



SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 05.11.2010

Version 13.2

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	A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

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

Identified uses	Reagent for analysis For additional information on uses please refer to the Merck Chemicals portal (www.merck-chemicals.com).
-----------------	---

1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department	EQ-RS * e-mail: prodsafe@merckgroup.com

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

2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Flammable liquid, Category 3, H226

Acute toxicity, Category 4, Oral, H302

Serious eye damage, Category 1, H318

Skin irritation, Category 2, H315

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

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

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

Classification (67/548/EEC or 1999/45/EC)

R10

Xn; R22

Xi; R37/38 - 41

For the full text of the R-phrases mentioned in this Section, see Section 16.

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

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.
H318 Causes serious eye damage.
H315 Causes skin irritation.
H335 May cause respiratory irritation.
H336 May cause drowsiness or dizziness.

Precautionary statements

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
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.

Reduced labelling (≤125 ml)

Hazard pictograms



Signal word

Danger

Hazard statements

H318 Causes serious eye damage.

Precautionary statements

P280 Wear protective gloves/ protective clothing/ eye protection/ face 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.

Index-No. 603-004-00-6

Labelling (67/548/EEC or 1999/45/EC)

Symbol(s)	Xn	Harmful
R-phrase(s)	10-22-37/38-41-67	Flammable. Harmful if swallowed. Irritating to respiratory system and skin. Risk of serious damage to eyes. Vapours may cause drowsiness and dizziness.
S-phrase(s)	7/9-13-26-37/39-46	Keep container tightly closed and in a well-ventilated place. Keep away from food, drink and animal feedingstuffs. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable gloves and eye/face

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

protection. If swallowed, seek medical advice immediately and show this container or label.

EC-No. 200-751-6

EC Label

Reduced labelling (≤125 ml)

Symbol(s) Xn

Harmful

R-phrase(s) 10-22-41

S-phrase(s) 26-37/39

Flammable. Harmful if swallowed. Risk of serious damage to eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable gloves and eye/face protection.

2.3 Other hazards

None known.

3. Composition/information on ingredients

Formula	CH ₃ (CH ₂) ₃ OH	C ₄ H ₁₀ O (Hill)
CAS-No.	71-36-3	
Index-No.	603-004-00-6	
EC-No.	200-751-6	
Molar mass	74,12 g/mol	

4. First aid measures

4.1 Description of first aid measures

After inhalation: fresh air. Consult doctor if feeling unwell.

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

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

After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed

irritant effects, Cough, depressed respiration, Shortness of breath, Drowsiness, Dizziness, narcosis, inebriation, Nausea, Vomiting, cardiovascular disorders, drowsiness, CNS disorders

4.3 Indication of immediate medical attention and special treatment needed

No information available.

5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Carbon dioxide (CO₂), 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 material, 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

The Safety Data Sheets for catalogue items are available at www.merck-chemicals.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

Special protective equipment for fire-fighters

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.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders: Protective equipment see section 8.

6.2 Environmental precautions

Do not empty into drains. 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 7.2 and 10.5).

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.

7. Handling and storage

7.1 Precautions for safe handling

Observe label precautions.

Work under hood. Do not inhale substance. 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.

7.2 Conditions for safe storage, including any incompatibilities

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

Storage temperature: no restrictions.

7.3 Specific end uses

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

8. Exposure controls/personal protection

8.1 Control parameters

8.2 Exposure controls

Engineering measures

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

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.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance. Work under hood. Do not inhale substance.

Eye/face protection

Tightly fitting safety goggles

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).

Other protective equipment:

Flame retardant antistatic protective clothing

Respiratory protection

required when vapours/aerosols are generated.

Recommended Filter type: Filter A-(P2)

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 empty into drains.

Risk of explosion.

