

# SAFETY DATA SHEET



Isobutanol

10250

Version / Revision

5.01

Revision Date

30-Nov-2020

Supersedes Version

5.00\*\*\*

Issuing date

30-Nov-2020

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

### 1.1. Product identifier

Identification of the substance/preparation

# Isobutanol

Chemical Name

2-Methylpropan-1-ol

CAS-No

78-83-1

EC No.

201-148-0

Registration number (REACH)

01-2119484609-23

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

Identified uses

Intermediate  
Formulation  
Distribution of substance  
coatings  
cleaning agent  
Lubricants and lubricant additives  
Metal working fluids / rolling oils  
laboratory chemicals  
Polymer processing  
consumer care product

Uses advised against

None

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

Company/Undertaking  
Identification

**OQ Chemicals GmbH**  
Rheinpromenade 4A  
D-40789 Monheim  
Germany

Product Information

Product Stewardship  
FAX: +49 (0)208 693 2053  
email: sc.psq@oq.com

### 1.4. Emergency telephone number

Emergency telephone number +44 (0) 1235 239 670 (UK)  
available 24/7\*\*\*

National emergency telephone number National Poisons Information Centre  
+353 (0)1 809 2166  
available to the public 8 am - 10 pm  
available 24/7 for medical professionals

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

This substance is classified based on Directive 1272/2008/EC and its amendments (CLP Regulation)

Flammable liquid Category 3, H226  
Skin corrosion/irritation Category 2, H315  
Serious eye damage/eye irritation Category 1, H318  
Target Organ Systemic Toxicant - Single exposure Category 3, H335, Category 3, H336

## Additional information

For full text of Hazard- and EU Hazard-statements see SECTION 16.

## 2.2. Label elements

Labelling according to Regulation 1272/2008/EC and its amendments (CLP Regulation).

### Hazard pictograms



### Signal word

**Danger**

### Hazard statements

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

### Precautionary statements

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
P233: Keep container tightly closed.  
P261: Avoid breathing gas/mist/vapours.  
P280: Wear protective gloves/protective clothing/eye protection/face protection.  
P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.  
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P310: Immediately call a POISON CENTER/doctor.  
P403 + P235: Store in a well ventilated place. Keep cool.

## 2.3. Other hazards

Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback  
Vapours may form explosive mixture with air  
Components of the product may be absorbed into the body by inhalation, ingestion and through the skin

### PBT and vPvB assessment

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT), nor very persistent nor very bioaccumulating (vPvB)

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

## SECTION 3: Composition / information on ingredients

### 3.1. Substances

Component	CAS-No	REACH-No	1272/2008/EC	Concentration (%)
2-Methylpropan-1-ol	78-83-1	01-2119484609-23	Flam. Liq. 3; H226 Skin Irrit. 2; H315 Eye Dam. 1; H318 STOT SE 3; H335 STOT SE 3; H336	> 99,0

For full text of Hazard- and EU Hazard-statements see SECTION 16.

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

#### Inhalation

Keep at rest. Aerate with fresh air. When symptoms persist or in all cases of doubt seek medical advice.

#### Skin

Wash off immediately with soap and plenty of water. When symptoms persist or in all cases of doubt seek medical advice.

#### Eyes

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Immediate medical attention is required.

#### Ingestion

Rinse mouth. Call a physician immediately. If conscious, drink plenty of water. Do not induce vomiting without medical advice.

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

#### Main symptoms

headache, dizziness, drowsiness, abdominal pain, nausea, diarrhea, vomiting, unconsciousness.

#### Special hazard

Lung irritation, Pneumonia.

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

#### General advice

Remove contaminated, soaked clothing immediately and dispose of safely. If unconscious place in recovery position and seek medical advice. First aider needs to protect himself.

Treat symptomatically. If ingested, irrigate the stomach using activated charcoal. Chemical pneumonitis could follow respiratory exposure.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

dry chemical, carbon dioxide (CO<sub>2</sub>), water spray, alcohol-resistant foam

## Unsuitable Extinguishing Media

Do not use a solid water stream as it may scatter and spread fire.

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

Under conditions giving incomplete combustion, hazardous gases produced may consist of:

carbon monoxide (CO)

carbon dioxide (CO<sub>2</sub>)

Combustion gases of organic materials must in principle be graded as inhalation poisons

Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback

Vapours may form explosive mixture with air

## 5.3. Advice for firefighters

### Special protective equipment for firefighters

Fire fighter protection should include a self-contained breathing apparatus (NIOSH-approved or EN 133) and full fire-fighting turn out gear.

### Precautions for firefighting

Cool containers / tanks with water spray. Dike and collect water used to fight fire. Keep people away from and upwind of fire. Do not allow run-off from fire fighting to enter drains or water courses. Foam should be applied in large quantities as it is broken down to some extent by the product.

## SECTION 6: Accidental release measures

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

For non-emergency personnel: For personal protective equipment see section 8. Avoid contact with skin and eyes. Avoid breathing vapors or mists. Keep people away from and upwind of spill/leak. Ensure adequate ventilation, especially in confined areas. Keep away from heat and sources of ignition.

For emergency responders: Personal protection see section 8.

### 6.2. Environmental precautions

Prevent further leakage or spillage. Do not discharge product into the aquatic environment without pretreatment (biological treatment plant).

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

#### Methods for containment

Stop the flow of material, if possible without risk. Dike spilled material, where this is possible.

#### Methods for cleaning up

Soak up with inert absorbent material (e.g. universal binder). Keep in suitable, closed containers for disposal. If liquid has been spilt in large quantities clean up promptly by scoop or vacuum. Dispose of in accordance with local regulations. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours).

### 6.4. Reference to other sections

For personal protective equipment see section 8.



Isobutanol  
10250

Version / Revision 5.01

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Further info may be available in the appropriate Exposure scenarios in the annex to this SDS.

#### Advice on safe handling

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Provide sufficient air exchange and/or exhaust in work rooms.

#### Hygiene measures

When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

#### Advice on the protection of the environment

See Section 8: Environmental exposure controls.

#### Incompatible products

strong oxidizing agents

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

#### Advice on protection against fire and explosion

Keep away from sources of ignition - No smoking. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). In case of fire, emergency cooling with water spray should be available. Ground and bond containers when transferring material. Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback. Vapours may form explosive mixture with air.

#### Technical measures/Storage conditions

Keep containers tightly closed in a cool, well-ventilated place. Handle and open container with care.

#### Suitable material

stainless steel, mild steel

#### Unsuitable material

Aluminium, Attacks some forms of plastic and rubber

#### Temperature class

T2

### 7.3. Specific end use(s)

Intermediate

Formulation

Distribution of substance

coatings

cleaning agent

Lubricants and lubricant additives

Metal working fluids / rolling oils

laboratory chemicals

Polymer processing

consumer care product

For specific end use information see the annex of this safety data sheet

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

## SECTION 8: Exposure controls / personal protection

### 8.1. Control parameters

#### Exposure limits European Union

No exposure limits established

#### Exposure limits Ireland

##### Ireland OELs

Component	TWA (mg/m <sup>3</sup> )	TWA (ppm)	STEL (mg/m <sup>3</sup> )	STEL (ppm)	Skin Absorption	Sensitizer
2-Methylpropan-1-ol CAS: 78-83-1	150	50	225	75		

##### Notes

For details and further information please refer to the original regulation.

##### DNEL & PNEC

#### 2-Methylpropan-1-ol, CAS: 78-83-1

##### Workers

DN(M)EL - long-term exposure - systemic effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Inhalation	310 mg/m <sup>3</sup>
DN(M)EL - acute / short-term exposure - local effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - systemic effects - Dermal	No hazard identified
DN(M)EL - acute / short-term exposure - systemic effects - Dermal	No hazard identified
DN(M)EL - long-term exposure - local effects - Dermal	Medium hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - local effects - Dermal	Medium hazard (no threshold derived)
DN(M)EL - local effects - eyes	Medium hazard (no threshold derived)

##### General population

DN(M)EL - long-term exposure - systemic effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Inhalation	55 mg/m <sup>3</sup>
DN(M)EL - acute / short-term exposure - local effects - Inhalation	Low hazard (no threshold derived)
DN(M)EL - long-term exposure - systemic effects - Dermal	No hazard identified
DN(M)EL - acute / short-term exposure - systemic effects - Dermal	No hazard identified
DN(M)EL - long-term exposure - local effects - Dermal	Medium hazard (no threshold derived)

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

<b>DN(M)EL - acute / short-term exposure - local effects - Dermal</b>	derived) Medium hazard (no threshold derived)
<b>DN(M)EL - long-term exposure - systemic effects - Oral</b>	No hazard identified
<b>DN(M)EL - acute / short-term exposure - systemic effects - Oral</b>	No hazard identified
<b>DN(M)EL - local effects - eyes</b>	Medium hazard (no threshold derived)

## Environment

<b>PNEC aqua - freshwater</b>	0,4 mg/l
<b>PNEC aqua - marine water</b>	0,04 mg/l
<b>PNEC aqua - intermittent releases</b>	11 mg/l
<b>PNEC STP</b>	10 mg/l
<b>PNEC sediment - freshwater</b>	1,56 mg/kg dw***
<b>PNEC sediment - marine water</b>	0,156 mg/kg dw***
<b>PNEC Air</b>	No hazard identified***
<b>PNEC soil</b>	0,0756 mg/kg dw***
<b>Secondary poisoning</b>	No potential for bioaccumulation

## 8.2. Exposure controls

### Special adaptations (REACH)

Not applicable.

### Appropriate Engineering controls

General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

### Personal protective equipment

#### General industrial hygiene practice

Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Ensure that eyewash stations and safety showers are close to the workstation location.

#### Hygiene measures

When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

#### Eye protection

Tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.

Equipment should conform to EN 166

#### Hand protection

Wear protective gloves. Recommendations are listed below. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

<b>Suitable material</b>	butyl-rubber
<b>Evaluation</b>	according to EN 374: level 6
<b>Glove thickness</b>	approx 0,3 mm
<b>Break through time</b>	> 480 min

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

**Suitable material** nitrile rubber  
**Evaluation** according to EN 374: level 6  
**Glove thickness** approx 0,55 mm  
**Break through time** > 480 min

## Skin and body protection

Impervious clothing. Wear face-shield and protective suit for abnormal processing problems.

## Respiratory protection

Respirator with A filter. Full mask with above mentioned filter according to producers using requirements or self-contained breathing apparatus. Equipment should conform to EN 136 or EN 140 and EN 143.

