Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue: 16.08.2004
Supersedes edition of 07.04.2004

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

Identification of the product

Catalogue No.: 114832

Product name: Zinc Test Method: photometric 0.05 - 2.50 mg/l Zn 100 Tests Spectroquant®

Zn-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 of inorganic and organic compounds.

Hazardous ingredients:

Name according to EC Directives:

CAS-No.	*EC No.*	*EC-Index-No.*	*Classification*	*Content:*
Sodium hydroxide				
1310-73-2	215-185-5	011-002-00-6	C; R35	≥ 2 - < 5 %

(Full text of R-Phrases in heading 16)

3. Hazards identification

Causes 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 ophtalmologist.
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.

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.

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.

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® OH^-, Art. No. 101596). 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

TRGS 900

Name	Sodium hydroxide
Value	2 mg/m^3 inhalable fraction
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).
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.

9. Physical and chemical properties

Form:		liquid		
Colour:		colourless		
Odour:		odourless		
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	
Density		(20 ˚C)	1.17	g/cm^3
Solubility in water		(20 ˚C)	soluble	

10. Stability and reactivity

Conditions to be avoided

Heating.

Substances to be avoided

metals (i.a. aluminium and zinc): Formed could be: hydrogen;
ammonium compounds: Formed could be: ammonia.

Hazardous decomposition products

no information available

Further information

incompatible with various plastics, animal/vegetable tissues, glass, aluminium, zinc and and their compounds.

11. Toxicological information

Acute toxicity

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

Further toxicological information

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

After inhalation: Irritations of the mucous membranes, coughing, and dyspnoea.
After skin contact: burns.
After eye contact: burns.
After swallowing: burns in mouth, throat, oesophagus and gastrointestinal tract.

Further data

Further hazardous properties cannot be excluded.
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.

Biological effects:
Harmful effect due to pH shift.

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

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 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
CHEMICAL KIT, 9, UN 3316, 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:	34	Causes 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:	Sodium hydroxide	

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.

Catalogue No.: 114832
Product name: Zinc Test Method: photometric 0.05 - 2.50 mg/l Zn 100 Tests Spectroquant® Zn-1

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

Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue: 16.08.2004
Supersedes edition of 07.04.2004

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

Identification of the product

Catalogue No.: 114832

Product name: Zinc Test Method: photometric 0.05 - 2.50 mg/l Zn 100 Tests Spectroquant®

Zn-2

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:*
Potassium cyanide				
151-50-8	205-792-3	006-007-00-5	T+; R26/27/28 R32 N; R50/53	≥ 10 - < 25 %

(Full text of R-Phrases in heading 16)

3. Hazards identification

Very toxic by inhalation, in contact with skin and if swallowed. Contact with acids liberates very toxic gas. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

4. First aid measures

General information: Rapid action is called for. First-aid personnel: ensure self-protection! Immediately call in physician (mentioning hydrocyanic acid poisoning). If breathing stops: immediately apply mechanical ventilation, if necessary also oxygen.

After inhalation: fresh air. Immediately call in physician.
After skin contact: wash off with plenty of water. Remove contaminated clothing. Immediately call in physician.
After eye contact: rinse out with plenty of water with the eyelid held wide open.
After swallowing: if victim is still conscious, make him drink plenty of water, induce vomiting, administer activated charcoal (20 - 40 g in 10% slurry). Immediately call in physician.

Indications for the doctor: Keep antidotes ready (sodium thiosulfate; dimethylaminophenol; Cobalt-EDTA.)

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: hydrogen cyanide.

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 carefully with liquid-absorbent material (e.g. Chemizorb®). Forward for disposal. Clean up affected area.

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. 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

TRGS 900

Name	Cyanides (as CN)
Value	5 mg/m^3 inhalable fraction
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.

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).
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. Avoid generation of vapours/aerosols. Under no circumstances eat or drink at workplace.

9. Physical and chemical properties

Form:		liquid		
Colour:		colourless		
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	
Density			not available	
Solubility in water		(20 ˚C)	soluble	
Bioconcentration factor			0.3	(calculated)

10. Stability and reactivity

Conditions to be avoided

Heating.

Substances to be avoided

magnesium, alkali salts, acids, fluorine, hydrogen fluoride, chlorates, nitrites, nitrates, nitrogen trichloride, strong oxidizing agents, carbon dioxide.

