

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	1 / 16

**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING****Product information**

Trade name	n-Butyl chloride
Company	Evonik Industries AG Advanced Intermediates Chemicals Management (660-112) Postfach 1345 D-63403 Hanau, Germany
Telephone	+49 (0)6181 59-3086
Telefax	+49 (0)6181 59-2083
Email address	sds-info@evonik.com
Emergency telephone number	+49 (0)2365 49-2232
Emergency telephone number(Telefax)	+49 (0)2365 49-4423
	Plant fire brigade, Infracor GmbH
Use of the Substance / Preparation	Preliminary / intermediate product for organic syntheses For detailed exposure scenarios see Annexes.
Function	Organic intermediate/s
REACH-No.	01-2119491193-37-0000

**2. HAZARDS IDENTIFICATION****Classification according to Regulation (EC) No. 1272/2008 [CLP]**

EU-CLP as per Regulation (EU) No. 1272/2008

Flammable liquids

Category 2

H225

**Classification as per Directive 67/548/EC or Directive 1999/45/EC**

F, Highly flammable

R11: Highly flammable.

**GHS-Labeling**

Statutory basis

EU-CLP as per Regulation (EU) No. 1272/2008

Symbol(s)



Signal word

Danger

Hazard statement

H225 - Highly flammable liquid and vapour.

Precautionary statement:  
Prevention

P210 - Keep away from heat/sparks/open flames/hot surfaces. No smoking.  
P233 - Keep container tightly closed.  
P243 - Take precautionary measures against static discharge.  
P280 - Wear protective gloves/protective clothing/eye protection.

Precautionary statement:  
Storage

P403 + P235 - Store in a well-ventilated place. Keep cool.

**Other Hazards**

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	2 / 16



Vapours can form explosive mixtures with air.  
Avoid formation of vapour.  
Do not allow material to contaminate ground water system.

Not a PBT, vPvB substance as per the criteria of the REACH Ordinance.

**3. COMPOSITION/INFORMATION ON INGREDIENTS****Information on ingredients / Hazardous components as per EU-CLP Regulation (EC) No. 1272/2008****• 1-chlorobutane**

CAS-No.	109-69-3	EC-No.	203-696-6	REACH-No.	01-2119491193-37-0000
Flammable liquids				Category 2	H225

Remarks Not a PBT, vPvB substance as per the criteria of the REACH Ordinance.

**Information on ingredients / Hazardous components as per Directive 67/548/EC or Directive 1999/45/EC****• 1-chlorobutane**

CAS-No.	109-69-3	EC-No.	203-696-6	REACH-No.	01-2119491193-37-0000
	F; R11				

**Other information**

Not a PBT, vPvB substance as per the criteria of the REACH Ordinance.

Texts of H phrases, see in Chapter 16  
See chapter 16 for text of risk phrases

**4. FIRST AID MEASURES****Description of first aid measures**

Pay attention to self-protection.  
Remove victims from hazardous area. Immediately remove soiled or soaked clothing and remove it to a safe distance. Keep victim warm, in a stabilized position and covered.  
Do not leave victims unattended.  
If the casualty is unconscious: Place the victim in the recovery position.

**Inhalation**

Inhalation is possible if aerosols, mists, dusts, or smoke form.  
Move victims into fresh air.  
With labored breathing: Provide with oxygen. Consult a doctor.  
If the casualty is not breathing: Perform mouth-to-mouth resuscitation, notify emergency physician immediately.

**Eye contact**

With eye held open, thoroughly rinse immediately with plenty of water for at least 10 minutes.  
In case of persistent discomfort: Consult an ophthalmologist.

**Ingestion**

Rinse out mouth.  
Immediately give large quantities of water to drink.  
Consult a physician immediately.

**Most important symptoms and effects, both acute and delayed****Indication of any immediate medical attention and special treatment needed**

This substance does not have any noteworthy noxious potential. Damage to health is thus not expected.

