

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 14.07.2018

Version 14.6

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

### 1.1 Product identifier

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

REACH Registration Number 01-2119484630-38-XXXX

CAS-No. 71-36-3

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

Identified uses Reagent for analysis  
In compliance with the conditions described in the annex to this safety data sheet.

### 1.3 Details of the supplier of the safety data sheet

Company Merck KGaA \* 64271 Darmstadt \* Germany \* Phone:+49 6151 72-0

Responsible Department LS-QHC \* e-mail: prodsafe@merckgroup.com

1.4 Emergency telephone number Please contact the regional company representation in your country.

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## SECTION 2. Hazards identification

### 2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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Flammable liquid, Category 3, H226

Acute toxicity, Category 4, Oral, H302

Specific target organ toxicity - single exposure, Category 3, Central nervous system, H336

Specific target organ toxicity - single exposure, Category 3, Respiratory system, H335

Skin irritation, Category 2, H315

Serious eye damage, Category 1, H318

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

## 2.2 Label elements

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

#### *Hazard pictograms*



#### *Signal word*

Danger

#### *Hazard statements*

H226 Flammable liquid and vapour.

H302 Harmful if swallowed.

H315 Causes skin irritation.

H318 Causes serious eye damage.

H335 May cause respiratory irritation.

H336 May cause drowsiness or dizziness.

#### *Precautionary statements*

##### Prevention

P210 Keep away from heat.

P280 Wear eye protection.

##### Response

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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lenses, if present and easy to do. Continue rinsing.

P313 Get medical advice/ attention.

## Reduced labelling (≤125 ml)

*Hazard pictograms*



*Signal word*

Danger

*Hazard statements*

H318 Causes serious eye damage.

*Precautionary statements*

P280 Wear eye protection.

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

P313 Get medical advice/ attention.

*Index-No.* 603-004-00-6

## 2.3 Other hazards

None known.

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## SECTION 3. Composition/information on ingredients

### 3.1 Substance

Formula	CH <sub>3</sub> (CH <sub>2</sub> ) <sub>3</sub> OH	C <sub>4</sub> H <sub>10</sub> O (Hill)
Index-No.	603-004-00-6	
EC-No.	200-751-6	
Molar mass	74,12 g/mol	

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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

*Chemical name (Concentration)*

CAS-No.            Registration number            Classification

n-butanol (<= 100 % )

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

71-36-3            01-2119484630-38-

XXXX

Flammable liquid, Category 3, H226

Acute toxicity, Category 4, H302

Skin irritation, Category 2, H315

Serious eye damage, Category 1, H318

Specific target organ toxicity - single exposure, Category 3, H336

Specific target organ toxicity - single exposure, Category 3, H335

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

### 3.2 Mixture

Not applicable

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## SECTION 4. First aid measures

### 4.1 Description of first aid measures

After inhalation: fresh air. Call in physician.

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

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

After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately.

### 4.2 Most important symptoms and effects, both acute and delayed

Risk of serious damage to eyes.

Irritation and corrosion, somnolence, Drowsiness, Cough, Shortness of breath, CNS disorders, cardiovascular disorders, Nausea, Vomiting, inebriation, Dizziness, narcosis, depressed respiration

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## 4.3 Indication of any immediate medical attention and special treatment needed

No information available.

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## SECTION 5. Firefighting measures

### 5.1 Extinguishing media

*Suitable extinguishing media*

Carbon dioxide (CO<sub>2</sub>), Foam, Dry powder

*Unsuitable extinguishing media*

For this substance/mixture no limitations of extinguishing agents are given.

### 5.2 Special hazards arising from the substance or mixture

Combustible.

Vapours are heavier than air and may spread along floors.

Forms explosive mixtures with air at elevated temperatures.

Development of hazardous combustion gases or vapours possible in the event of fire.

### 5.3 Advice for firefighters

*Special protective equipment for firefighters*

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

*Further information*

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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## SECTION 6. Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

### 6.2 Environmental precautions

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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Do not let product enter drains. Risk of explosion.

## 6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

## 6.4 Reference to other sections

Indications about waste treatment see section 13.

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## SECTION 7. Handling and storage

### 7.1 Precautions for safe handling

#### *Advice on safe handling*

Observe label precautions.

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

#### *Advice on protection against fire and explosion*

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

#### *Hygiene measures*

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

### 7.2 Conditions for safe storage, including any incompatibilities

#### *Storage conditions*

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Recommended storage temperature see product label.

### 7.3 Specific end use(s)

See exposure scenario in the Annex to this MSDS.