## Environmental exposure controls

If possible use in closed systems. If leakage can not be prevented, the substance needs to be suck off at the emersion point, if possible without danger. Observe the exposure limits, clean exhaust air if needed. If recycling is not practicable, dispose of in compliance with local regulations. Inform the responsible authorities in case of leakage into the atmosphere, or of entry into waterways, soil or drains.

## Additional advice

Further details on substance data can be found in the registration dossier under the following link:  
<http://echa.europa.eu/information-on-chemicals/registered-substances>. For specific exposure controls see the annex to this safety data sheet.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

<b>Appearance</b>	liquid
<b>Colour</b>	colourless
<b>Odour</b>	alcoholic
<b>Odour threshold</b>	123 mg/m <sup>3</sup>
<b>pH</b>	neutral
<b>Melting point/range</b>	< -90 °C (Pour point) < - 20 °C (Freezing Point)***
<b>Method</b>	DIN ISO 3016
<b>Boiling point/range</b>	108 °C @ 1013 hPa
<b>Method</b>	OECD 103
<b>Flash point</b>	31 °C @ 1013 hPa***
<b>Method</b>	ISO 2719
<b>Evaporation rate</b>	No data available
<b>Flammability (solid, gas)</b>	Does not apply, the substance is a liquid
<b>Lower explosion limit</b>	1,2 Vol %
<b>Upper explosion limit</b>	10,9 Vol %

#### Vapour pressure

Values [hPa]	Values [kPa]	Values [atm]	@ °C	@ °F	Method
10,5***	1,05***	0,010***	20	68	OECD 104***
40***	4***	0,039***	41***	105,8***	OECD 104***

**Vapour density** 2,6 (Air = 1) @ 20 °C (68 °F)

#### Relative density

Values	@ °C	@ °F	Method
0,802	20	68	DIN 51757



# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

<b>Solubility</b>	70 g/l @ 20 °C, in water, OECD 105
<b>log Pow</b>	1 @ pH 7 @ 25°C (77°F) (measured), OECD 117
<b>Autoignition temperature</b>	400 °C @ 1007 hPa***
<b>Method</b>	DIN 51794
<b>Decomposition temperature</b>	No data available
<b>Viscosity</b>	4,041 mPa*s @ 20 °C
<b>Method</b>	dynamic, DIN 51562, ASTM D445
<b>Explosive properties</b>	Does not apply, substance is not explosive. There are no chemical groups associated with explosive properties
<b>Oxidizing properties</b>	Does not apply, substance is not oxidising. There are no chemical groups associated with oxidizing properties

## 9.2. Other information

<b>Molecular weight</b>	74,12
<b>Molecular formula</b>	C4 H10 O
<b>log Koc</b>	0,47 calculated
<b>Refractive index</b>	1,396 @ 20 °C
<b>Surface tension</b>	69,7 mN/m (1 g/l @ 20°C (68°F)), OECD 115

## SECTION 10: Stability and Reactivity

### 10.1. Reactivity

The reactivity of the product corresponds to the typical reactivity shown by the substance group as described in any text book on organic chemistry.

### 10.2. Chemical stability

Stable under recommended storage conditions.

### 10.3. Possibility of hazardous reactions

Vapours may form explosive mixture with air.

### 10.4. Conditions to avoid

Avoid contact with heat, sparks, open flame and static discharge. Avoid any source of ignition.

### 10.5. Incompatible materials

strong oxidizing agents.

### 10.6. Hazardous decomposition products

No decomposition if stored and applied as directed.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

**Likely routes of exposure** Ingestion, Inhalation, Eye contact, Skin contact

### Acute toxicity

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

<b>2-Methylpropan-1-ol (78-83-1)</b>				
Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	> 2830 mg/kg	rat, male	OECD 401
Oral	LD50	3350 mg/kg	rat, female	OECD 401
Dermal	LD50	> 2000 mg/kg	rabbit male female	OECD 402
Inhalative	LC50	> 18,18 mg/l (6 h)	rat, male/female	40 CFR 798.1150

## **2-Methylpropan-1-ol, CAS: 78-83-1**

### **Assessment**

Based on available data, the classification criteria are not met for:

Acute oral toxicity  
Acute dermal toxicity  
Acute inhalation toxicity

### **Irritation and corrosion**

<b>2-Methylpropan-1-ol (78-83-1)</b>				
Target Organ Effects	Species	Result	Method	
Skin	rabbit	Mild skin irritation***	OECD 404	Weight of evidence in vivo 4h***
Eyes	rabbit	corrosive***	OECD 405	in vivo 24h***
Respiratory tract***	mouse male***	RD50: 1818 ppm***		5 min***

## **2-Methylpropan-1-ol, CAS: 78-83-1**

### **Assessment**

The available data lead to the classification given in section 2\*\*\*

### **Sensitization**

<b>2-Methylpropan-1-ol (78-83-1)</b>				
Target Organ Effects	Species	Evaluation	Method	
Skin***		not sensitizing***	QSAR***	Weight of evidence***

## **2-Methylpropan-1-ol, CAS: 78-83-1**

### **Assessment**

Based on available data, the classification criteria are not met for:

Skin sensitization  
For respiratory sensitization, no data are available

### **Subacute, subchronic and prolonged toxicity**

<b>2-Methylpropan-1-ol (78-83-1)</b>				
Type	Dose	Species	Method	
Subchronic toxicity	NOEL: > 1450 mg/m <sup>3</sup> /d (90 d)***	rat, male/female	OECD 408	Oral
Subchronic toxicity	NOAEL: >=7,5 mg/l	rat rat, male/female***	EPA OPPTS 870.3800	Inhalation
Subchronic toxicity***	NOEL: ~ 3 mg/m <sup>3</sup> /d (102 d)***	rat, male/female***	82-7 F***	Inhalation***

## **2-Methylpropan-1-ol, CAS: 78-83-1**

### **Assessment**

Based on available data, the classification criteria are not met for:  
STOT RE

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

<b>Carcinogenicity, Mutagenicity, Reproductive toxicity</b>					
<b>2-Methylpropan-1-ol (78-83-1)</b>					
Type	Dose	Species	Evaluation	Method	
Mutagenicity		Salmonella typhimurium	negative	OECD 471 (Ames)	In vitro study***
Mutagenicity		V79 cells, Chinese hamster	negative	HPRT	In vitro study***
Mutagenicity		V79 cells, Chinese hamster	negative	Chromosomal Aberration	in vitro micronucleus study
Mutagenicity		mouse male/female***	negative	OECD 474	Oral in vivo
Carcinogenicity			negative	QSAR	
Reproductive toxicity	NOAEL >= 7,5 mg/l	rat, parental		EPA OPPTS 870.3800	Inhalation
Reproductive toxicity	NOAEL >= 7,5 mg/l	rat, 1. Generation, male/female rat 2. Generation, male/female***		EPA OPPTS 870.3800	Inhalation
Developmental Toxicity	NOAEL 10 mg/l	rat		OECD 414, Inhalative	Maternal toxicity***
Developmental Toxicity	NOAEL 2,5 mg/l	rabbit		OECD 414, Inhalative	Maternal toxicity
Developmental Toxicity	NOAEL > 10 mg/l	rabbit rat		OECD 414, Inhalative	Teratogenicity
Developmental Toxicity	NOAEL > 10 mg/l	rabbit rat		OECD 414, Inhalative	Fetal toxicity
Mutagenicity***		human lung carcinoma epithelial A549***	negative***	Comet Assay***	In vitro study***

## **2-Methylpropan-1-ol, CAS: 78-83-1**

### **CMR Classification**

The available data on CMR properties are summarized in the table above. They do not indicate a classification into categories 1A or 1B

### **Evaluation**

In vitro tests did not show mutagenic effects  
Did not show reprotoxic or mutagenic effects in animal experiments  
No developmental effects in the absence of maternal toxicity  
No indication for a carcinogenic potential

## **2-Methylpropan-1-ol, CAS: 78-83-1**

### **Main symptoms**

headache, dizziness, drowsiness, abdominal pain, nausea, diarrhoea, vomiting, unconsciousness.

### **Target Organ Systemic Toxicant - Single exposure**

The available data lead to the classification given in section 2

### **Target Organ Systemic Toxicant - Repeated exposure**

Based on available data, the classification criteria are not met for:

STOT RE

### **Aspiration toxicity**

Based on the viscosity a potential aspiration hazard cannot be excluded

### **Other adverse effects**

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

Components of the product may be absorbed into the body by inhalation, ingestion and through the skin.

## Note

Handle in accordance with good industrial hygiene and safety practice. Further details on substance data can be found in the registration dossier under the following link:

<http://echa.europa.eu/information-on-chemicals/registered-substances>.

## SECTION 12: Ecological information

### 12.1. Toxicity

<b>Acute aquatic toxicity</b>			
<b>2-Methylpropan-1-ol (78-83-1)</b>			
Species	Exposure time	Dose	Method
Pimephales promelas (fathead minnow)	96h	LC50: 1430 mg/l	
Daphnia pulex (Water flea)	48h	EC50: 1100 mg/l	ASTM D4229***
Pseudokirchneriella subcapitata	72h	EC50: 1799 mg/l (Growth rate)	OECD 201
Pseudokirchneriella subcapitata	72h	EC50: 632 mg/l (Biomass)	OECD 201
Bacteria / Sewage	16 h	IC50: > 1000 mg/l (Growth inhibition)	
Pseudomonas putida***	TGK: 280 mg/l***	Cell multiplication inhibition test***	

<b>Long term toxicity</b>			
<b>2-Methylpropan-1-ol (78-83-1)</b>			
Type	Species	Dose	Method
Reproductive toxicity	Daphnia magna (Water flea)	NOEC: 20 mg/l (21d)	
Aquatic toxicity	Pseudokirchneriella subcapitata	NOEC: 53 mg/l (3d) Biomass	OECD 201

### 12.2. Persistence and degradability

#### **2-Methylpropan-1-ol, CAS: 78-83-1**

##### Biodegradation

70-80 % (28 d), Industrial sewage filtrate, aerobic, OECD 301 D.\*\*\*

<b>Abiotic Degradation</b>		
<b>2-Methylpropan-1-ol (78-83-1)</b>		
Type	Result	Method
Hydrolysis	No data available	
Photolysis	Half-life (DT50): 56 h***	calculated SRC AOP v1.92

### 12.3. Bioaccumulative potential

<b>2-Methylpropan-1-ol (78-83-1)</b>		
Type	Result	Method
log Pow	1 @ pH 7 @ 25°C (77°F)	measured, OECD 117
BCF	not expected***	

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

## 12.4. Mobility in soil

<b>2-Methylpropan-1-ol (78-83-1)</b>		
Type	Result	Method
Surface tension	69,7 mN/m (1 g/l @ 20°C (68°F))	OECD 115
Adsorption/Desorption	log Koc: 0,47	calculated SRC PCKOCWIN v2.00
Distribution to environmental compartments	no data available	

## 12.5. Results of PBT and vPvB assessment

### **2-Methylpropan-1-ol, CAS: 78-83-1**

#### **PBT and vPvB assessment**

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT), nor very persistent nor very bioaccumulating (vPvB)

## 12.6. Other adverse effects

### **2-Methylpropan-1-ol, CAS: 78-83-1**

No data available

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

#### **Product Information**

Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.