# SAFETY DATA SHEET (EC 1907/2006)

## n-Butyl chloride

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	3 / 16



### 5. FIRE-FIGHTING MEASURES

#### Suitable extinguishing media

Water spray, foam, CO2, dry powder.

#### Unsuitable extinguishing media

high volume water jet

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

In case of fire cool endangered containers with water.

Hazardous fumes in fires, specific to the product:

hydrogen chloride

Under certain fire conditions, traces of other toxic products may occur.

#### Special protective equipment for fire-fighters

In case of fire: full protective suit and wear a self contained respiratory apparatus

Wear suitable protective clothing.

#### Advice for firefighters

Water used to extinguish fire should not enter drainage systems, soil, or stretches of water. Ensure there are sufficient retaining facilities for water used to extinguish fire. Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities.

Fire residues should be disposed of in accordance with the regulations.

### 6. ACCIDENTAL RELEASE MEASURES

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

Ensure adequate ventilation.

Keep away from sources of ignition - No smoking.

Do not allow to enter drains (danger of explosion).

Wear personal protective equipment; see section 8.

#### Environmental precautions

Prevent product from entering drains.

Do not allow entrance in sewage water, soil or stretches of water.

#### Methods and material for containment and cleaning up

Take up mechanically or with a non-combustible absorbent material.

Suitable absorbents:

universal absorbent

Fill into marked, sealable containers.

### 7. HANDLING AND STORAGE

#### Handling

##### Precautions for safe handling

Provide good ventilation or extraction.

Observe the rules usually applicable when handling chemicals.

Wear personal protective equipment; see section 8.

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

Take precautionary measures against static charges, keep away from sources of ignition.

Explosion protection equipment required.

#### Storage

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

Keep container tightly closed.

Keep in a well-ventilated place.

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	4 / 16



Keep in a cool place.

Unsuitable materials light metals, copper, brass

**Specific use(s)**

For more details see annexes Exposure scenario.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Control parameters****Other information**

Suitable measuring processes are:  
BIA method 6568

**DNEL/DMEL values**

End Use	Worker
Routes of exposure	dermal
Possible health damage	Long-term - systemic effects
Value	2.4 mg/kg bodyweight/day
End Use	Worker
Routes of exposure	Inhalation
Possible health damage	Long-term - systemic effects
Value	8.5 mg/m <sup>3</sup>

**PNEC values**

	<b>Freshwater</b>
Value	0.056 mg/l
	<b>marine water</b>
Value	0.006 mg/l
	<b>water - intermittent releases</b>
Value	0.756 mg/l
	<b>Fresh water sediment</b>
Value	1.9712 mg/kg (dry weight)
	<b>Marine sediment</b>
Value	0.19712 mg/kg (dry weight)
	<b>soil</b>
Value	0.3675 mg/kg (dry weight)

**Engineering measures**

If possible, use material transfer/filling, metering and blending plants that are closed.  
If contact with gases or vapours cannot be excluded: Extraction at the emission source required.  
see also section 7.

**Personal protective equipment****Respiratory protection**

In case of leakage or if TLV is exceeded wear respiratory equipment with suitable filter or a self contained respiratory apparatus.

Suitable filter: A-P2, code colour brown-white

Note time limit for wearing respiratory protective equipment.

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	5 / 16

**Hand protection**

Recommendation:  
suitable protective gloves

Glove material	chloroprene (Camapren, Tricopren)
Material thickness	0.4 mm
Method	DIN EN 374

Glove material	Fluorinated rubber (Vitoject)
Material thickness	0.4 mm
Method	DIN EN 374

**Eye protection**

safety glasses with side-shields conforming to EN166

**Skin and body protection**

suitable protective clothing - Use disposable clothing if appropriate.

**Hygiene measures**

Do not inhale vapours / aerosols.

Avoid contact with skin and eyes.

Wash off immediately in the event of contact with the skin (rinsing agent: glycol polyethylene 400), rinse off afterwards with copious amounts of water.

