MATERIAL SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Date of issue: 03/11/2013 Version 1.0

SECTION 1. Identification

Product identifier

Product number 801554

Product name Ethylene glycol monobutyl ether for synthesis

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

Identified uses Chemical for synthesis

Details of the supplier of the safety data sheet

Company EMD Millipore Corporation | 290 Concord Road, Billerica, MA 01821, United States of America | SDS Phone Support: +1-978-715-1335 | General Inquiries: +1-978-715-4321 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5)

e-mail: mm_sds@merckgroup.com

Emergency telephone 800-424-9300 CHEMTREC (USA)
+1-703-527-3887 CHEMTREC (International)
24 Hours/day; 7 Days/week

SECTION 2. Hazards identification

GHS Classification

Acute toxicity, Category 4, Inhalation, H332
Acute toxicity, Category 4, Dermal, H312
Acute toxicity, Category 4, Oral, H302
Eye irritation, Category 2, H319
Skin irritation, Category 2, H315

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

GHS-Labeling

Hazard pictograms



Signal Word
Warning

Hazard Statements
H302 Harmful if swallowed.
H312 Harmful in contact with skin.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.

Precautionary Statements
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.

OSHA Hazards
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Other hazards
None known.

SECTION 3. Composition/information on ingredients

Formula	$C_4H_9OCH_2CH_2OH$	$C_6H_{14}O_2$ (Hill)
CAS-No.	111-76-2	
Molar mass	118.17 g/mol	

Hazardous ingredients
Chemical Name (Concentration)
CAS-No.
2-butoxyethanol (>= 90 % - <= 100 %)
111-76-2

SECTION 4. First aid measures

Description of first-aid measures

Inhalation
After inhalation: fresh air. If breathing stops: mouth-to-mouth breathing or artificial respiration. Oxygen if necessary. Immediately call in physician.

Skin contact
After skin contact: wash off with plenty of water. Remove contaminated clothing. Consult a physician.

Eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist.

Ingestion
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

irritant effects, Cough, Shortness of breath, Drowsiness, agitation, Nausea, Vomiting, Headache, insomnia, ataxia (impaired locomotor coordination), Lung edema

Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5. Fire-fighting measures

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.

Special hazards arising from the substance or mixture

Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapors possible in the event of fire.

Advice for firefighters

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.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

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

Advice for emergency responders: Protective equipment see section 8.

Environmental precautions

Do not empty into drains.

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.

SECTION 7. Handling and storage

Precautions for safe handling

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

Observe label precautions.

Conditions for safe storage, including any incompatibilities

Tightly closed. Dry. Protected from light.

Requirements for storage areas and containers

Do not use light-weight-metal containers.

Store at +15°C to +25°C (+59°F to +77°F).

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Ingredients

Basis	Value	Threshold limits	Remarks
2-butoxyethanol 111-76-2			
ACGIH	Time Weighted Average (TWA):	20 ppm	
NIOSH/GUIDE	Recommended exposure limit (REL):	5 ppm 24 mg/m³	
	Skin designation:		Can be absorbed through the skin.
OSHA_TRANS	PEL:	50 ppm 240 mg/m³	
	Skin designation:		Can be absorbed through the skin.
Z1A	Time Weighted Average (TWA):	25 ppm 120 mg/m³	
	Skin designation (Final Rule Limit applies):		Can be absorbed through the skin.

Engineering measures

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

Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures

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

Eye/face protection

Safety glasses

Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Other protective equipment:

protective clothing

Respiratory protection
required when vapors/aerosols are generated.
Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

SECTION 9. Physical and chemical properties

Physical state	liquid
Color	colorless
Odor	ether-like
Odor Threshold	0.1 - 58.6 ppm
pH	7 at 68 °F (20 °C) (as aqueous solution)
Melting point	< -70 °C
Boiling point/boiling range	334 - 342 °F (168 - 172 °C) at 1,013 hPa Method: DIN 53171
Flash point	153 °F (67 °C) Method: DIN 51758
Evaporation rate	No information available.
Flammability (solid, gas)	not applicable
Lower explosion limit	1.1 %(V)
Upper explosion limit	10.6 %(V)
Vapor pressure	0.8 hPa at 68 °F (20 °C) 7.6 hPa at 122 °F (50 °C)
Relative vapor density	4.07
Relative density	0.90 g/cm³ at 68 °F (20 °C) Method: DIN 51757

Water solubility	at 68 °F (20 °C) soluble
Partition coefficient: n-octanol/water	log Pow: 0.81 (25 °C) OECD Test Guideline 107 (Lit.) Bioaccumulation is not expected (log Pow <1).
Autoignition temperature	No information available.
Decomposition temperature	Distillable in an undecomposed state at normal pressure.
Viscosity, dynamic	3.3 mPa.s at 68 °F (20 °C)
Explosive properties	Not classified as explosive.
Ignition temperature	446 °F (230 °C) Method: DIN 51794
Viscosity, kinematic	3.642 mm²/s at 68 °F (20 °C)

SECTION 10. Stability and reactivity

Reactivity
Vapor/air-mixtures are explosive at intense warming.