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## SECTION 8. Exposure controls/personal protection

### 8.1 Control parameters

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## Derived No Effect Level (DNEL)

Worker DNEL, longterm	Local effects	inhalation	310 mg/m <sup>3</sup>
Consumer DNEL, longterm	Local effects	inhalation	55 mg/m <sup>3</sup>
Consumer DNEL, longterm	Systemic effects	oral	3,125 mg/kg Body weight

## Predicted No Effect Concentration (PNEC)

PNEC Fresh water	0,082 mg/l
PNEC Fresh water sediment	0,178 mg/kg
PNEC Marine water	0,0082 mg/l
PNEC Marine sediment	0,0178 mg/kg
PNEC Aquatic intermittent release	2,25 mg/l
PNEC Sewage treatment plant	2476 mg/l
PNEC Soil	0,015 mg/kg

## 8.2 Exposure controls

### Engineering measures

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

See section 7.1.

### Individual protection measures

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

#### *Eye/face protection*

Tightly fitting safety goggles

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## *Hand protection*

full contact:

Glove material:	Nitrile rubber
Glove thickness:	0,40 mm
Break through time:	> 480 min

splash contact:

Glove material:	polychloroprene
Glove thickness:	0,65 mm
Break through time:	> 120 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 730 Camatril® -Velours (full contact), KCL 720 Camapren® (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: [www.kcl.de](http://www.kcl.de)).

## *Other protective equipment*

Flame retardant antistatic protective clothing.

## *Respiratory protection*

required when vapours/aerosols are generated.

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

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

## **Environmental exposure controls**

Do not let product enter drains.

Risk of explosion.



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	101990
Product name	1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## SECTION 9. Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Form	liquid
Colour	colourless
Odour	ethanolic
Odour Threshold	0,004 - 48,7 ppm
pH	7 at 70 g/l 20 °C
Melting point	-89 °C
Boiling point/boiling range	116 - 118 °C at 1.013 hPa Method: DIN 53171
Flash point	34 °C Method: DIN 51755 Part 1
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	1,4 %(V)
Upper explosion limit	11,3 %(V)

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	101990
Product name	1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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Vapour pressure	6,7 hPa at 20 °C (calculated)
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Relative vapour density	2,6 at 20 °C
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Density	0,81 g/cm <sup>3</sup> at 20 °C
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Relative density	No information available.
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Water solubility	66 g/l at 20 °C Method: OECD Test Guideline 105
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Partition coefficient: n-octanol/water	log Pow: 1 (25 °C) OECD Test Guideline 117 Bioaccumulation is not expected.
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Auto-ignition temperature	No information available.
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Decomposition temperature	No information available.
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Viscosity, dynamic	2,95 mPa.s at 20 °C
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Explosive properties	Not classified as explosive.
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Oxidizing properties	none
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## 9.2 Other data

Ignition temperature	340 °C Method: DIN 51794
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# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## SECTION 10. Stability and reactivity

### 10.1 Reactivity

Vapour/air-mixtures are explosive at intense warming.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

### 10.2 Chemical stability

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

### 10.3 Possibility of hazardous reactions

Risk of ignition or formation of inflammable gases or vapours with:

strong oxidising agents, chromium(VI) oxide

Exothermic reaction with:

Alkali metals, Alkaline earth metals, Aluminium, strong reducing agents, Acid chlorides

### 10.4 Conditions to avoid

Heating.

### 10.5 Incompatible materials

rubber, various plastics

### 10.6 Hazardous decomposition products

no information available

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## SECTION 11. Toxicological information

### 11.1 Information on toxicological effects

*Acute oral toxicity*

LD50 Rat: 790 mg/kg

(RTECS)

Symptoms: Nausea, Vomiting, Risk of aspiration upon vomiting., Pulmonary failure possible after aspiration of vomit.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## *Acute inhalation toxicity*

LC50 Rat: > 18 mg/l; 4 h ; vapour

OECD Test Guideline 403

(highest concentration to be prepared)

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

## *Acute dermal toxicity*

LD50 Rabbit: 3.430 mg/kg

OECD Test Guideline 402

## *Skin irritation*

Rabbit

Result: Irritations

Draize Test

Causes skin irritation.

## *Eye irritation*

Rabbit

Result: Irreversible effects on the eye

OECD Test Guideline 405

Causes serious eye damage.

## *Sensitisation*

This information is not available.

## *Germ cell mutagenicity*

### *Genotoxicity in vitro*

Ames test

Salmonella typhimurium

Result: negative

(ECHA)

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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Mutagenicity (mammal cell test): micronucleus.