Hazardous waste according to European Waste Catalogue (EWC)

#### **Uncleaned empty packaging**

Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

## SECTION 14: Transport information

### ADR/RID

<b>14.1. UN number</b>	UN 1212
<b>14.2. UN proper shipping name</b>	Isobutanol
<b>14.3. Transport hazard class(es)</b>	3
<b>14.4. Packing group</b>	III
<b>14.5. Environmental hazards</b>	no
<b>14.6. Special precautions for user</b>	
ADR Tunnel restriction code	(D/E)
Classification Code	F1
Hazard Number	30

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

## ADN

ADN: Container and Tanker

<b>14.1. UN number</b>	UN 1212
<b>14.2. UN proper shipping name</b>	Isobutanol
<b>14.3. Transport hazard class(es)</b>	3
<b>14.4. Packing group</b>	III
<b>14.5. Environmental hazards</b>	no
<b>14.6. Special precautions for user</b>	
Classification Code	F1
Hazard Number	30

## ICAO-TI / IATA-DGR

<b>14.1. UN number</b>	UN 1212
<b>14.2. UN proper shipping name</b>	Isobutanol
<b>14.3. Transport hazard class(es)</b>	3
<b>14.4. Packing group</b>	III
<b>14.5. Environmental hazards</b>	no
<b>14.6. Special precautions for user</b>	no data available

## IMDG

<b>14.1. UN number</b>	UN 1212
<b>14.2. UN proper shipping name</b>	Isobutanol
<b>14.3. Transport hazard class(es)</b>	3
<b>14.4. Packing group</b>	III
<b>14.5. Environmental hazards</b>	no
<b>14.6. Special precautions for user</b>	
EmS	F-E, S-D
<b>14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code</b>	
Product name	Isobutyl alcohol
Ship type	3
Pollution category	Z

## **SECTION 15: Regulatory information**

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

**Regulation 1272/2008, Annex VI**

**2-Methylpropan-1-ol, CAS: 78-83-1**

<b>Classification</b>	Flam. Liq. 3; H226 STOT SE 3; H335 Skin Irrit. 2; H315 Eye Dam. 1; H318 STOT SE 3; H336
-----------------------	---

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

**Hazard pictograms** GHS02 Flame  
GHS05 Corrosion  
GHS07 Exclamation mark  
**Signal word** Danger  
**Hazard statements** H226, H335, H315, H318, H336

## **DI 2012/18/EU (Seveso III)**

**Category** Annex I, part 1:  
P5a - c; depending on conditions

## **DI 1999/13/EC (VOC Guideline)**

Component	Status
2-Methylpropan-1-ol CAS: 78-83-1	regulated

## **International Inventories**

### **2-Methylpropan-1-ol, CAS: 78-83-1**

AICS (AU)  
DSL (CA)  
IECSC (CN)  
EC-No. 2011480 (EU)  
ENCS (2)-3049 (JP)  
ISHL (2)-3049 (JP)  
KECI KE-24894 (KR)  
INSQ (MX)  
PICCS (PH)  
TSCA (US)  
NZIoC (NZ)  
TCSI (TW)

## **15.2. Chemical safety assessment**

The Chemical Safety Report (CSR) has been generated. For Exposure Scenarios see the annex.

## **SECTION 16: Other information**

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

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

### **Abbreviations**

A table of terms and abbreviations can be found under the following link:  
[http://echa.europa.eu/documents/10162/13632/information\\_requirements\\_r20\\_en.pdf](http://echa.europa.eu/documents/10162/13632/information_requirements_r20_en.pdf)

### **Training advice**

For effective first-aid, special training / education is needed.

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Sources of key data used to compile the datasheet

Information contained in this safety data sheet is based on OQ owned data and public sources deemed valid or acceptable. The absence of data elements required by OSHA, ANSI or Annex II, Regulation 1907/2006/EC indicates, that no data meeting these requirements is available.

## Further information for the safety data sheet

Changes against the previous version are marked by \*\*\*. Observe national and local legal requirements. For more information, other material safety data sheets or technical data sheets please consult the OQ homepage ([www.chemicals.oq.com](http://www.chemicals.oq.com)).

## Disclaimer

**For industrial use only.** The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. OQ makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards.

**End of Safety Data Sheet**

# Annex to the extended Safety Data Sheet (eSDS)

## General information

Human health hazard assessment:

A quantitative approach used to conclude safe use for:

Long term local hazards via inhalation

A qualitative approach used to conclude safe use for:

Long-term Systemic effects via inhalation

Acute systemic hazards via inhalation

Acute local hazards via inhalation

Long-term Systemic effects via skin

Acute local hazards via skin

Long-term local effects via skin

Acute systemic hazards via skin

Local hazards via eyes

For consumer applications in the following usage areas please contact OQ ([sc.psq@oq.com](mailto:sc.psq@oq.com)):

Uses in coatings

Use in Cleaning Agents

lubricants

Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation

For specific information regarding the SPERC used please refer to the ESIG webpage

<https://www.esig.org/reach-ges/environment/>

Other combinations of operational conditions may also be safe. Please contact OQ in case your local operational conditions differ from the ones described below and you are unsure if they are also safe\*\*\*

## Operational conditions and risk management measures



# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Following operational conditions and risk management measures, are based on qualitative risk characterisation:  
Wear protective gloves and eye/face protection  
Minimization of manual phases  
Avoid direct contact with the chemical/the product/the preparation by establishing organisational measures  
Supervision in place to check that the RMMs in place are being used correctly and OCs followed.\*\*\*

## Exposure scenario identification

- 1 **Industrial use resulting in manufacture of another substance (use of intermediates)**
- 2 **Formulation & (re)packing of substances and mixtures**
- 3 **Distribution of substance**
- 4 **Uses in coatings**
- 5 **Uses in coatings**
- 6 **Use in Cleaning Products**
- 7 **Use in Cleaning Products**
- 8 **lubricants**
- 9 **lubricants**
- 10 **Metal working fluids / rolling oils**
- 11 **Metal working fluids / rolling oils**
- 12 **Use in laboratories**
- 13 **Polymer processing**

## **Number of the ES 1**

Short title of the exposure scenario

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

## **List of use descriptors**

### **Sector of uses [SU]**

SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites  
SU8: Manufacture of bulk, large scale chemicals (including petroleum products)  
SU9: Manufacture of fine chemicals

### **Process categories [PROC]**

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  
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)

### **Environmental release categories [ERC]**

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

### **Product characteristics**

Refer to attached safety data sheets

### **Processes and activities covered by the exposure scenario**

Manufacture of the substance or use as an intermediate, process chemical or extracting agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

### **Further explanations**

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision**

5.01

Assessment tool used:

Chesar 3.2

Industrial use

Covers percentage substance in the product up to 100 % (unless stated differently)

Assumes an advanced standard of occupational Health and Safety Management System

Assumes use at not more than 20°C above ambient temperature (unless stated differently)\*\*\*

## Contributing Scenarios

**Number of the contributing scenario** 1  
**Contributing exposure scenario controlling environmental exposure for ERC 6a**

### Product characteristics

liquid.\*\*\*

### Amounts used

Daily amount per site: 61 to

Annual amount per site: 20124 to

Fraction of EU tonnage used in region: 1\*\*\*

### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 0.05 %

Release fraction to wastewater from process: 0.02 %

Release fraction to soil from process: 0.1%

### Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Onsite treatment wastewater. Apply acclimated biological treatment. Assumed Efficiency: 99 % Onsite treatment off-air.

Upgrade Systems in place or implement additional treatment. Assumed Efficiency: 99 %

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

Size of municipal sewage system/ treatment plant (m<sup>3</sup>/d): 2000

Water flow in sewage/river (m<sup>3</sup>/day): 18000

The minimum grade of elimination in the sewage plant is (%): 87.49

Do not apply industrial sludge to natural soils\*\*\*

**Number of the contributing scenario** 2  
**Contributing exposure scenario controlling worker exposure for PROC 1**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 3  
**Contributing exposure scenario controlling worker exposure for PROC 2**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 4

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision

5.01

## Contributing exposure scenario controlling worker exposure for PROC 3

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

5

## Contributing exposure scenario controlling worker exposure for PROC 4

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

Assumes an advanced standard of occupational Health and Safety Management System\*\*\*

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

6

## Contributing exposure scenario controlling worker exposure for PROC 8a

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

## Number of the contributing scenario

7

## Contributing exposure scenario controlling worker exposure for PROC 8b

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).\*\*\*

## Number of the contributing scenario

8

## Contributing exposure scenario controlling worker exposure for PROC 9

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Product characteristics

Liquid\*\*\*

## Frequency and duration of use

8 h (full shift)

## Other given operational conditions affecting workers exposure

Indoor use

## Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.079 mg/l; RCR: 0.197
Fresh Water (Sediment)	PEC: 0.306 mg/kg dw; RCR: 0.197
Marine Water (Pelagic)	PEC: 7.87E-3 mg/l; RCR: 0.197
Marine Water (Sediment)	PEC: 0.031 mg/kg dw; RCR: 0.196
Agricultural Soil	PEC: 8.88E-4 mg/kg dw; RCR: 0.012
Sewage Treatment Plant (Effluent)	PEC: 0.763 mg/l; RCR: 0.076

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects.\*\*\*

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44

### Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05

## Number of the ES 2

Short title of the exposure scenario

## Formulation & (re)packing of substances and mixtures

## List of use descriptors

### Sector of uses [SU]

SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)

## Process categories [PROC]

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)

PROC15: Use as laboratory reagent

## Environmental release categories [ERC]

ERC2: Formulation of preparations (mixtures)

## Product characteristics

Refer to attached safety data sheets

## Processes and activities covered by the exposure scenario

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

## Further explanations

Assessment tool used:

Chesar 3.2

Covers percentage substance in the product up to 100 % (unless stated differently).

