * Tel: +49 (0)6151/722775 * Fax: +49 (0)6151/726433 * e-mail:prodsafe@merck.de

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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Use of the substance/preparation

Reagent for analysis

Company/undertaking identification

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Emergency telephone No.: +49 (0)6151/72112 * Fax: +49 (0)6151/72-7780

2. Composition/information on ingredients

CAS-No.:	64-19-7	EC-Index-No.:	607-002-00-6
M:	60.05 g/mol	EC-No.:	200-580-7
Formula Hill:	C ₂ H ₄ O ₂		
Chemical formula:	CH ₃ COOH		

3. Hazards identification

Flammable. Causes severe burns.

4. First aid measures

After inhalation: fresh air. Call in physician.
After skin contact: wash off with plenty of water. Dab with polyethylene glycol 400.
Immediately remove contaminated clothing.
After eye contact: rinse out with plenty of water for at least 10 minutes with the eyelid held wide open. Immediately call in ophthalmologist.
After swallowing: make victim drink plenty of water (if necessary several litres), avoid vomiting (risk of perforation!). Immediately call in physician. Do not attempt to neutralize.

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5. Fire-fighting measures

Suitable extinguishing media:
Water, CO₂, foam, powder.

Special risks:
Combustible. Vapours heavier than air. Forms explosive mixtures with air at ambient temperatures. Development of hazardous combustion gases or vapours possible in the event of fire. The following may develop in event of fire: Acetic acid 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:
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; risk of explosion!

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

7. Handling and storage

Handling:

Notes for prevention of fire and explosion:
Keep away from sources of ignition. Take measures to prevent electrostatic charging.

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

TRGS 900

Name	Acetic acid
Value	10 ml/m ³ 25 mg/m ³
Peak limit	=1= Concentration must not exceed limit concentration.

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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. filter E-(P2)

Eye protection: required

Hand protection: In full contact:
Glove material: butyl rubber
Layer thickness: 0.7 mm
Breakthrough time: > 480 Min.
In splash contact:
Glove material: natural latex
Layer thickness: 0.6 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 898 Butoject® (full contact), 706 Lapren® (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 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: Suitable protective clothing.

Industrial hygiene:

Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance.

9. Physical and chemical properties

Form:	liquid
Colour:	colourless
Odour:	pungent
pH value at 50 g/l H ₂ O	(20 °C) 2.5
Viscosity dynamic	(20 °C) 1.22 mPa*s
Viscosity kinematic	(20 °C) 1.17 mm ² /s
Melting point	17 °C
Boiling point	(1013 hPa) 116-118 °C
Ignition temperature	485 °C
Flash point	39 °C c.c.
Explosion limits	lower 4 Vol%
	upper 19.9 Vol%

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Vapour pressure	(20 °C)	15.4	hPa
Relative vapour density		2.07	
Density	(20 °C)	1.05	g/cm ³
Solubility in water	(20 °C)	soluble	
log Pow:		-0.17	(experimental)
Bioconcentration factor		< 1	
Refractive index	(20 °C)	1.37	

10. Stability and reactivity

Conditions to be avoided

Strong heating. Temperatures < 0 °C.

Substances to be avoided

anhydrides / water, aldehydes, alcohols, halogen-halogen compounds, oxidizing agent (i.a. CrO₃, potassium permanganate, peroxi compounds, perchloric acid, chromosulfuric acid), metals (iron, zinc, magnesium (generation of hydrogen)), alkali hydroxides, nonmetallic halides, ethanolamine.

Hazardous decomposition products

in the event of fire: See chapter 5.

Further information

incompatible with various metals;
Explosible with air in a vaporous/gaseous state.

11. Toxicological information

Acute toxicity

LC₅₀ (inhalation, rat): 11.4 mg/l /4 h.
LD₅₀ (dermal, rabbit): 1060 mg/kg.
LD₅₀ (oral, rat): 3310 mg/kg.

Specific symptoms in animal studies:
Eye irritation test (rabbit): burns.
Skin irritation test (rabbit): burns.

The literature data available to us do not conform with the labelling prescribed by the EC. The EC has dossiers which have not been published.

Subacute to chronic toxicity

Bacterial mutagenicity: Salmonella typhimurium: negative.
No teratogenic effect in animal experiments.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-3

Further toxicological information

Strongly corrosive substance.