Hazardous decomposition products

hydrogen cyanide (with acids).
in the event of fire: See chapter 5.

Further information

none

11. Toxicological information

Acute toxicity

LD_{50} (dermal, rabbit): 14.3-33.3 mg/kg (toxicologically determinant component).
LD_{50} (oral, rat): 5 mg/kg (toxicologically determinant component).
LDLo (oral, human): 2.86 mg/kg (toxicologically determinant component).

Specific symptoms in animal studies:
Eye irritation test (rabbit): Irritations (toxicologically determinant component).

Subacute to chronic toxicity

Applicable to the toxicologically determinant component:

Bacterial mutagenicity: Salmonella typhimurium: negative.

Further toxicological information

Quantity contained sufficient to cause lethal intoxication.

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

After inhalation of vapours: mucosal irritations, nausea, vomiting, tachycardia, dyspnoea, dizziness, unconsciousness.
After skin contact: Danger of skin absorption.
After eye contact: Slight irritations.
After swallowing: absorption

Lethal effect after absorption. respiratory paralysis, cardiovascular failure.
Other notes:
The following applies to cyanogen compounds/ nitriles in general: utmost caution! Release of hydrocyanic acid is possible - blockade of cellular respiration. Cardiovascular disorders, dyspnoea, unconsciousness.

Further data

Further hazardous properties cannot be excluded.
This substance should be handled with particular care.

12. Ecological information

Applicable to the ecotoxic determinant component:

Abiotic degradation:
Slow degradation. (air)

Behavior in environmental compartments:
BCF: 0.3 (calculated);
Not bioaccumulative (BCF ≤1).

Ecotoxic effects:
Biological effects:
Toxic for aquatic organisms. May cause long-term adverse effects in the aquatic environment.
Hazard for drinking water supplies. Forms toxic mixtures in water, dilution measures notwithstanding.
Reacts with water to form toxic decomposition products.

Fish toxicity: L.macrochirus LC_{50}: 0.45 mg/l /96 h (in soft water).
Daphnia toxicity: Daphnia magna EC_{50}: 2 mg/l /48 h; Daphnia magna EC_{50}: 0.53 mg/l /24 h.
Bacterial toxicity: activated sludge EC_{50}: 0.6-2.3 mg/l /30 min.
Maximum permissible toxic concentration:
Algeal toxicity: Sc.quadricauda IC_5: 0.03 mg/l /8 d (referred to cyanide ions);
Bacterial toxicity: Ps.putida EC_5: 0.001 mg/l /16 h (referred to cyanide ions); M.aeruginosa EC_5: 0.07 mg/l /8 d (referred to cyanide ions);
Protozoa: E.sulcatum EC_5: 1.8-1.9 mg/l /72 h (referred to cyanide ions).

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.

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
CHEMICAL KIT, 9, UN 3316, 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 !

Catalogue No.: 114832
Product name: Zinc Test Method: photometric 0.05 - 2.50 mg/l Zn 100 Tests Spectroquant® Zn-2

15. Regulatory information

Labelling according to EC Directives

Symbol:	T+	Very toxic
	N	Dangerous for the environment
R-phrases:	26/27/28-32	Very toxic by inhalation, in contact with skin and if swallowed. Contact with acids liberates very toxic gas.
S-phrases:	28-36/37-45	After contact with skin, wash immediately with plenty of water. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
contains:	Potassium cyanide	

German regulations

Water pollution class	3 (highly polluting substance) VwVwS Anh. 4
Storage class VCI	6.1 B
Data sheet of the Chemical Professional Association	M002 Hydrocyanic acid
	M050 Dealing with harmful substances
Local regulations on chemical accidents:	1
	9b

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:

26/27/28	Very toxic by inhalation, in contact with skin and if swallowed.
32	Contact with acids liberates very toxic gas.
50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

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

Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue: 16.08.2004
Supersedes edition of 07.04.2004

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

Identification of the product

Catalogue No.: 114832

Product name: Zinc Test Method: photometric 0.05 - 2.50 mg/l Zn 100 Tests Spectroquant®

Zn-3

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

Dye solution.