No eating, drinking, smoking, or snuffing tobacco at work. Wash face and/or hands before break and end of work.

Take off clothing and shoes contaminated with product. Clean before reuse.

**Protective measures**

The personal protective equipment used must meet the requirements of directive 89/686/EEC and amendments (CE certification).

---

**9. PHYSICAL AND CHEMICAL PROPERTIES****Appearance**

Form	liquid
Colour	colourless
Odour	stinging
Smell threshold:	No data available

**Information on basic physical and chemical properties**

pH	not applicable
Melting point/range	-123 °C
Boiling point/range	ca. 79 °C (1013 hPa)
Flash point	ca. -12 °C Method: EEC method 92/69/EEC, A 9
Evaporation rate	No data available
Flammability (solid, gas)	No data available
Ignition temperature	ca. 245 °C Method: DIN 51 794
Autoinflammability	No data available
Thermal decomposition	Distills without decomposition at atmospheric pressure.
Oxidizing properties	Not to be expected in view of the structure

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	6 / 16



Explosiveness	No data available
Lower explosion limit	1.8 %(V) Method: EC Method A.11
Upper explosion limit	10.1 %(V) Method: EC Method A.11
Vapour pressure	ca. 110 hPa (20 °C)
Density	0.886 g/cm <sup>3</sup> (20 °C)
Relative density	No data available
Water solubility	ca. 0.5 g/l (20 °C)
Partition coefficient (n-octanol/water)	log Pow: 2.66 (measured) tested substance: 1-chlorobutane
Viscosity, dynamic	0.45 mPa.s (20 °C)

**10. STABILITY AND REACTIVITY**

Hazardous decomposition products	Decomposition products in combustion, chemical or thermal decomposition hydrogen chloride
----------------------------------	--

**11. TOXICOLOGICAL INFORMATION**

Acute oral toxicity	LD50 rat: 2200 mg/kg Assessment: based on available data, the classification criteria are not met.
Acute inhalation toxicity	LC50 rat(male/female): > 7.74 mg/l / 4 h / Aerosol Method: OECD Test Guideline 403 Assessment: based on available data, the classification criteria are not met.
Acute dermal toxicity	No data available
Skin irritation	Rabbit / 4 h not irritating Method: OECD Test Guideline 404 based on available data, the classification criteria are not met.
Eye irritation	Rabbit not irritating Method: OECD Test Guideline 405 based on available data, the classification criteria are not met.
Sensitization	Buehler Test guinea pig: negativenot sensitizing Method: OECD Test Guideline 406 based on available data, the classification criteria are not met.

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	7 / 16

## Repeated dose toxicity

## Oral Rat(male/female) / 90-day

NOAEL: 120 mg/kg

LOAEL: 250 mg/kg

Method: OECD 408

Assessment: based on available data, the classification criteria are not met.

## Oral mouse(male/female) / 90-day

NOAEL: 500 mg/kg

LOAEL: 1000 mg/kg

Method: OECD 408

Assessment: based on available data, the classification criteria are not met.

## Assessment of STOT single exposure

No data available

## Assessment of STOT repeat exposure

No data available

## Risk of aspiration toxicity

No data available

## Gentoxicity in vitro

gene mutation Salmonella typhimurium  
negative

Metabolic activation: with or without

Method: OECD TG 471

Chromosome aberration test in vitro Chinese hamster  
negative

Metabolic activation: with or without

Method: OECD TG 473

Sister chromatid exchange assay Chinese hamster (CHO K1 -cells)  
negative

Metabolic activation: with or without

Method: OECD TG 479

## Gentoxicity in vivo

chromosomal aberration mouse intraperitoneal  
negative

Method: OECD TG 474

## Mutagenicity assessment

based on available data, the classification criteria are not met.  
The assessment is based on the strength-of-evidence approach.