After inhalation of vapours: Irritation symptoms in the respiratory tract. pneumonia bronchitis.

Inhalation may lead to the formation of oedemas in the respiratory tract.

After skin contact: Burns.

After eye contact: Burns. Risk of blindness! Risk of corneal clouding. burns of mucous membranes.

After swallowing: Burns in oesophagus and stomach. gastric spasms, bloody vomiting, dyspnoea. Risk of perforation in the oesophagus and stomach. Pulmonary failure possible after aspiration of vomit.

Cannot be excluded: shock, cardiovascular failure, acidosis. Damage of: kidneys.

Further data

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

12. Ecological information

Biologic degradation:

Biodegradation: 99 % /30 d (closed bottle test).

Readily biodegradable.

Behavior in environmental compartments:

Distribution: log p(o/w): -0.17 (experimental).

No bioaccumulation is to be expected (log P(o/w) <1).

Passage from aqueous solution into the atmosphere is not to be expected.

Ecotoxic effects:

Biological effects:

Harmfull effect on aquatic organisms. Harmful effect due to pH shift. Caustic even in diluted form.

Fish toxicity: *L.macrochirus* LC₅₀: 75 mg/l /96 h. *P.promelas* LC₅₀: 88 mg/l /96 h.

Daphnia toxicity: *Daphnia magna* EC₅₀: 47 mg/l /24 h.

Bacterial toxicity: *Photobacterium phosphoreum* EC₅₀: 11 mg/l /15 min microtox test.

Maximum permissible toxic concentration:

Algeal toxicity: *Sc.quadricauda* IC₅: 4000 mg/l /16 h.

Bacterial toxicity: *Ps.putida* EC₅: 2850 mg/l /16 h neutral.

Protozoa: *E.sulcatum* EC₅: 78 mg/l /72 h neutral.

Further ecologic data:

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.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-3

14. Transport information

Road & Rail ADR, RID
UN 1830 SCHWEFELSAEURE, 8, II

Inland waterway ADN, ADNR not tested

Sea IMDG-Code
UN 1830 SULPHURIC ACID, 8, II
Ems F-A S-B

Air CAO, PAX
SULPHURIC ACID, 8, UN 1830, 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:	C	Corrosive
R-phrases:	35	Causes severe burns.
S-phrases:	23-26-45	Do not breathe vapour. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
EC-No.:	200-580-7	EC label
contains:	Acetic acid	

German regulations

Water pollution class 1 (slightly polluting substance) VwVwS Anh. 2 KennNr. 93

Storage class VCI 3 A

Data sheet of the Chemical Professional Association M004 Irritant substances/corrosive substances

M050 Dealing with harmful substances

M053 General industrial safety measures for dangerous substances.

Local regulations on chemical accidents: 6

The employment restrictions for young workers in accordance with section 22 of the Youth Employment Protection Law (JArbSchG) are to be observed.

16. Other information

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-3

Reduced labelling on the container due to small quantity.

Reason for alteration

General update.

Contact for information:

HSSE-C/CI * Tel: +49 (0)6151/722775 * Fax: +49 (0)6151/726433 * e-mail:prodsafe@merck.de

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.

Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue: 24.09.2004
Supersedes edition of 28.07.2004

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

Identification of the product

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-5

Use of the substance/preparation

Reagent for analysis

Company/undertaking identification

Company: Merck KGaA * 64271 Darmstadt * Germany * Tel: +49 (0)6151/72-0
Emergency telephone No.: +49 (0)6151/72112 * Fax: +49 (0)6151/72-7780

2. Composition/information on ingredients

CAS-No.:	7664-93-9	EC-Index-No.:	016-020-00-8
M:	98.08 g/mol	EC-No.:	231-639-5
Formula Hill:	H ₂ O ₄ S		
Chemical formula:	H ₂ SO ₄		

Hazardous ingredients:

Name according to EC Directives:

CAS-No.	EC No.	EC-Index-No.	Classification	Content:
Sulphuric acid				
7664-93-9	231-639-5	016-020-00-8	C; R35	95 - < 97 %

(Full text of R-Phrases in heading 16)

3. Hazards identification

Causes severe burns.