9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form liquid

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

Colour	colourless
Odour	ethanolic
Odour Threshold	No information available.
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)
Vapour pressure	6,7 hPa at 20 °C (calculated)
Relative vapour density	2,6 at 20 °C
Relative density	0,81 g/cm ³ at 20 °C
Water solubility	77 g/l at 20 °C
Partition coefficient: n-octanol/water	log Pow: 0,88 Method: (experimental) (Lit.) Bioaccumulation is not expected (log Pow <1).
Autoignition temperature	No information available.
Decomposition temperature	No information available.
Viscosity, dynamic	2,95 mPa.s at 20 °C
Explosive properties	No information available.
Oxidizing properties	No information available.

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

9.2 Other data

Ignition temperature 340 °C
Method: DIN 51794

10. Stability and reactivity

10.1 Reactivity

Vapour/air-mixtures are explosive at intense warming.

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.

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

10.5 Incompatible materials

rubber, various plastics

10.6 Hazardous decomposition products

no information available

11. Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity

LD50 rat

Dose: 790 mg/kg

(RTECS)

Symptoms: Nausea, Vomiting, Aspiration may cause pulmonary oedema and pneumonitis.

absorption

Acute inhalation toxicity

LC50 rat

Dose: > 18 mg/l, 4 h

(highest concentration to be prepared) (IUCLID)

Symptoms: mucosal irritations, Cough, Shortness of breath, drowsiness, Drowsiness

LCLO human

Dose: 0,08 mg/l

(IUCLID)

absorption

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

Acute dermal toxicity
LD50 rabbit
Dose: 3.400 mg/kg
(RTECS)

Skin irritation
rabbit
Result: Irritations
(IUCLID)
Causes skin irritation.

Eye irritation
rabbit
Result: Severe irritations
Method: OECD Test Guideline 405
Causes serious eye damage.

Genotoxicity in vitro
Ames test
Salmonella typhimurium
Result: negative
(IUCLID)

Specific target organ toxicity - single exposure
May cause respiratory irritation.

May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
No aspiration toxicity classification

11.2 Further information

Further information

After absorption:

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

Damage to:

Liver, Kidney

Further data:

Handle in accordance with good industrial hygiene and safety practice.

12. Ecological information

12.1 Toxicity

Toxicity to fish

LC50

Species: Leuciscus idus (Golden orfe)

Dose: 1.200 - 1.700 mg/l

Exposure time: 96 h

(IUCLID)

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

Toxicity to daphnia and other aquatic invertebrates.

EC50
Species: Daphnia magna (Water flea)
Dose: 1.983 mg/l
Exposure time: 48 h
Method: DIN 38412

Toxicity to algae

IC50
Species: Desmodesmus subspicatus (green algae)
Dose: > 500 mg/l
Exposure time: 72 h
(IUCLID)

Toxicity to bacteria

EC10
Species: Pseudomonas putida
Dose: 2.250 mg/l
Exposure time: 16 h
(IUCLID)

12.2 Persistence and degradability

Biodegradability

Result: Readily biodegradable.
98 %
Exposure time: 28 d
Method: OECD Test Guideline 301E

Ratio BOD/ThBOD

BOD5 33 %
(IUCLID)

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water

log Pow: 0,88
Method: (experimental)
(Lit.) Bioaccumulation is not expected (log Pow <1).

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

12.6 Other adverse effects

Additional ecological information

Do not allow to run into surface waters, wastewater, or soil.

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

13. Disposal considerations

Waste treatment methods

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

14. Transport information

ADR/RID

UN 1120 BUTANOLS, 3, III

IATA

UN 1120 BUTANOLS, 3, III

IMDG

UN 1120 BUTANOLS, 3, III

EmS F-E S-D

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.

15. Regulatory information

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

EU regulations

Major Accident Hazard 96/82/EC
Legislation Flammable.
6
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. Take note of Dir 92/85/EEC on the safety and health at work of pregnant workers.

National legislation

Storage class VCI 3 Flammable Liquids

15.2 Chemical Safety Assessment

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

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.

Full text of R-phrases referred to under sections 2 and 3

R10 Flammable.
R22 Harmful if swallowed.

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

R37/38 Irritating to respiratory system and skin.
R41 Risk of serious damage to eyes.

Training advice

Provide adequate information, instruction and training for operators.

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

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.

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.