## Carcinogenicity

Oral Rat(male/female): 2 years

Method: OECD Test Guideline 451

No evidence that cancer may be caused.

Oral mouse(male/female): 2 years

Method: OECD Test Guideline 451

No evidence that cancer may be caused.

## carcinogenicity assessment

based on available data, the classification criteria are not met.  
The assessment is based on the strength-of-evidence approach.

## Toxicity to reproduction

Oral Rat(male/female)

NOAEL (No Observed Adverse Effect Level) of parents: 300 mg/kg

Method: OECD 421

No evidence of effects of reproductive / developmental toxicity.

## reproduction toxicity assessment

based on available data, the classification criteria are not met.

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	8 / 16



The assessment is based on the strength-of-evidence approach.

**Teratogenicity****Oral Rat**

NOAEL (No Observed Adverse Effect Level) teratogenesis: 300 mg/kg

Method: OECD TG 422

no evidence of teratogenic properties

**teratogenicity assessment**

based on available data, the classification criteria are not met.

The assessment is based on the strength-of-evidence approach.

**Toxicology Assessment****Acute effects**

The classification criteria are not met based on the available data.

**Sensitization**

The classification criteria are not met based on the available data.

**Repeated dose toxicity**

The classification criteria are not met based on the available data.

**CMR assessment****Carcinogenicity**

The classification criteria are not met based on the available data.

**Mutagenicity**

The classification criteria are not met based on the available data.

**Teratogenicity**

The classification criteria are not met based on the available data.

**Toxicity to reproduction**

The classification criteria are not met based on the available data.

**12. ECOLOGICAL INFORMATION****Elimination information (persistence and degradability)****Biodegradability**

aerobic

inoculum: Activated sludge

Concentration: 73.2 mg/l

Exposure time: 28 d

Result: 47.2 % Not readily biodegradable.

Method: BODIS test

**Behaviour in environmental compartments****Bioaccumulation**

Species: Cyprinus carpio (Carp)

Exposure time: 42 d

Concentration: 0.5 mg/l

Bioconcentration factor (BCF): 7.6 - 21

Method: OECD 305

**Mobility**

logKOC: 2.5

Method: OECD TG 121

**Ecotoxicity effects****Toxicity to fish**

LC50 semi-static test Cyprinus carpio (Carp): 258.6 mg/l / 48 h

Analytical monitoring: no

Method: OECD TG 203

LC50 semi-static test Brachydanio rerio: 75.6 mg/l / 96 h

Analytical monitoring: yes

Method: OECD TG 203

**Toxicity in aquatic invertebrates**

EC50 Daphnia magna: 452 mg/l / 48 h

Analytical monitoring: yes

Method: Directive 84/449/EEC, C.2



**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	9 / 16



NOEC Daphnia magna: 5.6 mg/l / 21 d  
Method: OECD TG 211

EC50 Daphnia magna: 16 mg/l / 21 d  
Method: OECD TG 211

**Toxicity to algae**

EC50 scenedesmus subspicatus: > 450.00 mg/l / 72 h  
Analytical monitoring: no  
Method: (Directive 88/302/EEC part C.3.)

NOEC scenedesmus subspicatus: 90 mg/l / 72 h  
Analytical monitoring: no  
Method: (Directive 88/302/EEC part C.3.)

**Toxicity to bacteria**

EC50 Community sewage sludge: > 1000 mg/l / 3 h  
Method: OECD TG 209

**Ecotoxicology Assessment**

Acute aquatic toxicity  
Chronic aquatic toxicity

The classification criteria are not met based on the available data.  
The classification criteria are not met based on the available data.

**Results of PBT assessment**

Not a PBT, vPvB substance as per the criteria of the REACH Ordinance.

---

**13. DISPOSAL CONSIDERATIONS****Product**

With respect to local regulations, e.g. dispose of to suitable waste incineration plant.

The waste key number must be determined as per the European Waste Types List (decision on EU Waste Types List 2000/532/EC) in cooperation with the disposal firm / producing firm / official authority.