4. First aid measures

After inhalation: fresh air. Call in physician.
After skin contact: wash off with plenty of water. Dab with polyethylene glycol 400.
Immediately remove contaminated clothing.
After eye contact: rinse out with plenty of water for at least 10 minutes with the eyelid held wide open. Immediately call in ophthalmologist.
After swallowing: make victim drink plenty of water (if necessary several litres), avoid vomiting (risk of perforation!). Immediately call in physician. Do not attempt to neutralize.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-5

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.

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:
Prevent fire-fighting water from entering surface water or groundwater. Contain escaping vapours with water.

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. Chemisorb® H⁺, Art. No. 101595). Forward for disposal. Clean up affected area.

7. Handling and storage

Handling:

No further requirements.

Storage:

Tightly closed in a well-ventilated place. Accesible 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

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-5

TRGS 900

Name	Sulfuric acid
Kind of use	others
Value	0.1 mg/m ³ Inhalable fraction. The following regulation applies to the peak limit: short-term exposure duration: max. 15 minutes as mean value, frequency per shift: 4, time interval: min. 1 hour
Peak limit	1 Concentration must not exceed limit concentration.
Embryotoxic	Y Substances with which no foetotoxic risk is to be expected when observing the maximum allowable concentration (MAC Germany) and the biological tolerance value at the workplace (BAT Germany).

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

In splash contact:

Glove material: butyl rubber
Layer thickness: 0.7 mm
Breakthrough time: > 120 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), 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 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.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-5

9. Physical and chemical properties

Form:	liquid
Colour:	colourless
Odour:	odourless
pH value at 49 g/l H ₂ O	(25 °C) 0.3
Viscosity dynamic	(20 °C) 26.9 mPa*s
Melting point	~ -15 °C
Boiling point	~ 310 °C
Ignition temperature	not applicable
Flash point	not applicable
Explosion limits	lower not applicable upper not applicable
Vapour pressure	(20 °C) ~ 0.0001 hPa
Relative vapour density	~ 3.4
Density	(20 °C) 1.84 g/cm ³
Solubility in water	(20 °C) soluble (caution ! development of heat)
Thermal decomposition	~ 338 °C

10. Stability and reactivity

Conditions to be avoided

Strong heating.

Substances to be avoided

water, alkali metals, alkali compounds, ammonia, alkaline earth metals, alkalis, acids, alkaline earth compounds, metals, metal alloys, phosphorus oxides, phosphorus, hydrides, halogen-halogen compounds, oxyhalogenic compounds, permanganates, nitrates, carbides, combustible substances, organic solvents, acetylidene, nitriles, organic nitro compounds, anilines, peroxides, picrates, nitrides, lithium silicide.

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!).

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-5

11. Toxicological information

Acute toxicity

LC₅₀ (inhalation, rat): 510 mg/m³ /2 h (calculated on the pure substance).
LD₅₀ (oral, rat): 2140 mg/kg (Using 25 % solution).

Specific symptoms in animal studies:

Eye irritation test (rabbit): burns.

Skin irritation test (rabbit): burns.

Toxicologic values are not available due to other dangerous properties of the substance.

Subacute to chronic toxicity

Applicable to partial component(s):

Bacterial mutagenicity: Ames test: negative.

No teratogenic effect in animal experiments.

Further toxicological information

Property that must be anticipated on the basis from the components of the preparation:

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.

Further data

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

12. Ecological information

Biologic degradation:

Methods for the determination of biodegradability are not applicable to inorganic substances.

Behavior in environmental compartments:

Concentration in organisms is not to be expected.

Ecotoxic effects:

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

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).

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

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-5

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.

14. Transport information

Road & Rail ADR, RID
UN 1830 SCHWEFELSAEURE, 8, II

Inland waterway ADN, ADNR not tested

Sea IMDG-Code
UN 1830 SULPHURIC ACID, 8, II
Ems F-A S-B

Air CAO, PAX
SULPHURIC ACID, 8, UN 1830, 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:	C	Corrosive
R-phrases:	35	Causes severe burns.
S-phrases:	26-30-45	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Never add water to this product. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
EC-No.:	231-639-5	EC label
contains:	Sulphuric acid	

German regulations

Water pollution class 1 (slightly polluting substance) VwVwS Anh. 2 KennNr. 182

Storage class VCI 8 B

Data sheet of the Chemical Professional Association M004 Irritant substances/corrosive substances
M051 Dangerous chemical substances

The employment restrictions for young workers in accordance with section 22 of the Youth Employment Protection Law (JArbSchG) are to be observed.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-5

16. Other information

Text of any R phrases referred to under heading 2:

35 Causes severe burns.

Reason for alteration

General update.