Chemical stability
Reacts with air to form peroxides.
Sensitivity to light

Possibility of hazardous reactions
Violent reactions possible with:

Strong oxidizing agents

Generates dangerous gases or fumes in contact with:

Aluminum

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

Incompatible materials
no information available

Hazardous decomposition products
Peroxides

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure
Inhalation, Eye contact, Skin contact

Target Organs
hematopoietic system
Blood
Eyes
Skin
Respiratory system
Central nervous system
Kidneys
Liver
lymphoid system

Acute oral toxicity
LD50 rat: 470 mg/kg (RTECS)

absorption
Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.

Acute inhalation toxicity
LC50 rat: 2.2 mg/l; 4 h (RTECS)

absorption
Symptoms: mucosal irritations, Cough, Shortness of breath

Acute dermal toxicity
LD50 rabbit: 220 mg/kg
(RTECS)

absorption

Skin irritation
Causes skin irritation.

Eye irritation
rabbit
Result: Eye irritation
(RTECS)

Causes serious eye irritation.

Sensitization
Sensitization test: guinea pig
Result: negative
(External MSDS)

Genotoxicity in vitro
Ames test
Result: negative
(External MSDS)

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

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

Aspiration hazard
Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	Confirmed animal carcinogen with unknown relevance to humans.
	2-butoxyethanol 111-76-2

Further information
Possible effect after contact with substance:
After absorption:
Headache, Nausea, Vomiting, ataxia (impaired locomotor coordination), acidosis, Drowsiness, agitation, insomnia, Changes in the blood count, Lung edema
Damage to:
Liver, Kidney
Handle in accordance with good industrial hygiene and safety practice.

SECTION 12. Ecological information

Ecotoxicity

Toxicity to fish
LC50 Lepomis macrochirus (Bluegill sunfish): 1,490 mg/l; 96 h (Lit.)

Toxicity to daphnia and other aquatic invertebrates
EC50 Daphnia magna (Water flea): 1,698 - 1,940 mg/l; 24 h (IUCLID)

Toxicity to bacteria
EC0 Pseudomonas putida: 700 mg/l; 16 h (Lit.)

Persistence and degradability
Biodegradability
95 %; 28 d
OECD Test Guideline 301E
Readily biodegradable.

Bioaccumulative potential

Partition coefficient: n-octanol/water
log Pow: 0.81 (25 °C)
OECD Test Guideline 107
(Lit.) Bioaccumulation is not expected (log Pow <1).

Mobility in soil
No information available.

Other adverse effects

SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)
Not classified as dangerous in the meaning of transport regulations.

Air transport (IATA)
Not classified as dangerous in the meaning of transport regulations.

Sea transport (IMDG)
Not classified as dangerous in the meaning of transport regulations.

SECTION 15. Regulatory information

United States of America

OSHA Hazards
Combustible Liquid
Toxic by inhalation.
Toxic by ingestion
Toxic by skin absorption
Skin irritant
Eye irritant
Target organ effects

This information is based on 29 CFR 1910.1200 criteria prior to adoption of the GHS, and may deviate from the GHS information on the label and in section 2.

SARA 311/312 Hazards
Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313
The following components are subject to reporting levels established by SARA Title III, Section 313:
Ingredients
2-butoxyethanol 111-76-2

SARA 302
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

Clean Water Act
This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

DEA List I
Not listed

DEA List II
Not listed

Massachusetts Right To Know
Ingredients
2-butoxyethanol

Pennsylvania Right To Know
Ingredients
2-butoxyethanol

New Jersey Right To Know
Ingredients
2-butoxyethanol

Notification status

TSCA:	On TSCA Inventory
DSL:	All components of this product are on the Canadian DSL.

SECTION 16. Other information

Training advice
Provide adequate information, instruction and training for operators.

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

H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.

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.

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The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.

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