Hazardous ingredients:

Name according to EC Directives:

CAS-No.	*EC No.*	*EC-Index-No.*	*Classification*	*Content:*
N,N-Dimethylformamide				
68-12-2	200-679-5	616-001-00-X	Repr. Cat. 2; R61 Xn; R20/21 Xi; R36	≥ 50 %

(Full text of R-Phrases in heading 16)

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

5. Fire-fighting measures

Suitable extinguishing media:
CO_2, 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. 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

BAT Germany (biol. tolerance value)

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

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/m^3 30 mg/m^3
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).
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. Under no circumstances eat or drink at workplace.

9. Physical and chemical properties

Form:	liquid
Colour:	orange
Odour:	characteristic odour

pH value	not available
Melting point	not available
Boiling point	~ 150 °C

Ignition temperature			~ 410	˚C	(Dimethylformamide)
Flash point			~ 58	˚C	(Dimethylformamide)
Explosion limits	lower		2.2	Vol%	(Dimethylformamide)
	upper		16	Vol%	(Dimethylformamide)
Density		(20 ˚C)	~ 0.95	g/cm^3	
Solubility in water		(20 ˚C)	soluble		

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

LC_{50} (inhalation, rat): 9-15 mg/l /4 h (Dimethylformamide).
LD_{50} (dermal, rabbit): 1500 mg/kg (Dimethylformamide).
LD_{50} (oral, rat): 2800 mg/kg (Dimethylformamide).

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

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

Properties to be expected on the basis of the main component of the preparation:

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

Further data

Further hazardous properties cannot be excluded.
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:
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.

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
CHEMICAL KIT, 9, UN 3316, 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 !

Catalogue No.: 114832
Product name: Zinc Test Method: photometric 0.05 - 2.50 mg/l Zn 100 Tests Spectroquant® Zn-3

15. Regulatory information

Labelling according to EC Directives

Symbol:	T	Toxic
R-phrases:	61-20/21	May cause harm to the unborn child. Also harmful by inhalation and in contact with skin.
S-phrases:	53-36/37-45	Avoid exposure - obtain special instructions before use. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
contains:	N,N-Dimethylformamide	

German regulations

Water pollution class	2 (polluting substance) VwVwS Anh. 4
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

Text of any R phrases referred to under heading 2:

20/21	Harmful by inhalation and in contact with skin.
36	Irritating to eyes.
61	May cause harm to the unborn child.

Reduced labelling on the container due to small quantity.

Reason for alteration

Chapter 4: first aid measures.

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

Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue: 16.08.2004
Supersedes edition of 07.04.2004

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

Identification of the product

Catalogue No.: 114832

Product name: Zinc Test Method: photometric 0.05 - 2.50 mg/l Zn 100 Tests Spectroquant®

Zn-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

Aqueous solution of organic compounds.

Hazardous ingredients:

Name according to EC Directives:

CAS-No.	*EC No.*	*EC-Index-No.*	*Classification*	*Content:*
Formaldehyde				
50-00-0	200-001-8	605-001-00-5	Carc. Cat. 3; R40 T; R23/24/25 C; R34 Xi; R43	≥ 25 - < 50 %
methanol				
67-56-1	200-659-6	603-001-00-X	F; R11 T; R23/24/25-39/23/24/25	≥ 10 - < 20 %

(Full text of R-Phrases in heading 16)

3. Hazards identification

Limited evidence of a carcinogenic effect. May cause sensitization by skin contact.Toxic by inhalation, in contact with skin and if swallowed. Causes burns. Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

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. Remove contaminated clothing. Immediately call in physician.
After eye contact: rinse out with plenty of water with the eyelid held wide open. Call in ophtalmologist.
After swallowing: make victim drink plenty of water. Subsequently administer: activated charcoal (20 - 40 g in 10% slurry). Immediately call in physician.

Indications for the doctor: Gastric lavage. Laxative: Sodium sulfate (1 tablespoon/1/4 l water). Mention methanol.

5. Fire-fighting measures

Suitable extinguishing media:
Water, CO_2, foam, powder.

Special risks:
formaldehyde vapours: Combustible.
Forms explosive mixtures with air at ambient temperatures.

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.

Additional notes:
Render harmless: Treatment with execess sodium hydrogen sulfite solution.