Contact for information:

HSSE-C/CI * Tel: +49 (0)6151/722775 * Fax: +49 (0)6151/726433 * e-mail:prodsafe@merck.de

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.

Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue: 24.09.2004
Supersedes edition of 28.07.2004

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

Identification of the product

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-6

Use of the substance/preparation

Reagent for analysis

Company/undertaking identification

Company: Merck KGaA * 64271 Darmstadt * Germany * Tel: +49 (0)6151/72-0
Emergency telephone No.: +49 (0)6151/72112 * Fax: +49 (0)6151/72-7780

2. Composition/information on ingredients

CAS-No.:	68-12-2	EC-Index-No.:	616-001-00-X
M:	73.10 g/mol	EC-No.:	200-679-5
Formula Hill:	C ₃ H ₇ NO		
Chemical formula:	HCON(CH ₃) ₂		

3. Hazards identification

May cause harm to the unborn child. Also harmful by inhalation and in contact with skin. Irritating to eyes.

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

4. First aid measures

After inhalation: fresh air. Call in physician.

After skin contact: wash off with plenty of water. Remove contaminated clothing. Call in physician.

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

After swallowing: immediately make victim drink plenty of water. Subsequently administer: activated charcoal (20 - 40 g in 10% slurry). Call in physician.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-6

5. Fire-fighting measures

Suitable extinguishing media:
Water, CO₂, foam, powder.

Special risks:
Combustible. Vapours heavier than air. Forms explosive mixtures with air at elevated temperatures. Development of hazardous combustion gases or vapours possible in the event of fire. The following may develop in event of fire: nitrogen oxides.

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:
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 material (e.g. Chemizorb®). Forward for disposal. Clean up affected area.

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

Specific control parameter

BAT Germany (biol. tolerance value)

Name	Dimethylformamide
Parametr	Methylformamide
Values	35 mg/l
Test material	urine
test extraction, time	b

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-6

EC

Name N,N-Dimethylformamide
Embryotoxic R(E) 2:should be regarded as if it impaire developmental toxicity

TRGS 900

Name N,N-Dimethylformamide
Value 10 ml/m³
30 mg/m³
Peak limit 4 exceeding factor: 4-fold in 15 minutes
Skin resorption Risk of skin absorption

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. Filter A (acc. to DIN 3181) for vapours of organic compounds

Eye protection: required

Hand protection:

In full contact:

Glove material: butyl rubber
Layer thickness: 0.7 mm
Breakthrough time: > 480 Min.

In splash contact:

Glove material: viton
Layer thickness: 0.70 mm
Breakthrough time: > 240 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 898 Butoject® (full contact), 890 Vitoject® (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 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:

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

9. Physical and chemical properties

Form: liquid
Colour: colourless
Odour: weakly amine-like

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-6

pH value				
at 200 g/l H ₂ O	(20 °C)	7		
Viscosity dynamic	(20 °C)	0.82	mPa*s	
Melting point		-61	°C	
Boiling point	(1013 hPa)	153	°C	
Ignition temperature		410	°C	
Flash point		58	°C	c.c.
		67	°C	o.c.
Explosion limits	lower	2.2	Vol%	
	upper	16	Vol%	
Vapour pressure	(20 °C)	3.77	hPa	
Relative vapour density		2.51		
Density	(20 °C)	0.94	g/cm ³	
Solubility in water	(20 °C)	soluble		
Thermal decomposition		> 350	°C	
log Pow:		-0.85		(experimental)
Bioconcentration factor		~ 0.3-0.8		

10. Stability and reactivity

Conditions to be avoided

Strong heating.

Substances to be avoided

alkali metals, halogens, halides, reducing agents, triethylaluminium, nitrates, metallic oxides, nonmetallic oxides. Violent reactions possible with: strong oxidizing agents, halogenated hydrocarbons.

Hazardous decomposition products

in the event of fire: See chapter 5.

Further information

hygroscopic;
Explosible with air in a vaporous/gaseous state when heated.

11. Toxicological information

Acute toxicity

LC₅₀ (inhalation, rat): 9-15 mg/l /4 h.
LD₅₀ (dermal, rabbit): 1500 mg/kg.
LD₅₀ (oral, rat): 2800 mg/kg.