Result: negative

(ECHA)

In vitro mammalian cell gene mutation test

Result: negative

Method: OECD Test Guideline 476

## *Carcinogenicity*

This information is not available.

## *Reproductive toxicity*

This information is not available.

## *Teratogenicity*

Application Route: Oral

Rat

Number of exposures: daily

(ECHA)

## *Specific target organ toxicity - single exposure*

May cause respiratory irritation.

May cause drowsiness or dizziness.

## *Specific target organ toxicity - repeated exposure*

This information is not available.

## *Repeated dose toxicity*

Rat

male and female

Oral

90 d

daily

NOAEL: 125 mg/kg

LOAEL: 500 mg/kg

OECD Test Guideline 408

Subchronic toxicity

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## *Aspiration hazard*

This information is not available.

## 11.2 Further information

After absorption:

CNS disorders, Dizziness, inebriation, drop in blood pressure, cardiovascular disorders, depressed respiration, narcosis

Damage to:

Liver, Kidney

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

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## SECTION 12. Ecological information

### 12.1 Toxicity

#### *Toxicity to fish*

static test LC50 Pimephales promelas (fathead minnow): 1.376 mg/l; 96 h

Analytical monitoring: yes

OECD Test Guideline 203

#### *Toxicity to daphnia and other aquatic invertebrates*

static test EC50 Daphnia magna (Water flea): 1.328 mg/l; 48 h

Analytical monitoring: yes

OECD Test Guideline 202

#### *Toxicity to algae*

static test EC50 Pseudokirchneriella subcapitata (green algae): 225 mg/l; 96 h

Analytical monitoring: yes

OECD Test Guideline 201

#### *Toxicity to bacteria*

static test EC50 Pseudomonas putida: 4.390 mg/l; 17 h

DIN 38412 TEIL 8

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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*Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)*

semi-static test NOEC Daphnia magna (Water flea): 4,1 mg/l; 21 d

Analytical monitoring: yes

OECD Test Guideline 211

## 12.2 Persistence and degradability

*Biodegradability*

98 %; 28 d

OECD Test Guideline 301E

Readily biodegradable

*Ratio BOD/ThBOD*

BOD5 33 %

(IUCLID)

## 12.3 Bioaccumulative potential

*Partition coefficient: n-octanol/water*

log Pow: 1 (25 °C)

OECD Test Guideline 117

Bioaccumulation is not expected.

## 12.4 Mobility in soil

No information available.

## 12.5 Results of PBT and vPvB assessment

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

## 12.6 Other adverse effects

Discharge into the environment must be avoided.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## SECTION 13. Disposal considerations

### *Waste treatment methods*

See [www.retrologistik.com](http://www.retrologistik.com) for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

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## SECTION 14. Transport information

### Land transport (ADR/RID)

14.1 UN number	UN 1120
14.2 Proper shipping name	BUTANOLS
14.3 Class	3
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
Tunnel restriction code	D/E

### Inland waterway transport (ADN)

Not relevant

### Air transport (IATA)

14.1 UN number	UN 1120
14.2 Proper shipping name	BUTANOLS
14.3 Class	3
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	no

### Sea transport (IMDG)



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	101990
Product name	1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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14.1 UN number	UN 1120
14.2 Proper shipping name	BUTANOLS
14.3 Class	3
14.4 Packing group	III
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
EmS	F-E S-D

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

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## SECTION 15. Regulatory information

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

#### *EU regulations*

Major Accident Hazard	SEVESO III
Legislation	FLAMMABLE LIQUIDS P5c Quantity 1: 5.000 t Quantity 2: 50.000 t

Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.
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Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated
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Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated
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# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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Substances of very high concern (SVHC)

This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of  $\geq 0.1\%$  (w/w).

*National legislation*

Storage class 3

## 15.2 Chemical safety assessment

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

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## SECTION 16. Other information

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

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.

### Training advice

Provide adequate information, instruction and training for operators.

### Labelling

*Hazard pictograms*



*Signal word*

Danger

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

---

## *Hazard statements*

H226 Flammable liquid and vapour.

H302 Harmful if swallowed.

H315 Causes skin irritation.

H318 Causes serious eye damage.

H335 May cause respiratory irritation.

H336 May cause drowsiness or dizziness.

## *Precautionary statements*

### Prevention

P210 Keep away from heat.

P280 Wear eye protection.

### Response

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

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

P313 Get medical advice/ attention.

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

Used abbreviations and acronyms can be looked up at [www.wikipedia.org](http://www.wikipedia.org).