Industrial use

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes an advanced standard of occupational Health and Safety Management System\*\*\*

## Contributing Scenarios

### Number of the contributing scenario

1

### Contributing exposure scenario controlling environmental exposure for ERC 2

#### Amounts used

Daily amount per site: 36.4 to

Annual amount per site: 10915 to

Fraction of EU tonnage used in region: 1\*\*\*

#### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 2.5%

Release fraction to wastewater from process: 0.02%

Release fraction to soil from process: 0.01%

Release factor to external waste : 0 %\*\*\*

#### Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Onsite treatment wastewater. Apply acclimated biological treatment. Assumed Efficiency: 99 % Onsite treatment off-air.

Upgrade Systems in place or implement additional treatment. Assumed Efficiency: 70 %\*\*\*

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

Size of municipal sewage system/ treatment plant (m<sup>3</sup>/d): 2000

Water flow in sewage/river (m<sup>3</sup>/day): 18000

The minimum grade of elimination in the sewage plant is (%): 87.49

Do not apply industrial sludge to natural soils\*\*\*

### Number of the contributing scenario

2

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

## Contributing exposure scenario controlling worker exposure for PROC 1

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario 3**

## Contributing exposure scenario controlling worker exposure for PROC 2

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario 4**

## Contributing exposure scenario controlling worker exposure for PROC 3

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario 5**

## Contributing exposure scenario controlling worker exposure for PROC 4

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario 6**

## Contributing exposure scenario controlling worker exposure for PROC 5

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario**

**7**

**Contributing exposure scenario controlling worker exposure for PROC 8a**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario**

**8**

**Contributing exposure scenario controlling worker exposure for PROC 8b**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario**

**9**

**Contributing exposure scenario controlling worker exposure for PROC 9**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario**

**10**

**Contributing exposure scenario controlling worker exposure for PROC 15**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

**Technical conditions and measures to control dispersion from source towards the worker**  
provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.048 mg/l; RCR: 0.12
Fresh Water (Sediment)	PEC: 0.176 mg/kg dw; RCR: 0.12
Marine Water (Pelagic)	PEC: 4.8E-3 mg/l; RCR: 0.12
Marine Water (Sediment)	PEC: 0.019 mg/kg dw; RCR: 0.12
Agricultural Soil	PEC: 8.67E-3 mg/kg dw; RCR: 0.113
Sewage Treatment Plant (Effluent)	PEC: 0.455 mg/l; RCR: 0.046

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects.\*\*\*

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 5	EE(inhal): 15.44
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44
Proc 15	EE(inhal): 30.88

### Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 5	RCR(inhal): 0.05
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 15	RCR(inhal): 0.1

## Number of the ES 3

Short title of the exposure scenario

## Distribution of substance

### List of use descriptors

### Sector of uses [SU]

SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites  
SU8: Manufacture of bulk, large scale chemicals (including petroleum products)  
SU9: Manufacture of fine chemicals



# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Process categories [PROC]

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

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)

PROC15: Use as laboratory reagent

## Environmental release categories [ERC]

ERC2: Formulation of preparations (mixtures)

## Product characteristics

Refer to attached safety data sheets

## Processes and activities covered by the exposure scenario

Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, distribution and associated laboratory activities.

## Further explanations

Assessment tool used:

Chesar 3.2

Industrial use

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes an advanced standard of occupational Health and Safety Management System\*\*\*

## Contributing Scenarios

<b>Number of the contributing scenario</b>	<b>1</b>
<b>Contributing exposure scenario controlling environmental exposure for ERC 2</b>	

### Further specification

SpERC ESVOC 1.1b.v1 (ESVOC 3).\*\*\*

### Amounts used

Daily amount per site: 0.028 to

Annual amount per site: 42577 to

Fraction of Regional tonnage used locally: 0.2

Release factor to external waste : 0 %\*\*\*

### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 0.1%

Release fraction to wastewater from process: 0.001%

Release fraction to soil from process: 0.001%

### Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption.\*\*\*

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

Size of municipal sewage system/ treatment plant (m<sup>3</sup>/d): 2000

Water flow in sewage/river (m<sup>3</sup>/day): 18000

The minimum grade of elimination in the sewage plant is (%): 87.49\*\*\*

<b>Number of the contributing scenario</b>	<b>2</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 1</b>	

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

Version / Revision

5.01

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

3

### Contributing exposure scenario controlling worker exposure for PROC 2

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

4

### Contributing exposure scenario controlling worker exposure for PROC 3

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

5

### Contributing exposure scenario controlling worker exposure for PROC 4

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

6

### Contributing exposure scenario controlling worker exposure for PROC 8a

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 7  
**Contributing exposure scenario controlling worker exposure for PROC 8b**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 8  
**Contributing exposure scenario controlling worker exposure for PROC 9**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 9  
**Contributing exposure scenario controlling worker exposure for PROC 15**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 2.5E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.72E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.57E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 3.44E-3 mg/kg dw; RCR: 0.045
Sewage Treatment Plant (Effluent)	PEC: 1.77E-5 mg/l; RCR: < 0.01

### Human exposure prediction (oral, dermal, inhalative)

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects.\*\*\*

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44
Proc 15	EE(inhal): 30.88

## Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 15	RCR(inhal): 0.1

## Number of the ES 4

Short title of the exposure scenario

### Uses in coatings

### List of use descriptors

### Sector of uses [SU]

SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

### Process categories [PROC]

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)

PROC7: Industrial spraying

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

PROC13: Treatment of articles by dipping and pouring

PROC15: Use as laboratory reagent

### Environmental release categories [ERC]

ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

### Product characteristics

Refer to attached safety data sheets

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Processes and activities covered by the exposure scenario

Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and preparation, application by brush, spray by hand or similar methods) and equipment cleaning

## Further explanations

Industrial use

Assessment tool used:

Chesar 3.2

StoffenManager V 6 for Following PROC:

PROC 7

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes an advanced standard of occupational Health and Safety Management System\*\*\*

## Contributing Scenarios

<b>Number of the contributing scenario</b>	<b>1</b>
<b>Contributing exposure scenario controlling environmental exposure for ERC 4</b>	

### Further specification

release factors for (Sp)ERC were modified.

### Amounts used

Daily amount per site: 10.39 to

Annual amount per site: 3116 to

Fraction of EU tonnage used in region: 1\*\*\*

### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 3.6%

Release fraction to wastewater from process: 0%

Release fraction to soil from process: 0%

Release factor to external waste : 0 %\*\*\*

### Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption.\*\*\*

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

Size of municipal sewage system/ treatment plant (m<sup>3</sup>/d): 2000

Water flow in sewage/river (m<sup>3</sup>/day): 18000

The minimum grade of elimination in the sewage plant is (%): 87.49\*\*\*

<b>Number of the contributing scenario</b>	<b>2</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 1</b>	

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

<b>Number of the contributing scenario</b>	<b>3</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 2</b>	

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

Version / Revision 5.01

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 4  
**Contributing exposure scenario controlling worker exposure for PROC 3**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 5  
**Contributing exposure scenario controlling worker exposure for PROC 4**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 6  
**Contributing exposure scenario controlling worker exposure for PROC 5**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 7  
**Contributing exposure scenario controlling worker exposure for PROC 7**

**Further specification**

Assessment tool used: StoffenManager

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

Room volume > 1000 m<sup>3</sup>

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

**Technical conditions and measures to control dispersion from source towards the worker**

Use in ventilated spray booths only.

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

**Conditions and measures related to personal protection, hygiene and health evaluation**

Inspect and clean equipment regularly.

**Number of the contributing scenario** 8  
**Contributing exposure scenario controlling worker exposure for PROC 8a**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 9  
**Contributing exposure scenario controlling worker exposure for PROC 8b**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 10  
**Contributing exposure scenario controlling worker exposure for PROC 9**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 11  
**Contributing exposure scenario controlling worker exposure for PROC 10**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

## Number of the contributing scenario

12

### Contributing exposure scenario controlling worker exposure for PROC 13

#### Product characteristics

Liquid\*\*\*

#### Frequency and duration of use

8 h (full shift)

#### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

## Number of the contributing scenario

13

### Contributing exposure scenario controlling worker exposure for PROC 15

#### Product characteristics

Liquid\*\*\*

#### Frequency and duration of use

8 h (full shift)

#### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 2.49E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.71E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.56E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 8.9E-3 mg/kg dw; RCR: 0.116
Sewage Treatment Plant (Effluent)	PEC: 0 mg/l; RCR: < 0.01

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects.\*\*\*

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 5	EE(inhal): 15.44
Proc 7	EE(inhal): 0
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861



# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Proc 9	EE(inhal): 15.44
Proc 10	EE(inhal): 15.44
Proc 13	EE(inhal): 15.44
Proc 15	EE(inhal): 30.88

## Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 5	RCR(inhal): 0.05
Proc 7	RCR(inhal): < 0.01
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 10	RCR(inhal): 0.05
Proc 13	RCR(inhal): 0.05
Proc 15	RCR(inhal): 0.1

## Number of the ES 5

Short title of the exposure scenario

### Uses in coatings

### List of use descriptors

### Sector of uses [SU]

SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

### Process categories [PROC]

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

PROC11: Non industrial spraying

PROC13: Treatment of articles by dipping and pouring

PROC15: Use as laboratory reagent

PROC19: Hand-mixing with intimate contact and only PPE available

### Environmental release categories [ERC]

ERC8d: Wide dispersive outdoor use of processing aids in open systems

### Product characteristics

Refer to attached safety data sheets

### Processes and activities covered by the exposure scenario

Covers the use in coatings (paints, inks, adhesives, etc) within closed or contained systems including incidental exposures

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application activities and film formation) and equipment cleaning, maintenance and associated laboratory activities.

## Further explanations

Professional use

Assessment tool used:

Chesar 3.2

StoffenManager V 6 for Following PROC:

PROC 11

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes a good basic standard of occupational hygiene is implemented\*\*\*

## Contributing Scenarios

**Number of the contributing scenario** 1

**Contributing exposure scenario controlling environmental exposure for ERC 8d**

### Further specification

SpERC ESVOC 8.3b.v1.