Specific symptoms in animal studies:
Eye irritation test (rabbit): Irritations.
Skin irritation test (rabbit): No irritation.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-6

Subacute to chronic toxicity

Sensitization:
Sensitization test (guinea pig): negative.

Based on clear evidence from animal experiments there is a high risk of teratogenic effects.
Pregnant women must not be exposed to the product.

Noncarcinogenic in animal experiments.
Bacterial mutagenicity: Ames test: negative.
No mutagenic properties suspected.

Further toxicological information

After skin contact: Danger of skin absorption.
After eye contact: Irritations.
After swallowing: Symptoms in: gastrointestinal tract.

Further data

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

12. Ecological information

Abiotic degradation:
air: Rapid degradation.

Biologic degradation:
Biodegradation: >90 % /28 d modified OECD screening test.
The product is readily biodegradable according to the OECD criteria.

Behavior in environmental compartments:
Distribution: log p(o/w): -0.85 (experimental).
No bioaccumulation is to be expected (log P(o/w) <1).
Henry constant: 0.00747 Pa·m³/mol.
Passage from aqueous solution into the atmosphere is not to be expected.

Ecotoxic effects:
Biological effects:
Fish toxicity: L.macrochirus LC₅₀: 6300 mg/l /96 h. Onchorhynchus mykiss LC₅₀: 9800 mg/l /96 h.
P.promelas LC₅₀: 10600 mg/l /96 h.
Daphnia toxicity: Daphnia magna EC₅₀: 15700 mg/l /48 h.
Algal toxicity: Desmodesmus subspicatus IC₅₀: >500 mg/l /96 h.
Bacterial toxicity: Photobacterium phosphoreum EC₅₀: 2000 mg/l /5 min microtox test.
Maximum permissible toxic concentration:
Algal toxicity: Sc.quadricauda IC₅: 10 mg/l.
When used properly, no impairments in the function of waste- water-treatment plants are to be expected.

Further ecologic data:
TOD: 1.863 g/g.
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.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-6

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 1830 SCHWEFELSAEURE, 8, II

Inland waterway ADN, ADNR not tested

Sea IMDG-Code
UN 1830 SULPHURIC ACID, 8, II
Ems F-A S-B

Air CAO, PAX
SULPHURIC ACID, 8, UN 1830, 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:	61-20/21-36	May cause harm to the unborn child. Also harmful by inhalation and in contact with skin. Irritating to eyes.
S-phrases:	53-45	Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
EC-No.:	200-679-5	EC label
contains:	N,N-Dimethylformamide	

German regulations

Water pollution class 1 (slightly polluting substance) VwVwS Anh. 2 KennNr. 83

Storage class VCI 6.1 A

Data sheet of the Chemical Professional Association M017 Solvents

M039 Teratogenic effects - protection at working place

M051 Dangerous chemical substances

The employment restrictions for young workers in accordance with section 22 of the Youth Employment Protection Law (JArbSchG) are to be observed.

The employment restrictions for expectant and nursing mothers in accordance with sections 4 and 5 of the Maternity Protection Guideline (MuSchRiV) are to be observed.

16. Other information

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-6

Reason for alteration

General update.

Contact for information:

HSSE-C/CI * Tel: +49 (0)6151/722775 * Fax: +49 (0)6151/726433 * e-mail:prodsafe@merck.de

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.

Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue: 24.09.2004
Supersedes edition of 28.07.2004

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

Identification of the product

Catalogue No.: 114839
Product name: Boron Test Method: photometric 0.050 - 0.800 mg/l B 60 Tests
Spectroquant®
B-4

Use of the substance/preparation

Reagent for analysis

Company/undertaking identification

Company: Merck KGaA * 64271 Darmstadt * Germany * Tel: +49 (0)6151/72-0
Emergency telephone No.: +49 (0)6151/72112 * Fax: +49 (0)6151/72-7780

2. Composition/information on ingredients

Preparation contains organic compounds.

Hazardous ingredients:

Name according to EC Directives:

CAS-No.	EC No.	EC-Index-No.	Classification	Content:
Tetramethylurea 632-22-4	211-173-9		Repr. Cat. 2; R61 Xn; R22	≥ 50 %

(Full text of R-Phrases in heading 16)

3. Hazards identification

May cause harm to the unborn child. Also harmful if swallowed.