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. 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

BAT Germany (biol. tolerance value)

Name	Methanol
Parametr	Methanol
Values	30 mg/l
Test material	urine
test extraction, time	c,b

EC

Name	Formaldehyde
Carcinogenic	C 3:owing possible carcinogenic effects for man
Sensitization	Sh Danger of sensitization of the skin

TRGS 900

Name	Formaldehyde
Value	0.5 ml/m^3 0.62 mg/m^3
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).
Skin resorption	Risk of skin absorption

Name	Methanol
Value	200 ml/m^3 270 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

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:	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. Avoid generation of vapours/aerosols.

9. Physical and chemical properties

Form:		liquid			
Colour:		colourless			
Odour:		pungent			
pH value		(20 ˚C)	2.8-4.0		
Melting point			< -15	˚C	
Boiling point			93-96	˚C	
Ignition temperature			~ 300	˚C	(Formaldehyde)
Flash point			> 62	˚C	
Explosion limits	lower		7	Vol%	(Formaldehyde)
	upper		73	Vol%	(Formaldehyde)
Density		(20 ˚C)	1.09	g/cm^3	
Solubility in water		(20 ˚C)	soluble		
log Pow:			0.00		(Formaldehyde) (calculated)

10. Stability and reactivity

Conditions to be avoided

Heating.

Substances to be avoided

polymerization initiators (e.g. alkali metals), acids, nitrogen oxides, hydrogen peroxide, oxidizing agent, performic acid, phenol.

Hazardous decomposition products

no information available

Stabilizer

methanol

Further information

hygroscopic, inflammable; reductive; tends to polymerize;
incompatible with various metals and various alloys.
Explosible with air in a vaporous/gaseous state when heated.

11. Toxicological information

Acute toxicity

LC_{50} (inhalation, rat): 0.578 mg/l /4 h (Formaldehyde).
LD_{50} (dermal, rabbit): 270 mg/kg (Formaldehyde).
LD_{50} (oral, rat): 100 mg/kg (Formaldehyde).

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

Subacute to chronic toxicity

Applicable to partial component(s):

Sensitization:
Sensitization test (guinea pig): positive.

The carcinogenic potential requires further clarification.

No impairment of reproductive performance in animal experiments.

Further toxicological information

Property that must be anticipated on the basis of the components of the preparation:
After inhalation: Irritations of the mucous membranes, coughing, and dyspnoea. Inhalation may lead to the formation of oedemas in the respiratory tract.
After skin contact: burns. Risk of skin sensitization. Danger of skin absorption.
After eye contact: burns. Lacrimal irritation due to vapours.
After swallowing: burns in mouth, throat, oesophagus and gastrointestinal tract. Risk of perforation in the oesophagus and stomach.
Systemic effects: narcosis, blindness.

Other notes:
The following applies to aldehydes in general: irritations after contact with eyes and skin. Mucosal irritations, coughing, and dyspnoea after inhalation.
The following applies to aliphatic alcohols in general: effect when product is not handled and used properly: mucosal irritations; after absorption of large quantities: narcosis.

Further data

Further hazardous properties cannot be excluded.
This substance should be handled with particular care.

12. Ecological information

The following statements refer to individual components of the preparation:

Abiotic degradation:
Rapid degradation. (air, formaldehyde)

Biologic degradation:
Biodegradation: 97.4 % /5 d (Formaldehyde). Readily biodegradable.

Behavior in environmental compartments:
Distribution: log p(o/w): 0.00 (Formaldehyde).
No bioaccumulation is to be expected (log P(o/w) <1).

Ecotoxic effects:
Biological effects:
Toxic for aquatic organisms. protoplasmatic toxin. Caustic even in diluted form. Disinfectant effect.
Toxic effect on fish and plankton.
Sludge decomposition impaired or not possible even in diluted concentration.
Endangers drinking-water supplies if allowed to enter soil and/or waters in large quantities.
Fish toxicity: P.promelas LC_{50}: 24 mg/l /96 h (Formaldehyde); Br.rerio LC_{50}: 41 mg/l /96 h (Formaldehyde);
Daphnia toxicity: Daphnia magna EC_{50}: ~2 mg/l /48 h (Formaldehyde);
Bacterial toxicity: Photobacterium phosphoreum EC_{50}: 8.5 mg/l /30 min (Formaldehyde).
Maximum permissible toxic concentration: Algeal toxicity: Sc.quadricauda IC_5: 2.5 mg/l /8 d (Formaldehyde); Bacterial toxicity: M.aeruginosa EC_5: 0.39 mg/l /8 d (Formaldehyde).