### Amounts used

daily wide dispersive use: 0.0002 to/d

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used locally: 0.0005

### Frequency and duration of use

Covers use up to: 365 days\*\*\*

### Other given operational conditions affecting environmental exposure

Indoor/Outdoor use

### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 98%

Release fraction to wastewater from process: 1%

Release fraction to soil from process: 1%

Release factor to external waste : 0 %\*\*\*

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

The minimum grade of elimination in the sewage plant is (%): 87.4

**Number of the contributing scenario** 2

**Contributing exposure scenario controlling worker exposure for PROC 1**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 3

**Contributing exposure scenario controlling worker exposure for PROC 2**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

**Technical conditions and measures to control dispersion from source towards the worker**  
provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 4  
**Contributing exposure scenario controlling worker exposure for PROC 3**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**  
provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 5  
**Contributing exposure scenario controlling worker exposure for PROC 4**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**  
provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 6  
**Contributing exposure scenario controlling worker exposure for PROC 5**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**  
provide a basic standard of general ventilation (1 to 3 air changes per hour).\*\*\*

**Number of the contributing scenario** 7  
**Contributing exposure scenario controlling worker exposure for PROC 8a**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**  
provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 8  
**Contributing exposure scenario controlling worker exposure for PROC 8b**

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 9  
**Contributing exposure scenario controlling worker exposure for PROC 9**

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 10  
**Contributing exposure scenario controlling worker exposure for PROC 10**

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 11  
**Contributing exposure scenario controlling worker exposure for PROC 11**

## Further specification

Assessment tool used: StoffenManager

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

Room volume > 1000 m3

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

### Technical conditions and measures to control dispersion from source towards the worker

Use in ventilated spray booths only.

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

### Conditions and measures related to personal protection, hygiene and health evaluation

Inspect and clean equipment regularly.

**Number of the contributing scenario** 12

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

## Contributing exposure scenario controlling worker exposure for PROC 11

### Further specification

Assessment tool used: StoffenManager

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor use

Room volume 100 - 1000 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

Ensure that the task is not carried out by more than one worker simultaneously.

### Technical conditions and measures to control dispersion from source towards the worker

Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

### Conditions and measures related to personal protection, hygiene and health evaluation

Inspect and clean equipment regularly.

Number of the contributing scenario

13

## Contributing exposure scenario controlling worker exposure for PROC 11

### Further specification

Assessment tool used: StoffenManager

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

Room volume < 100 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

Ensure that the task is not carried out by more than one worker simultaneously.

### Technical conditions and measures to control dispersion from source towards the worker

Provide enhanced general ventilation by mechanical means.

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

### Conditions and measures related to personal protection, hygiene and health evaluation

Wear respiratory protection (Efficiency: 80 %) Alternatively: Use duration max. 2 h. Inspect and clean equipment regularly.

Number of the contributing scenario

14

## Contributing exposure scenario controlling worker exposure for PROC 13

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

Number of the contributing scenario

15

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

## Contributing exposure scenario controlling worker exposure for PROC 15

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

16

## Contributing exposure scenario controlling worker exposure for PROC 19

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Human factors not influenced by risk management

Area potentially exposed: corresponds to 1980 cm<sup>2</sup>

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 2.51E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.76E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.47E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.62E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 9.76E-5 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 1.35E-4 mg/l; RCR: < 0.01

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects.\*\*\*

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 61.77
Proc 3	EE(inhal): 77.21
Proc 4	EE(inhal): 154.4
Proc 5	EE(inhal): 185.3
Proc 8a	EE(inhal): 185.3
Proc 8b	EE(inhal): 92.65
Proc 9	EE(inhal): 185.3
Proc 10	EE(inhal): 185.3
Proc 11	EE(inhal): 0 - Contributing Scenario 11 EE(inhal): 256.10 - Contributing Scenario 12 EE(inhal): 240.60 - Contributing Scenario 13
Proc 13	EE(inhal): 185.3
Proc 15	EE(inhal): 30.88
Proc 19	EE(inhal): 185.3

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.199
Proc 3	RCR(inhal): 0.2490
Proc 4	RCR(inhal): 0.4980
Proc 5	RCR(inhal): 0.598
Proc 8a	RCR(inhal): 0.598
Proc 8b	RCR(inhal): 0.299
Proc 9	RCR(inhal): 0.598
Proc 10	RCR(inhal): 0.598
Proc 11	RCR(inhal): < 0.01 - Contributing Scenarios 11 RCR(inhal): 0.826 - Contributing Scenarios 12 RCR(inhal): 0.776 - Contributing Scenarios 13
Proc 13	RCR(inhal): 0.598
Proc 15	RCR(inhal): 0.1
Proc 19	RCR(inhal): 0.598

## Number of the ES 6

Short title of the exposure scenario

### Use in Cleaning Products

#### List of use descriptors

#### Sector of uses [SU]

SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

#### Process categories [PROC]

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

PROC7: Industrial spraying

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

PROC13: Treatment of articles by dipping and pouring

#### Environmental release categories [ERC]

ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

#### Product characteristics

Refer to attached safety data sheets

#### Processes and activities covered by the exposure scenario

Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance.

#### Further explanations

Industrial use

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

Version / Revision

5.01

Assessment tool used:

Chesar 3.2

StoffenManager V 6 for Following PROC:

PROC 7

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes an advanced standard of occupational Health and Safety Management System\*\*\*

## Contributing Scenarios

**Number of the contributing scenario** 1  
**Contributing exposure scenario controlling environmental exposure for ERC 4**

### Further specification

SpERC ESVOC 4.4a.v1 (ESVOC 8).

### Amounts used

Daily amount per site: 5 to

Annual amount per site: 100 to

Fraction of Regional tonnage used locally: 1\*\*\*

### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 30%

Release fraction to wastewater from process: 0.01%

Release fraction to soil from process: 0%

### Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption.\*\*\*

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

Size of municipal sewage system/ treatment plant (m<sup>3</sup>/d): 2000

The minimum grade of elimination in the sewage plant is (%): 87.47

**Number of the contributing scenario** 2  
**Contributing exposure scenario controlling worker exposure for PROC 1**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 3  
**Contributing exposure scenario controlling worker exposure for PROC 2**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 4



# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

## Contributing exposure scenario controlling worker exposure for PROC 3

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 5

## Contributing exposure scenario controlling worker exposure for PROC 4

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 6

## Contributing exposure scenario controlling worker exposure for PROC 7

### Further specification

Assessment tool used: StoffenManager

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

Room volume > 1000 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

### Technical conditions and measures to control dispersion from source towards the worker

Use in ventilated spray booths only.

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

### Conditions and measures related to personal protection, hygiene and health evaluation

Inspect and clean equipment regularly.

**Number of the contributing scenario** 7

## Contributing exposure scenario controlling worker exposure for PROC 8a

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation):

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

Version / Revision 5.01

90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 8  
**Contributing exposure scenario controlling worker exposure for PROC 8b**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 9  
**Contributing exposure scenario controlling worker exposure for PROC 9**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 10  
**Contributing exposure scenario controlling worker exposure for PROC 10**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 11  
**Contributing exposure scenario controlling worker exposure for PROC 13**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 5.62E-3 mg/l; RCR: 0.014
Fresh Water (Sediment)	PEC: 0.022 mg/kg dw; RCR: 0.014
Marine Water (Pelagic)	PEC: 5.58E-4 mg/l; RCR: 0.014
Marine Water (Sediment)	PEC: 9.56E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 8.11E-3 mg/kg dw; RCR: 0.106
Sewage Treatment Plant (Effluent)	PEC: 0.031 mg/l; RCR: < 0.01

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative long-term exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 7	EE(inhal): 0
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44
Proc 10	EE(inhal): 15.44
Proc 13	EE(inhal): 15.44

### Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 7	RCR(inhal): < 0.01
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 10	RCR(inhal): 0.05
Proc 13	RCR(inhal): 0.05

## Number of the ES 7

Short title of the exposure scenario

### Use in Cleaning Products

#### List of use descriptors

#### Sector of uses [SU]

SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

#### Process categories [PROC]

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)

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises  
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  
PROC11: Non industrial spraying  
PROC13: Treatment of articles by dipping and pouring

## **Environmental release categories [ERC]**

ERC8d: Wide dispersive outdoor use of processing aids in open systems

## **Product characteristics**

Refer to attached safety data sheets

## **Processes and activities covered by the exposure scenario**

Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand).

## **Further explanations**

Professional use

Assessment tool used:

Chesar 3.2

StoffenManager V 6 for Following PROC:

PROC 11

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes a good basic standard of occupational hygiene is implemented\*\*\*

## **Contributing Scenarios**

<b>Number of the contributing scenario</b>	<b>1</b>
<b>Contributing exposure scenario controlling environmental exposure for ERC 8d</b>	

### **Further specification**

SpERC ESVOC 8.4b.v1 (ESVOC 9).

### **Amounts used**

daily wide dispersive use: 0.000042 to/d

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used locally: 0.0005

### **Frequency and duration of use**

Covers use up to: 365 days

### **Environment factors not influenced by risk management**

River flow rate: 18000 m<sup>3</sup>/d Local freshwater dilution factor: 10 Local marine water dilution factor: 100

### **Other given operational conditions affecting environmental exposure**

Indoor/Outdoor use

### **Technical conditions and measures at process level (source) to prevent release**

Release fraction to air from process: 2%

Release fraction to wastewater from process: 0.0001%

Release fraction to soil from process: 0%

Release factor to external waste : 0 %\*\*\*

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

Size of municipal sewage system/ treatment plant (m<sup>3</sup>/d): 2000

The minimum grade of elimination in the sewage plant is (%): 87.47

<b>Number of the contributing scenario</b>	<b>2</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 1</b>	

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 3  
**Contributing exposure scenario controlling worker exposure for PROC 2**

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 4  
**Contributing exposure scenario controlling worker exposure for PROC 3**

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 5  
**Contributing exposure scenario controlling worker exposure for PROC 4**

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 6  
**Contributing exposure scenario controlling worker exposure for PROC 8a**

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

**Technical conditions and measures to control dispersion from source towards the worker**  
provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 7  
**Contributing exposure scenario controlling worker exposure for PROC 8b**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 8  
**Contributing exposure scenario controlling worker exposure for PROC 9**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 9  
**Contributing exposure scenario controlling worker exposure for PROC 10**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 10  
**Contributing exposure scenario controlling worker exposure for PROC 11**

**Further specification**

Assessment tool used: StoffenManager

**Product characteristics**

Liquid, vapour pressure 0,5 - 10 kPa at STP

Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

Room volume > 1000 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

**Technical conditions and measures to control dispersion from source towards the worker**

Use in ventilated spray booths only.

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision**

5.01

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

Clean equipment and the work area every day  
Ensure the ventilation system is regularly maintained and tested

## **Conditions and measures related to personal protection, hygiene and health evaluation**

Inspect and clean equipment regularly.