## **Regional representation**

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

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

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## EXPOSURE SCENARIO 1 (Industrial use)

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### 1. Industrial use Reagent for analysis)

#### Sectors of end-use

- SU 3* Industrial uses: Uses of substances as such or in preparations at industrial sites  
*SU 9* Manufacture of fine chemicals  
*SU 10* Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)

#### Chemical product category

- PC21* Laboratory chemicals

#### Process categories

- PROC1* Use in closed process, no likelihood of exposure  
*PROC2* Use in closed, continuous process with occasional controlled exposure  
*PROC3* Use in closed batch process (synthesis or formulation)  
*PROC4* Use in batch and other process (synthesis) where opportunity for exposure arises  
*PROC5* Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)  
*PROC8a* Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities  
*PROC8b* Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities  
*PROC9* Transfer of substance or preparation into small containers (dedicated filling line, including weighing)  
*PROC10* Roller application or brushing  
*PROC15* Use as laboratory reagent

#### Environmental Release Categories

- ERC1* Manufacture of substances  
*ERC2* Formulation of preparations  
*ERC6a* Industrial use resulting in manufacture of another substance (use of intermediates)
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### 2. Contributing scenarios: Operational conditions and risk management measures

#### 2.1 Contributing scenario controlling environmental exposure for: ERC1, SpERC ESVOC 3

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	101990
Product name	1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## Amount used

Daily amount per site	13 t
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## Environment factors not influenced by risk management

Flow rate	18.000 m3/d
Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

## Other given operational conditions affecting environmental exposure

Emission or Release Factor: Air	0,01 %
Emission or Release Factor: Water	0,001 %
Emission or Release Factor: Soil	0 %

## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	2.000 m3/d
Effectiveness (of a measure)	87,4 %

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## 2.2 Contributing scenario controlling environmental exposure for: ERC2, SpERC ESVOC 4

### Amount used

Daily amount per site	133 t
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### Environment factors not influenced by risk management

Flow rate	18.000 m3/d
Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

### Other given operational conditions affecting environmental exposure

Emission or Release Factor: Air	0,05 %
Emission or Release Factor: Water	0,02 %
Emission or Release Factor: Soil	0 %

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	101990
Product name	1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	2.000 m3/d
Effectiveness (of a measure)	87,4 %

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## 2.3 Contributing scenario controlling environmental exposure for: ERC6a

### Amount used

Daily amount per site	735 t
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### Environment factors not influenced by risk management

Flow rate	18.000 m3/d
Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

### Other given operational conditions affecting environmental exposure

Emission or Release Factor: Air	0,05 %
Emission or Release Factor: Water	0,002 %
Emission or Release Factor: Soil	0,1 %

## Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	2.000 m3/d
Effectiveness (of a measure)	87,4 %
Sludge Treatment	Sewage sludge should not be applied to natural soils.

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## 2.4 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC15

### Product characteristics

Concentration of the Substance in	Covers the percentage of the substance in the product up to
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# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	101990
Product name	1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

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Mixture/Article	100 %.
Physical Form (at time of use)	Medium volatile liquid
Process Temperature	< 62 °C

## Frequency and duration of use

Frequency of use	5 days/week
Frequency of use	< 8 hours/day

## Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor without local exhaust ventilation (LEV)
Outdoor / Indoor	Outdoor

## Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

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## 2.5 Contributing scenario controlling worker exposure for: PROC5, PROC8a, PROC8b, PROC9, PROC10

### Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Medium volatile liquid
Process Temperature	< 62 °C

### Frequency and duration of use

Frequency of use	5 days/week
Frequency of use	< 8 hours/day

### Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with local exhaust ventilation (LEV)
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### Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

### Organisational measures to prevent /limit releases, dispersion and exposure

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The Safety Data Sheets for catalogue items are available at [www.merckgroup.com](http://www.merckgroup.com)

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

Covers daily exposures up to 8 hours.

## 3. Exposure estimation and reference to its source

### Environment

CS	Use descriptor	Msafe	Compartment	RCR	Exposure Assessment Method
2.1	ERC1		Fresh water	0,045	ECETOC TRA
			Fresh water sediment	0,146	ECETOC TRA
			Marine water	0,008	ECETOC TRA
			Marine sediment	0,206	ECETOC TRA
			Soil	0,200	ECETOC TRA
			Sewage treatment plant	< 0,001	ECETOC TRA
2.2	ERC2		Fresh water	0,247	ECETOC TRA
			Fresh water sediment	0,805	ECETOC TRA
			Marine water	0,566	ECETOC TRA
			Marine sediment	0,865	ECETOC TRA
			Soil	0,196	ECETOC TRA
			Sewage treatment plant	< 0,001	ECETOC TRA
2.3	ERC6a		Fresh water	0,156	ECETOC TRA
			Fresh water sediment	0,509	ECETOC TRA
			Marine water	0,175	ECETOC TRA
			Marine sediment	0,568	ECETOC TRA
			Soil	0,198	ECETOC TRA
			Sewage treatment plant	< 0,001	ECETOC TRA

### Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.4	PROC1	longterm, inhalative, local	< 0,001	ECETOC TRA
2.4	PROC2	longterm, inhalative, local	0,1	ECETOC TRA
2.4	PROC3	longterm, inhalative, local	0,25	ECETOC TRA
2.4	PROC4	longterm, inhalative, local	0,2	ECETOC TRA
2.4	PROC15	longterm, inhalative, local	0,1	ECETOC TRA



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2.5	PROC5	longterm, inhalative, local	0,05	ECETOC TRA
2.5	PROC8a	longterm, inhalative, local	0,05	ECETOC TRA
2.5	PROC8b	longterm, inhalative, local	0,015	ECETOC TRA
2.5	PROC9	longterm, inhalative, local	0,05	ECETOC TRA
2.5	PROC10	longterm, inhalative, local	0,05	ECETOC TRA

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## 4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

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## EXPOSURE SCENARIO 2 (Professional use)

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### 1. Professional use Reagent for analysis)

#### Sectors of end-use

*SU 22* Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

#### Chemical product category

*PC21* Laboratory chemicals

#### Process categories

*PROC15* Use as laboratory reagent

#### Environmental Release Categories

*ERC2* Formulation of preparations

*ERC6a* Industrial use resulting in manufacture of another substance (use of intermediates)

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### 2. Contributing scenarios: Operational conditions and risk management measures

#### 2.1 Contributing scenario controlling environmental exposure for: ERC2, SpERC ESVOC 4

#### Amount used

Daily amount per site 133 t

#### Environment factors not influenced by risk management

Flow rate 18.000 m<sup>3</sup>/d

Dilution Factor (River) 10

Dilution Factor (Coastal Areas) 100

#### Other given operational conditions affecting environmental exposure

Emission or Release Factor: Air 0,05 %

Emission or Release Factor: Water 0,02 %

Emission or Release Factor: Soil 0 %

#### Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant Municipal sewage treatment plant

Flow rate of sewage treatment 2.000 m<sup>3</sup>/d

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plant effluent	
Effectiveness (of a measure)	87,4 %

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## 2.2 Contributing scenario controlling environmental exposure for: ERC6a

### Amount used

Daily amount per site	735 t
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### Environment factors not influenced by risk management

Flow rate	18.000 m3/d
Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

### Other given operational conditions affecting environmental exposure

Emission or Release Factor: Air	0,05 %
Emission or Release Factor: Water	0,002 %
Emission or Release Factor: Soil	0,1 %

### Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment	2.000 m3/d
plant effluent	
Effectiveness (of a measure)	87,4 %
Sludge Treatment	Sewage sludge should not be applied to natural soils.

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## 2.3 Contributing scenario controlling worker exposure for: PROC15

### Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 %.
Physical Form (at time of use)	Medium volatile liquid
Process Temperature	< 62 °C

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# SAFETY DATA SHEET

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Catalogue No. 101990

Product name 1-Butanol for analysis EMSURE® ACS,ISO,Reag. Ph Eur

## Frequency and duration of use

Frequency of use 5 days/week

## Other operational conditions affecting workers exposure

Outdoor / Indoor Indoor without local exhaust ventilation (LEV)

Outdoor / Indoor Outdoor

## Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

## 3. Exposure estimation and reference to its source

### Environment

CS	Use descriptor	Msafe	Compartment	RCR	Exposure Assessment Method
2.1	ERC2		Fresh water	0,247	ECETOC TRA
			Fresh water sediment	0,805	ECETOC TRA
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			Marine sediment	0,865	ECETOC TRA
			Soil	0,196	ECETOC TRA
			Sewage treatment plant	< 0,001	ECETOC TRA
2.2	ERC6a		Fresh water	0,156	ECETOC TRA
			Fresh water sediment	0,509	ECETOC TRA
			Marine water	0,175	ECETOC TRA
			Marine sediment	0,568	ECETOC TRA
			Soil	0,198	ECETOC TRA
			Sewage treatment plant	< 0,001	ECETOC TRA

### Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.3	PROC15	longterm, inhalative, local	0,1	ECETOC TRA

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