Further ecologic data:
COD: 1.06 g/g (Formaldehyde); TOD: 1.068 g/g (Formaldehyde)
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.

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
CHEMICAL KIT, 9, UN 3316, 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:	23/24/25-34-39/23/24/25-40-43	Toxic by inhalation, in contact with skin and if swallowed. Causes burns. Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed. Limited evidence of a carcinogenic effect. May cause sensitization by skin contact.
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:	Formaldehyde methanol	

German regulations

Water pollution class	2 (polluting substance) VwVwS Anh. 4
Storage class VCI	6.1 A
Data sheet of the Chemical Professional Association	M010 Formaldehyde
	M004 Irritant substances/corrosive substances
	M051 Dangerous chemical substances

Local regulations on chemical accidents: 2

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:

11	Highly flammable.
23/24/25	Toxic by inhalation, in contact with skin and if swallowed.
34	Causes burns.
39/23/24/25	Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.
40	Limited evidence of a carcinogenic effect.
43	May cause sensitization by skin contact.

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

Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue: 16.08.2004
Supersedes edition of 07.04.2004

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

Identification of the product

Catalogue No.: 114832

Product name: Zinc Test Method: photometric 0.05 - 2.50 mg/l Zn 100 Tests Spectroquant®

Zn-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.: 20624-25-3

M: 225.31 g/mol EC-No.: 205-710-6

Formula Hill: $C_5H_{10}NNaS_2 * 3 H_2O$

3. Hazards identification

Harmful if swallowed.

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. Call in physician.

5. Fire-fighting measures

Suitable extinguishing media:
Water, CO_2, foam, powder.

Special risks:
Combustible. Formation of hazardous combustion gases or vapours possible in event of fire.
The following may develop in event of fire: sulfur oxides, nitrogen oxides, nitrosamines.

Special protective equipment for fire fighting:
Do not stay in dangerous zone without self-contained breathing apparatus.

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:
Avoid generation of dusts; do not inhale dusts. 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 dry. 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. Dry. At +15˚C to +25˚C.

The data apply to the entire pack.

8. Exposure controls/personal protection

Specific control parameter

TRGS 900

Name	Sodium diethyldithiocarbamate	
Value	2 mg/m^3	inhalable fraction. The limit value protects from a systemic effect, the stimulus threshold has to be checked.
Peak limit	4 exceeding factor: 4-fold in 15 minutes	

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 dusts 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).

Industrial hygiene:
Change contaminated clothing. Application of skin- protective barrier cream recommended. Wash hands after working with substance.

9. Physical and chemical properties

Form:		solid		
Colour:		white		
Odour:		almost odourless		
pH value				
at 20 g/l H_2O		(20 ˚C)	~ 7	
Melting point			~ 93 ˚C	
Boiling point			not available	
Ignition temperature			not available	
Flash point			not available	
Explosion limits	lower		not available	
	upper		not available	
Density			not available	
Solubility in water		(20 ˚C)	~ 600 g/l	
log Pow:			-1.43	(calculated)

10. Stability and reactivity

Conditions to be avoided

Strong heating.

Substances to be avoided

acids, strong bases, oxidizing agent.

Hazardous decomposition products

in the event of fire: See chapter 5.

Further information

none

11. Toxicological information

Acute toxicity

LD_{50} (dermal, rat): >1000 mg/kg (anhydrous substance).
LD_{50} (oral, rat): 1500 mg/kg (anhydrous substance).

Further toxicological information

After swallowing: We have no description of any toxic symptoms.

Further data

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

12. Ecological information

Biologic degradation:
Distribution: log p(o/w): -1.43 (calculated).
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!

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 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
CHEMICAL KIT, 9, UN 3316, 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	Harmful if swallowed.
S-phrases:	---	
contains:	Sodium diethyldithiocarbamate	

German regulations

Water pollution class	2	(polluting substance) VwVwS Anh. 3
Storage class VCI	10-13	
Data sheet of the Chemical Professional Association	M050	Dealing with harmful 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

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