## **Number of the contributing scenario**

11

## **Contributing exposure scenario controlling worker exposure for PROC 11**

### **Further specification**

Assessment tool used: StoffenManager

### **Product characteristics**

Liquid, vapour pressure 0,5 - 10 kPa at STP

Covers percentage substance in the product up to 100 % (unless stated differently)

### **Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

### **Other given operational conditions affecting workers exposure**

Indoor use

Room volume 100 - 1000 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

Ensure that the task is not carried out by more than one worker simultaneously.

### **Technical conditions and measures to control dispersion from source towards the worker**

Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

## **Conditions and measures related to personal protection, hygiene and health evaluation**

Inspect and clean equipment regularly.

## **Number of the contributing scenario**

12

## **Contributing exposure scenario controlling worker exposure for PROC 11**

### **Further specification**

Assessment tool used: StoffenManager

### **Product characteristics**

Liquid, vapour pressure 0,5 - 10 kPa at STP

Covers percentage substance in the product up to 100 % (unless stated differently)

### **Frequency and duration of use**

8 h (full shift)

### **Other given operational conditions affecting workers exposure**

Indoor use

Room volume < 100 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

Ensure that the task is not carried out by more than one worker simultaneously.

### **Technical conditions and measures to control dispersion from source towards the worker**

Provide enhanced general ventilation by mechanical means. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

## **Conditions and measures related to personal protection, hygiene and health evaluation**

Wear respiratory protection (Efficiency: 80 %) Alternatively: Use duration max. 2 h. Inspect and clean equipment regularly.

## **Number of the contributing scenario**

13

## **Contributing exposure scenario controlling worker exposure for PROC 13**

### **Product characteristics**

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision**

5.01

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 2.49E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.71E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.56E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 9.69E-5 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 2.64E-9 mg/l; RCR: < 0.01

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects. \*\*\*

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 61.77
Proc 3	EE(inhal): 77.21
Proc 4	EE(inhal): 154.4
Proc 8a	EE(inhal): 185.3
Proc 8b	EE(inhal): 92.65
Proc 9	EE(inhal): 185.3
Proc 10	EE(inhal): 185.3
Proc 11	EE(inhal): 0 - Contributing Scenario 10 EE(inhal): 256.10 - Contributing Scenario 11 EE(inhal): 240.60 - Contributing Scenario 12
Proc 13	EE(inhal): 185.3

### Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.199
Proc 3	RCR(inhal): 0.2490
Proc 4	RCR(inhal): 0.4980
Proc 8a	RCR(inhal): 0.598
Proc 8b	RCR(inhal): 0.299
Proc 9	RCR(inhal): 0.598
Proc 10	RCR(inhal): 0.598
Proc 11	RCR(inhal): < 0.01 - Contributing Scenarios 10 RCR(inhal): 0.826 - Contributing Scenarios 11 RCR(inhal): 0.776 - Contributing Scenarios 12
Proc 13	RCR(inhal): 0.598

**Number of the ES**      **8**



# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

Short title of the exposure scenario

**lubricants**

## List of use descriptors

### Sector of uses [SU]

SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

### Process categories [PROC]

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

PROC7: Industrial spraying

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

PROC13: Treatment of articles by dipping and pouring

PROC17: Lubrication at high energy conditions and in partly open process

PROC18: Greasing at high energy conditions

### Environmental release categories [ERC]

ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

### Product characteristics

Refer to attached safety data sheets

### Processes and activities covered by the exposure scenario

Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes.

### Further explanations

Industrial use

Assessment tool used:

Chesar 3.2

StoffenManager V 6 for Following PROC:

PROC 7

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes a good basic standard of occupational hygiene is implemented\*\*\*

## Contributing Scenarios

Number of the contributing scenario

1

**Contributing exposure scenario controlling environmental exposure for ERC 4**

### Further specification

release factors for (Sp)ERC were modified, SpERC ESVOC 4.6a.v1 (ESVOC 13).

### Amounts used

Daily amount per site: 46.75 to

Annual amount per site: 935 to

Fraction of EU tonnage used in region: 1\*\*\*

### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 0.3%

Release fraction to wastewater from process: 0.015%

Release fraction to soil from process: 0.1%

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## **Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil**

Onsite treatment off-air; Apply air filtration - particle removal. Assumed Efficiency: 70 % Onsite treatment wastewater. Apply acclimated biological treatment. Assumed Efficiency: 85 %

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

Size of municipal sewage system/ treatment plant (m<sup>3</sup>/d): 2000

Water flow in sewage/river (m<sup>3</sup>/day): 18000

The minimum grade of elimination in the sewage plant is (%): 87.49\*\*\*

**Number of the contributing scenario** 2  
**Contributing exposure scenario controlling worker exposure for PROC 1**

### **Product characteristics**

Liquid\*\*\*

### **Frequency and duration of use**

8 h (full shift)

### **Other given operational conditions affecting workers exposure**

Indoor and outdoor use

### **Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 3  
**Contributing exposure scenario controlling worker exposure for PROC 2**

### **Product characteristics**

Liquid\*\*\*

### **Frequency and duration of use**

8 h (full shift)

### **Other given operational conditions affecting workers exposure**

Indoor and outdoor use

### **Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 4  
**Contributing exposure scenario controlling worker exposure for PROC 3**

### **Product characteristics**

Liquid\*\*\*

### **Frequency and duration of use**

8 h (full shift)

### **Other given operational conditions affecting workers exposure**

Indoor and outdoor use

### **Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 5  
**Contributing exposure scenario controlling worker exposure for PROC 4**

### **Product characteristics**

Liquid\*\*\*

### **Frequency and duration of use**

8 h (full shift)

### **Other given operational conditions affecting workers exposure**

Indoor and outdoor use

### **Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision

5.01

**Number of the contributing scenario** 6  
**Contributing exposure scenario controlling worker exposure for PROC 7**

**Further specification**

Assessment tool used: StoffenManager

**Product characteristics**

Liquid, vapour pressure 0,5 - 10 kPa at STP

Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

Room volume > 1000 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

**Technical conditions and measures to control dispersion from source towards the worker**

Use in ventilated spray booths only.

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

**Conditions and measures related to personal protection, hygiene and health evaluation**

Inspect and clean equipment regularly.

**Number of the contributing scenario** 7  
**Contributing exposure scenario controlling worker exposure for PROC 8a**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation):

90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 8  
**Contributing exposure scenario controlling worker exposure for PROC 8b**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation):

95 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 9  
**Contributing exposure scenario controlling worker exposure for PROC 9**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 10  
**Contributing exposure scenario controlling worker exposure for PROC 10**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 11  
**Contributing exposure scenario controlling worker exposure for PROC 13**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 12  
**Contributing exposure scenario controlling worker exposure for PROC 17**

**Further specification**

Assessment tool used: Chesar 2.3

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 13  
**Contributing exposure scenario controlling worker exposure for PROC 17**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Indoor use

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 14  
**Contributing exposure scenario controlling worker exposure for PROC 18**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 15  
**Contributing exposure scenario controlling worker exposure for PROC 18**

**Frequency and duration of use**

8 h (full shift)

**Human factors not influenced by risk management**

corresponds to 2 hands (960 cm<sup>2</sup>)

**Other given operational conditions affecting workers exposure**

Indoor use

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.046 mg/l; RCR: 0.116
Fresh Water (Sediment)	PEC: 0.18 mg/kg dw; RCR: 0.116
Marine Water (Pelagic)	PEC: 4.63E-3 mg/l; RCR: 0.116
Marine Water (Sediment)	PEC: 0.018 mg/kg dw; RCR: 0.116
Agricultural Soil	PEC: 2.51E-3 mg/kg dw; RCR: 0.033
Sewage Treatment Plant (Effluent)	PEC: 0.439 mg/l; RCR: 0.044

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects.\*\*\*

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 4	EE(inhal): 61.77
Proc 7	EE(inhal): 0
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Proc 10	EE(inhal): 15.44
Proc 13	EE(inhal): 15.44
Proc 17	EE(inhal): 154.4 - Contributing Scenario 12
	EE(inhal): 30.88 - Contributing Scenario 13
Proc 18	EE(inhal): 154.4 - Contributing Scenario 14
	EE(inhal): 30.88 - Contributing Scenario 15

## Risk characterisation

RCR(inhal): inhalative risk characterisation ratio. Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.05
Proc 3	RCR(inhal): 0.1
Proc 4	RCR(inhal): 0.199
Proc 7	RCR(inhal): 0.0000
Proc 8a	RCR(inhal): 0.05
Proc 8b	RCR(inhal): 0.012
Proc 9	RCR(inhal): 0.05
Proc 10	RCR(inhal): 0.05
Proc 13	RCR(inhal): 0.05
Proc 17	RCR(inhal): 0.4980 - Contributing Scenarios 12
	RCR(inhal): 0.1 - Contributing Scenarios 13
Proc 18	RCR(inhal): 0.4980 - Contributing Scenarios 14
	RCR(inhal): 0.1 - Contributing Scenarios 15

## Number of the ES 9

Short title of the exposure scenario

**lubricants**

### List of use descriptors

#### Sector of uses [SU]

SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

#### Process categories [PROC]

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

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

PROC11: Non industrial spraying

PROC13: Treatment of articles by dipping and pouring

PROC17: Lubrication at high energy conditions and in partly open process

PROC18: Greasing at high energy conditions

PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems

#### Environmental release categories [ERC]

ERC9b: Wide dispersive outdoor use of substances in closed systems

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Product characteristics

Refer to attached safety data sheets

## Processes and activities covered by the exposure scenario

Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of engines and similar articles, reworking on reject articles, equipment maintenance and disposal of waste oil.

## Further explanations

Professional use

Assessment tool used:

Chesar 3.2

StoffenManager V. ? for Following PROC:

PROC 11

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes a good basic standard of occupational hygiene is implemented\*\*\*

## Contributing Scenarios

<b>Number of the contributing scenario</b>	<b>1</b>
<b>Contributing exposure scenario controlling environmental exposure for ERC 9b</b>	

### Further specification

SpERC ESVOC 9.6b.v1 (ESVOC 14).