---

**14. TRANSPORT INFORMATION****Land transport ADR/RID/GGVSEB (Germany)**

Class	3
ADR/RID-Labels	3
UN-No	1127
Packaging group	II
orange warning plate	33 / 1127
Tunnel Restriction Code (ADR)	(D/E)
Description of the goods (Technical name)	
CHLOROBUTANES (1-chlorobutane)	

**Sea transport IMDG-Code/GGVSee (Germany)**

Class	3
UN-No	1127
Packaging group	II
EmS	F-E, S-D
Proper technical name (Proper shipping name)	
CHLOROBUTANES (1-chlorobutane)	

**Air transport ICAO-TI/IATA-DGR**

Class	3
UN-No	1127
Packaging group	II

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	10 / 16



Proper technical name (Proper shipping name)  
Chlorobutanes (1-chlorobutane)

**Inland waterway transport ADN/GGVSEB (Germany)**

Class	3
ADR/RID-Labels	3
UN-No / Substance number	1127
Packaging group	II
Description of the goods (Technical name)	
CHLOROBUTANES (1-chlorobutane)	

**Loading instructions/Remarks**

ADR	Observe listed materials regulation §35, paragraph 1 GGVSEB
IATA_C	ERG-Code 3L
IATA_P	ERG-Code 3L

---

**15. REGULATORY INFORMATION**

Chemical safety assessment : A substance safety assessment was carried out for this product.

**registration**

Europe (REACH)	listed/registered
USA (TSCA)	listed/registered
Canada (DSL)	listed/registered
Australia (AICS)	listed/registered
Japan (MITI)	listed/registered
Korea (TCCL)	listed/registered
Philippines (PICCS)	listed/registered
China	listed/registered

**National legislation**

Major Accident Hazard Legislation	The product is subject to the EC directive 96/82/EC and amendments (see regulations concerning malfunctions).
Regulations on labour safety:	It must be determined whether preventive substance-specific occupational medical examinations in accordance with national law in each case must be offered / carried out at regular intervals.
employment restriction	Please note Directive 92/85/EEC (Pregnant Workers Directive) and amendments. Please note Directive 94/33/EC (Protection of Young Workers at the Workplace Directive) and amendments.
Other regulations	Please observe Appendix XVII of the EU Regulation 1907/2006 (Restrictions on the manufacture, placing on the market, and use of certain dangerous substances, preparations and articles) as well as their amendments.

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	11 / 16

**16. OTHER INFORMATION****Risk phrase (R phrase) texts**

- **1-chlorobutane**

R11                      Highly flammable.

**Texts of the H-phrases**

- **1-chlorobutane**

H225                      Highly flammable liquid and vapour.