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

4. First aid measures

After inhalation: fresh air.

If breathing stops: mouth-to-mouth respiration or mechanical ventilation. Oxygen mask if necessary! Immediately call in physician.

After skin contact: wash off with plenty of water. Dab with polyethylene glycol 400. Immediately remove contaminated clothing.

After eye contact: rinse out with plenty of water with the eyelid held wide open. Call in ophthalmologist if necessary.

After swallowing: immediately make victim drink plenty of water. Immediately call in physician.

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5. Fire-fighting measures

Suitable extinguishing media:
Water, CO₂, foam, powder.

Special risks:
Combustible. Development of hazardous combustion gases or vapours possible in the event of fire. Forms explosive mixtures with air at ambient temperatures. The following may develop in event of fire: nitrogen oxides.

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:
Prevent fire-fighting water from entering surface water or groundwater. Contain escaping vapours with water.

6. Accidental release measures

Person-related precautionary measures:
Avoid substance contact. Do not inhale vapours/aerosols. 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 material (e.g. Chemizorb®). Forward for disposal. Clean up affected area.

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

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Hand protection:

In full contact:
Glove material: butyl rubber
Layer thickness: 0.7 mm
Breakthrough time: > 480 Min.

In splash contact:
Glove material: viton
Layer thickness: 0.70 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 898 Butoject® (full contact), 890 Vitoject® (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:

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

9. Physical and chemical properties

Form:	liquid
Colour:	yellow
Odour:	characteristic odour
pH value	not available
Melting point	not available
Boiling point	not available
Ignition temperature	not available
Flash point	~ 75 °C
Explosion limits	lower not available upper not available
Density	(20 °C) ~ 0.98 g/cm ³
Solubility in water	(20 °C) partially soluble
log Pow:	0.19 (experimental) (chief component)

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10. Stability and reactivity

Conditions to be avoided

Heating.

Substances to be avoided

strong oxidizing agents

Hazardous decomposition products

in the event of fire: See chapter 5.

Further information

hygroscopic

11. Toxicological information

Acute toxicity

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

Subacute to chronic toxicity

Applicable to the main component:

Based on clear evidence from animal experiments there is a high risk of teratogenic effects. Pregnant women must not be exposed to the product.

Further toxicological information

Property that must be anticipated on the basis from the components of the preparation:

After swallowing: drowsiness, drowsiness, tremor.

Further data

Further hazardous properties cannot be excluded.
The product should be handled with the care usual when dealing with chemicals.

12. Ecological information

Behavior in environmental compartments:

Applicable to the main component:

Distribution: log $p(o/w)$: 0.19 (experimental)

No bioaccumulation is to be expected ($\log P(o/w) < 1$).

Ecotoxic effects:

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

Further ecologic data:

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

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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.

14. Transport information

Road & Rail ADR, RID

UN 1830 SCHWEFELSAEURE, 8, II

Inland waterway ADN, ADNR not tested

Sea IMDG-Code

UN 1830 SULPHURIC ACID, 8, II

Ems F-A S-B

Air CAO, PAX

SULPHURIC ACID, 8, UN 1830, 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:	61-22	May cause harm to the unborn child. Also harmful if swallowed.
S-phrases:	53-37-45	Avoid exposure - obtain special instructions before use. Wear suitable gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
contains:	Tetramethylurea	

German regulations

Water pollution class	3 (highly polluting substance)	VwVwS Anh. 4
Storage class VCI	6.1 A	
Data sheet of the Chemical Professional Association	M039 Teratogenic effects - protection at working place M050 Dealing with harmful substances M053 General industrial safety measures for dangerous substances.	

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The employment restrictions for young workers in accordance with section 22 of the Youth Employment Protection Law (JArbSchG) are to be observed.

The employment restrictions for expectant and nursing mothers in accordance with sections 4 and 5 of the Maternity Protection Guideline (MuSchRiV) are to be observed.

16. Other information

Text of any R phrases referred to under heading 2:

22 Harmful if swallowed.
61 May cause harm to the unborn child.

Reason for alteration

General update.

Contact for information:

HSSE-C/CI * Tel: +49 (0)6151/722775 * Fax: +49 (0)6151/726433 * e-mail:prodsafe@merck.de

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.