### Amounts used

daily wide dispersive use: 0.000023 to/d

Fraction of EU tonnage used in region: 0.1

Fraction of Regional tonnage used locally: 0.0005

### Frequency and duration of use

Covers use up to: 365 days

### Other given operational conditions affecting environmental exposure

Indoor/Outdoor use

### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 1%

Release fraction to wastewater from process: 1%

Release fraction to soil from process: 1%

Release factor to external waste : 0 %\*\*\*

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

Estimated substance removal from wastewater via domestic sewage treatment (%): 87.49\*\*\*

<b>Number of the contributing scenario</b>	<b>2</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 1</b>	

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

<b>Number of the contributing scenario</b>	<b>3</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 2</b>	

### Product characteristics

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

Version / Revision 5.01

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 4  
**Contributing exposure scenario controlling worker exposure for PROC 3**

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 5  
**Contributing exposure scenario controlling worker exposure for PROC 4**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 6  
**Contributing exposure scenario controlling worker exposure for PROC 8a**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 7  
**Contributing exposure scenario controlling worker exposure for PROC 8b**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).



# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision

5.01

**Number of the contributing scenario** 8  
**Contributing exposure scenario controlling worker exposure for PROC 9**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Human factors not influenced by risk management**

Area potentially exposed: corresponds to palm of 2 hands (480 cm<sup>2</sup>)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 9  
**Contributing exposure scenario controlling worker exposure for PROC 10**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 10  
**Contributing exposure scenario controlling worker exposure for PROC 11**

**Further specification**

Assessment tool used: StoffenManager

**Product characteristics**

Liquid, vapour pressure 0,5 - 10 kPa at STP

Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

Room volume > 1000 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

**Technical conditions and measures to control dispersion from source towards the worker**

Use in ventilated spray booths only.

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

**Conditions and measures related to personal protection, hygiene and health evaluation**

Inspect and clean equipment regularly.

**Number of the contributing scenario** 11  
**Contributing exposure scenario controlling worker exposure for PROC 11**

**Further specification**

Assessment tool used: StoffenManager

**Product characteristics**

Liquid, vapour pressure 0,5 - 10 kPa at STP

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Other given operational conditions affecting workers exposure**

Indoor use

Room volume 100 - 1000 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

Ensure that the task is not carried out by more than one worker simultaneously.

**Technical conditions and measures to control dispersion from source towards the worker**

Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

**Conditions and measures related to personal protection, hygiene and health evaluation**

Inspect and clean equipment regularly.

**Number of the contributing scenario**

**12**

**Contributing exposure scenario controlling worker exposure for PROC 11**

**Further specification**

Assessment tool used: StoffenManager

**Product characteristics**

Liquid, vapour pressure 0,5 - 10 kPa at STP

Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

Room volume < 100 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

Ensure that the task is not carried out by more than one worker simultaneously.

**Technical conditions and measures to control dispersion from source towards the worker**

Provide enhanced general ventilation by mechanical means. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

**Conditions and measures related to personal protection, hygiene and health evaluation**

Inspect and clean equipment regularly. Wear respiratory protection (Efficiency: 80 %) Alternatively: Use duration max. 2 h.

**Number of the contributing scenario**

**13**

**Contributing exposure scenario controlling worker exposure for PROC 13**

**Further specification**

Assessment tool used: Chesar 2.3

**Product characteristics**

Liquid, vapour pressure 0,5 - 10 kPa at STP

Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**

Avoid carrying out activities involving exposure for more than 4 hours

**Human factors not influenced by risk management**

Area potentially exposed: corresponds to palm of 2 hands (480 cm<sup>2</sup>)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

**Number of the contributing scenario** 14  
**Contributing exposure scenario controlling worker exposure for PROC 17**

#### Product characteristics

Liquid\*\*\*

#### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

#### Other given operational conditions affecting workers exposure

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

Indoor use

#### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal).\*\*\*

#### Conditions and measures related to personal protection, hygiene and health evaluation

If above technical/organisational control measures are not feasible, then adopt following PPE. If carried out for more than 1h, wear respiratory protection (efficiency 90%).

**Number of the contributing scenario** 15  
**Contributing exposure scenario controlling worker exposure for PROC 17**

#### Product characteristics

Liquid\*\*\*

#### Frequency and duration of use

8 h (full shift)

#### Other given operational conditions affecting workers exposure

Indoor and outdoor use

#### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

#### Conditions and measures related to personal protection, hygiene and health evaluation

Wear respiratory protection (Efficiency: 90 %) Alternatively: Use duration max. 1 h.

**Number of the contributing scenario** 16  
**Contributing exposure scenario controlling worker exposure for PROC 18**

#### Product characteristics

Liquid\*\*\*

#### Frequency and duration of use

8 h (full shift)

#### Human factors not influenced by risk management

Area potentially exposed: corresponds to 2 hands (960 cm<sup>2</sup>)

#### Other given operational conditions affecting workers exposure

Indoor use

#### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal). If no adequate ventilation is available, avoid carrying out operations for more than 1 h.\*\*\*

**Number of the contributing scenario** 17  
**Contributing exposure scenario controlling worker exposure for PROC 18**

#### Product characteristics

Liquid\*\*\*

#### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

#### Other given operational conditions affecting workers exposure

Indoor use

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal). If no adequate ventilation is available, respiratory protection (efficiency 90 %) must be used.\*\*\*

**Conditions and measures related to personal protection, hygiene and health evaluation**

If above technical/organisational control measures are not feasible, then adopt following PPE. If carried out for more than 1h, wear respiratory protection (efficiency 90%).

**Number of the contributing scenario**

**18**

**Contributing exposure scenario controlling worker exposure for PROC 20**

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Exposure estimation and reference to its source**

**Environment**

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 2.5E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.71E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.57E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 9.7E-5 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 1.46E-5 mg/l; RCR: < 0.01

**Human exposure prediction (oral, dermal, inhalative)**

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects.\*\*\*

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 61.77
Proc 3	EE(inhal): 77.21
Proc 4	EE(inhal): 154.4
Proc 8a	EE(inhal): 185.3
Proc 8b	EE(inhal): 92.65
Proc 9	EE(inhal): 185.3
Proc 10	EE(inhal): 185.3
Proc 11	EE(inhal): 0 - Contributing Scenario 10 EE(inhal): 256.1 - Contributing Scenario 11 EE(inhal): 240.6 - Contributing Scenario 12
Proc 13	EE(inhal): 185.3
Proc 17	EE(inhal): 185.3 - Contributing Scenario 14 EE(inhal): 123.5 - Contributing Scenario 15
Proc 18	EE(inhal): 123.50 - Contributing Scenario 16 EE(inhal): 185.3 - Contributing Scenario 17
Proc 20	EE(inhal): 61.77

**Risk characterisation**

RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
--------	--------------------

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Proc 2	RCR(inhal): 0.199
Proc 3	RCR(inhal): 0.249
Proc 4	RCR(inhal): 0.498
Proc 8a	RCR(inhal): 0.598
Proc 8b	RCR(inhal): 0.299
Proc 9	RCR(inhal): 0.598
Proc 10	RCR(inhal): 0.598
Proc 11	RCR(inhal): < 0.01 - Contributing Scenarios 10 RCR(inhal): 0.826 - Contributing Scenarios 11 RCR(inhal): 0.776 - Contributing Scenarios 12
Proc 13	RCR(inhal): 0.598
Proc 17	RCR(inhal): 0.598 - Contributing Scenarios 14 RCR(inhal): 0.399 - Contributing Scenarios 15
Proc 18	RCR(inhal): 0.399 - Contributing Scenarios 16 RCR(inhal): 0.598 - Contributing Scenarios 17
Proc 20	RCR(inhal): 0.199

## Number of the ES 10

Short title of the exposure scenario

**Metal working fluids / rolling oils**

### List of use descriptors

#### Sector of uses [SU]

SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

#### Process categories [PROC]

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)

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

PROC7: Industrial spraying

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

PROC13: Treatment of articles by dipping and pouring

PROC17: Lubrication at high energy conditions and in partly open process

#### Environmental release categories [ERC]

ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

#### Product characteristics

Refer to attached safety data sheets

#### Processes and activities covered by the exposure scenario

Covers the use in formulated MWFs (MWFs)/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils.

#### Further explanations

Industrial use

Assessment tool used:

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Chesar 3.2

StoffenManager V 6 for Following PROC:

PROC 7

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes an advanced standard of occupational Health and Safety Management System\*\*\*

## Contributing Scenarios

<b>Number of the contributing scenario</b>	<b>1</b>
<b>Contributing exposure scenario controlling environmental exposure for ERC 4</b>	

### Further specification

SpERC ESVOC 4.7a.v1 (ESVOC 18), release factors for (Sp)ERC were modified.

### Amounts used

Daily amount per site: 5 to

Annual amount per site: 100 to

Fraction of EU tonnage used in region: 1\*\*\*

### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 0.6%

Release fraction to wastewater from process: 0.1%

Release fraction to soil from process: 0%

Release factor to external waste : 0 %\*\*\*

### Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption. Onsite treatment off-air. Upgrade Systems in place or implement additional treatment. Assumed Efficiency: 70 %\*\*\*

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

Size of municipal sewage system/ treatment plant (m<sup>3</sup>/d): 2000

Water flow in sewage/river (m<sup>3</sup>/day): 18000

The minimum grade of elimination in the sewage plant is (%): 87.49\*\*\*

<b>Number of the contributing scenario</b>	<b>2</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 1</b>	

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

Area potentially exposed: corresponds to palm of 1 hand (240 cm<sup>2</sup>)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

<b>Number of the contributing scenario</b>	<b>3</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 2</b>	

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

**Number of the contributing scenario** 4  
**Contributing exposure scenario controlling worker exposure for PROC 3**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 5  
**Contributing exposure scenario controlling worker exposure for PROC 5**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 6  
**Contributing exposure scenario controlling worker exposure for PROC 7**

**Further specification**

Assessment tool used: StoffenManager

**Product characteristics**

Liquid, vapour pressure 0,5 - 10 kPa at STP

Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

Room volume > 1000 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

**Technical conditions and measures to control dispersion from source towards the worker**

Use in ventilated spray booths only.

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

**Conditions and measures related to personal protection, hygiene and health evaluation**

Inspect and clean equipment regularly.