**Further information**

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	12 / 16

**Legend**

<b>ADR</b>	European Agreement concerning the International Carriage of Dangerous Goods by Road
<b>ADN</b>	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
<b>ADNR</b>	European agreement concerning the international carriage of dangerous goods by inland waterways (ADN)
<b>ASTM</b>	American Society for Testing and Materials
<b>ATP</b>	Adaptation to Technical Progress
<b>BCF</b>	Bioconcentration Factor
<b>BetrSichV</b>	German Ordinance on Industrial Safety and Health
<b>c. c.</b>	closed cup
<b>CAS</b>	Chemical Abstract Services
<b>CESIO</b>	European Committee of Organic Surfactants and their Intermediates
<b>ChemG</b>	German Chemicals Act
<b>CMR</b>	Carcinogenic-Mutagenic-toxic for Reproduction
<b>DIN</b>	German Institute for Standardization
<b>DNEL</b>	Derived No Effect Level
<b>EINECS</b>	European Inventory of Existing Commercial Chemical Substances
<b>GefStoffV</b>	German Ordinance on Hazardous Substances
<b>GGVSEB</b>	German ordinance for road, rail and inland waterway transportation of dangerous goods
<b>GGVSee</b>	German ordinance for sea transportation of dangerous goods
<b>GLP</b>	Good Laboratory Practice.
<b>GMO</b>	Genetic Modified Organism
<b>IATA DGR</b>	International Air Transport Association – Dangerous Goods Regulations
<b>ICAO-TI</b>	International Civil Aviation Organisation - Technical Instructions
<b>IMDG Code</b>	International Maritime Dangerous Goods Code
<b>ISO</b>	International Organization For Standardization
<b>LOAEL</b>	Lowest Observed Adverse Effect Level
<b>LOEL</b>	Lowest Observed Effect Level
<b>NOAEL</b>	No Observed Adverse Effect Level
<b>NOEC</b>	No Observed Effect Concentration
<b>NOEL</b>	No Observed Effect Level
<b>o. c.</b>	open cup
<b>OECD</b>	Organisation for Economic Cooperation and Development
<b>OEL</b>	Occupational Exposure Limit
<b>PBT</b>	Persistent, Bioaccumulative, Toxic
<b>PEC</b>	Predicted Environmental Concentration
<b>PNEC</b>	Predicted No Effect Concentration
<b>RID</b>	Regulations concerning the International Carriage of Dangerous Goods by Rail
<b>TA</b>	Technical Instructions (German Ordinance)
<b>TPR</b>	Third Party Representative (Art. 4)
<b>TRGS</b>	Technical Rules for Hazardous Substances (German Regulations)
<b>VCI</b>	German "Verband der Chemischen Industrie e. V."
<b>vPvB</b>	Very Persistent, Very Bioaccumulative
<b>VOC</b>	Volatile Organic Compounds
<b>VwVwS</b>	German Administrative Regulation on the Classification of Substances Hazardous to Waters into Water Hazard Classes
<b>WGK</b>	German Water Hazard Class
<b>WHO</b>	World Health Organization

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	13 / 16

**ANNEX**

Exposure scenario

**ES1: Use in chemical synthesis****1. Short title of exposure scenario****ES1: Use in chemical synthesis****2. Description of activities/process(es) covered in the Exposure Scenario**

Sector of use	SU8	Manufacture of bulk, large scale chemicals (including petroleum products)
Product category		not applicable
Process category	PROC8b	Unloading of drums / unloading of tank lorries
		Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
		Synthesis (closed and partially closed systems)
	PROC1	Use in closed process, no likelihood of exposure
	PROC3	Use in closed batch process (synthesis or formulation)
Article category		not applicable
Cat. release to the environment	ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)

**3. Application conditions****3.1 Duration and frequency****Duration of exposure**

Long-term 0.25 - 4 hours/day

**Frequency of exposure**

Long-term 220 days/year

**Annual site amount**

Long-term &lt; 10000 tons

**Emission days per site**

Long-term 100 days/year

**4.1 Physical form**

liquid

**4.2 Concentration of substance in preparation**

Remarks not applicable

**4.3 Amount used per time or per activity****5. Other operational conditions**

Compartment	air
Compartment	sewage water
Emission or Release Factor	0 %
Compartment	Soil
Emission or Release Factor	0 %

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	14 / 16

**6. RISK MANAGEMENT MEASURES****6.1.1 Occupational Measures****PROC8b**

Routes of exposure	dermal, inhalation, also in combination
Exposure time	> 4 h
Organizational protective measures	Assumes a good basic standard of occupational hygiene has been implemented.
Technical protective measures	Interior space with forced-air ventilation
Personal protective measures	Wear personal protective equipment; see section 8.
Remarks	Additional protective measures: See Section 8 of the Safety Data Sheet.

**PROC8b**

Routes of exposure	dermal, inhalation, also in combination
Exposure time	< 15 minutes
Organizational protective measures	Assumes a good basic standard of occupational hygiene has been implemented.
Technical protective measures	Outside air Under inert gas
Personal protective measures	Wear personal protective equipment; see section 8.
Remarks	Additional protective measures: See Section 8 of the Safety Data Sheet.

**PROC1**

Routes of exposure	dermal, inhalation, also in combination
Exposure time	> 4 h
Organizational protective measures	Assumes a good basic standard of occupational hygiene has been implemented.
Technical protective measures	Outside air Use product only in closed system.
Personal protective measures	Wear personal protective equipment; see section 8.
Remarks	Additional protective measures: See Section 8 of the Safety Data Sheet.

**PROC3**

Routes of exposure	dermal, inhalation, also in combination
Exposure time	< 1 h
Organizational protective measures	Assumes a good basic standard of occupational hygiene has been implemented.
Technical protective measures	Outside air
Personal protective measures	Wear personal protective equipment; see section 8.
Remarks	Additional protective measures: See Section 8 of the Safety Data Sheet.

**6.1.2 Consumer related measures**

**Not relevant for this exposure scenario.**

**6.2 Environment related measures**

Exposure time	Includes daily exposure.
Air	Avoid emissions in air.
Water	No release to waste water
Soil	No exposure expected

**7. Waste related measures**

Waste treatment	Must be brought to an authorized special waste incineration plant in accordance with the regulations on special waste following local regulations.
-----------------	--

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	15 / 16

**8. Prediction of exposure**

Specific conditions	workers, oral
Remarks	No significant oral exposure
Calculation method	ECETOC TRA
Specific conditions	workers, dermal
value type	PROC8b
Value	0.686 mg/kg bodyweight/day
Remarks	< 15 minutes using personal protection equipment
Calculation method	ECETOC TRA
Specific conditions	workers, dermal
value type	PROC1
Value	0.343 mg/kg bodyweight/day
Remarks	< 1 h using personal protection equipment and housing
Calculation method	ECETOC TRA
Specific conditions	workers, dermal
value type	PROC3
Value	0.343 mg/kg bodyweight/day
Remarks	< 1 h using personal protection equipment and housing
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC8b
Value	1.736 mg/m <sup>3</sup>
Remarks	> 4 hours using local exhaust ventilation (or respiratory protection)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC8b
Value	4.050 mg/m <sup>3</sup>
Remarks	> 4 hours Outside air (or respiratory protection)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC1
Value	0.027 mg/m <sup>3</sup>
Remarks	> 4 hours Outside air and limitation of exposure (e.g. in closed system)
Calculation method	ECETOC TRA
Specific conditions	workers, inhalation
value type	PROC3
Value	5.400 mg/m <sup>3</sup>
Remarks	< 1 h Outside air (or respiratory protection) and limitation of exposure (e.g. in closed system)
Calculation method	ECETOC TRA
Specific conditions	Worker, combined dermal and inhalative
value type	PROC8b
Value	0.934 mg/kg bodyweight/day
Remarks	> 4 hours using local exhaust ventilation (or respiratory protection)

**SAFETY DATA SHEET (EC 1907/2006)****n-Butyl chloride**

Material no.		Version	10.12 / GB
Specification	115686	Revision date	04.01.2013
VA-Nr		Print Date	17.04.2013
		Page	16 / 16

Calculation method	ECETOC TRA
Specific conditions	Worker, combined dermal and inhalative
value type	PROC8b
Value	1.264 mg/kg bodyweight/day
Remarks	< 15 minutes using personal protection equipment Outside air
Calculation method	ECETOC TRA
value type	PROC1
Value	0.347 mg/kg bodyweight/day
Remarks	> 4 hours using personal protection equipment Outside air and limitation of exposure (e.g. in closed system)
Calculation method	ECETOC TRA
value type	PROC3
Value	1.114 mg/kg bodyweight/day
Remarks	< 1 h using personal protection equipment Outside air and limitation of exposure (e.g. in closed system)
Calculation method	EUSES
Remarks	No data available

**9. Guidance to downstream user**

No additional relevant information available.