**Number of the contributing scenario** 7  
**Contributing exposure scenario controlling worker exposure for PROC 8a**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 9  
**Contributing exposure scenario controlling worker exposure for PROC 8b**

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 10  
**Contributing exposure scenario controlling worker exposure for PROC 9**

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

Area potentially exposed: corresponds to palm of 2 hands (480 cm<sup>2</sup>)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 11  
**Contributing exposure scenario controlling worker exposure for PROC 10**

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 12  
**Contributing exposure scenario controlling worker exposure for PROC 13**

## Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure



# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Number of the contributing scenario** 13  
**Contributing exposure scenario controlling worker exposure for PROC 17**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 14  
**Contributing exposure scenario controlling worker exposure for PROC 17**

**Product characteristics**

Liquid\*\*\*

**Frequency and duration of use**

8 h (full shift)

**Other given operational conditions affecting workers exposure**

Indoor use

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

**Exposure estimation and reference to its source**

**Environment**

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.034 mg/l; RCR: 0.084
Fresh Water (Sediment)	PEC: 0.131 mg/kg dw; RCR: 0.084
Marine Water (Pelagic)	PEC: 3.37E-3 mg/l; RCR: 0.084
Marine Water (Sediment)	PEC: 0.013 mg/kg dw; RCR: 0.084
Agricultural Soil	PEC: 1.71E-3 mg/kg dw; RCR: 0.022
Sewage Treatment Plant (Effluent)	PEC: 0.313 mg/l; RCR: 0.031

**Human exposure prediction (oral, dermal, inhalative)**

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects.\*\*\*

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 15.44
Proc 3	EE(inhal): 30.88
Proc 5	EE(inhal): 15.44
Proc 7	EE(inhal): < 0.01
Proc 8a	EE(inhal): 15.44
Proc 8b	EE(inhal): 3.861
Proc 9	EE(inhal): 15.44
Proc 10	EE(inhal): 15.44

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Proc 13 EE(inhal): 15.44  
Proc 17 EE(inhal): 154.4 - Contributing Scenario 13  
EE(inhal): 30.88 - Contributing Scenario 14

## Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 1 RCR(inhal): 0.0001  
Proc 2 RCR(inhal): 0.05  
Proc 3 RCR(inhal): 0.1  
Proc 5 RCR(inhal): 0.05  
Proc 7 RCR(inhal): 0  
Proc 8a RCR(inhal): 0.05  
Proc 8b RCR(inhal): 0.012  
Proc 9 RCR(inhal): 0.05  
Proc 10 RCR(inhal): 0.05  
Proc 13 RCR(inhal): 0.05  
Proc 17 RCR(inhal): 0.498 - Contributing Scenarios 13  
RCR(inhal): 0.1 - Contributing Scenarios 14

## Number of the ES 11

Short title of the exposure scenario

**Metal working fluids / rolling oils**

## List of use descriptors

### Sector of uses [SU]

SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

### Process categories [PROC]

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)

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

PROC10: Roller application or brushing

PROC11: Non industrial spraying

PROC13: Treatment of articles by dipping and pouring

PROC17: Lubrication at high energy conditions and in partly open process

### Environmental release categories [ERC]

ERC8a: Wide dispersive indoor use of processing aids in open systems

### Product characteristics

Refer to attached safety data sheets

### Processes and activities covered by the exposure scenario

Covers the use in formulated MWFs (MWFs) including transfer operations, open and contained cutting/machining activities, automated and manual application of corrosion protections, draining and working on contaminated/ reject articles, and disposal of waste oils.

### Further explanations

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

Version / Revision

5.01

Professional use  
Assessment tool used:  
Chesar 3.2  
StoffenManager V 6 for Following PROC:  
PROC 11  
Assumes use at not more than 20°C above ambient temperature (unless stated differently)  
Assumes a good basic standard of occupational hygiene is implemented\*\*\*

## Contributing Scenarios

**Number of the contributing scenario** 1  
**Contributing exposure scenario controlling environmental exposure for ERC 8a**

### Further specification

SpERC ESVOC 8.7c.v1 (ESVOC 20).

### Amounts used

daily wide dispersive use: 0.0027 to/d

Fraction of Regional tonnage used locally: 0.0005

Fraction of EU tonnage used in region: 0.1

### Other given operational conditions affecting environmental exposure

Indoor/Outdoor use

### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 40%

Release fraction to wastewater from process: 5%

Release fraction to soil from process: 5%

Release factor to external waste : 0 %\*\*\*

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

Estimated substance removal from wastewater via domestic sewage treatment (%): 87.49\*\*\*

**Number of the contributing scenario** 2  
**Contributing exposure scenario controlling worker exposure for PROC 1**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 3  
**Contributing exposure scenario controlling worker exposure for PROC 2**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 4  
**Contributing exposure scenario controlling worker exposure for**

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## PROC 3

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

5

## Contributing exposure scenario controlling worker exposure for PROC 5

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

6

## Contributing exposure scenario controlling worker exposure for PROC 8a

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

7

## Contributing exposure scenario controlling worker exposure for PROC 8b

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Number of the contributing scenario

8

## Contributing exposure scenario controlling worker exposure for PROC 10

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

Version / Revision

5.01

## Other given operational conditions affecting workers exposure

Indoor and outdoor use

## Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 9  
**Contributing exposure scenario controlling worker exposure for PROC 11**

### Further specification

Assessment tool used: StoffenManager

### Product characteristics

Liquid, vapour pressure 0,5 - 10 kPa at STP

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

## Other given operational conditions affecting workers exposure

Indoor use

Room volume > 1000 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

## Technical conditions and measures to control dispersion from source towards the worker

Use in ventilated spray booths only.

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

## Conditions and measures related to personal protection, hygiene and health evaluation

Inspect and clean equipment regularly.

**Number of the contributing scenario** 10  
**Contributing exposure scenario controlling worker exposure for PROC 11**

### Further specification

Assessment tool used: StoffenManager

### Product characteristics

Liquid, vapour pressure 0,5 - 10 kPa at STP

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

## Other given operational conditions affecting workers exposure

Indoor use

Room volume 100 - 1000 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

Ensure that the task is not carried out by more than one worker simultaneously.

## Technical conditions and measures to control dispersion from source towards the worker

Provide extract ventilation to points where emissions occur. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

## Conditions and measures related to personal protection, hygiene and health evaluation

Inspect and clean equipment regularly.

**Number of the contributing scenario** 11  
**Contributing exposure scenario controlling worker exposure for PROC 11**

### Further specification

Assessment tool used: StoffenManager

### Product characteristics

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

Liquid, vapour pressure 0,5 - 10 kPa at STP  
Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

Room volume < 100 m<sup>3</sup>

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

Ensure that the task is not carried out by more than one worker simultaneously.

### Technical conditions and measures to control dispersion from source towards the worker

Provide enhanced general ventilation by mechanical means. Effectiveness of LEV (local exhaust ventilation): 47 % (inhalative).

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

Clean equipment and the work area every day

Ensure the ventilation system is regularly maintained and tested

### Conditions and measures related to personal protection, hygiene and health evaluation

Inspect and clean equipment regularly. Wear respiratory protection (Efficiency: 80 %) Alternatively: Use duration max. 2 h.

**Number of the contributing scenario** 12  
**Contributing exposure scenario controlling worker exposure for PROC 13**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 13  
**Contributing exposure scenario controlling worker exposure for PROC 17**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal). If no adequate ventilation is available, avoid carrying out operations for more than 1 h.\*\*\*

**Number of the contributing scenario** 14  
**Contributing exposure scenario controlling worker exposure for PROC 17**

### Product characteristics

Liquid\*\*\*

### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

### Other given operational conditions affecting workers exposure

Operation is carried out at elevated temperature (> 20°C above ambient temperature)

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 90 % (dermal).\*\*\*

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

## Conditions and measures related to personal protection, hygiene and health evaluation

If above technical/organisational control measures are not feasible, then adopt following PPE. If carried out for more than 1h, wear respiratory protection (efficiency 90%).

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 3.35E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 0.013 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 3.31E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 1.29E-3 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 1.4E-4 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 8.57E-3 mg/l; RCR: < 0.01

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. The RMMs described above suffice to control risks for both local and systemic effects. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>].\*\*\*

Proc 1	EE(inhal): 0.031
Proc 2	EE(inhal): 61.77
Proc 3	EE(inhal): 77.21
Proc 5	EE(inhal): 185.3
Proc 8a	EE(inhal): 185.3
Proc 8b	EE(inhal): 92.65
Proc 10	EE(inhal): 185.3
Proc 11	EE(inhal): 0 - Contributing Scenario 9 EE(inhal): 256.10 - Contributing Scenario 10 EE(inhal): 240.60 - Contributing Scenario 11
Proc 13	EE(inhal): 185.3
Proc 17	EE(inhal): 123.50 - Contributing Scenario 13 EE(inhal): 185.3 - Contributing Scenario 14

### Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): < 0.013 - Contributing Scenarios < 0.014***
Proc 3	RCR(inhal): 0.199
Proc 5	RCR(inhal): 0.249
Proc 8a	RCR(inhal): 0.598
Proc 8b	RCR(inhal): 0.598
Proc 10	RCR(inhal): 0.299
Proc 11	RCR(inhal): 0.598
Proc 13	RCR(inhal): < 0.01 - Contributing Scenarios 9 RCR(inhal): 0.826 - Contributing Scenarios 10 RCR(inhal): 0.776 - Contributing Scenarios 11
Proc 17	RCR(inhal): 0.598
	RCR(inhal): 0.399 - Contributing Scenarios 13 RCR(inhal): 0.598 - Contributing Scenarios 14

**Number of the ES** 12

Short title of the exposure scenario

# SAFETY DATA SHEET



Isobutanol  
10250

Version / Revision 5.01

## Use in laboratories

### List of use descriptors

#### Sector of uses [SU]

SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

#### Process categories [PROC]

PROC10: Roller application or brushing

PROC15: Use as laboratory reagent

#### Environmental release categories [ERC]

ERC8a: Wide dispersive indoor use of processing aids in open systems

#### Product characteristics

Refer to attached safety data sheets

#### Processes and activities covered by the exposure scenario

Use of small quantities within laboratory settings, including material transfers and equipment cleaning

#### Further explanations

Professional use

Assessment tool used:

Chesar 3.2

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes a good basic standard of occupational hygiene is implemented\*\*\*

### Contributing Scenarios

#### Number of the contributing scenario

1

#### Contributing exposure scenario controlling environmental exposure for ERC 8a

#### Further specification

SpERC ESVOC 8.17.v1 (ESVOC 39).

#### Amounts used

daily wide dispersive use: 0.0000022 to/d

Fraction of Regional tonnage used locally: 0.0005

Fraction of EU tonnage used in region: 0.1

#### Other given operational conditions affecting environmental exposure

Indoor/Outdoor use

#### Technical conditions and measures at process level (source) to prevent release

Release fraction to air from process: 50%

Release fraction to wastewater from process: 50%

Release fraction to soil from process: 0%

Release factor to external waste : 0 %\*\*\*

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

The minimum grade of elimination in the sewage plant is (%): 87.49

#### Number of the contributing scenario

2

#### Contributing exposure scenario controlling worker exposure for PROC 10

#### Product characteristics

Liquid\*\*\*

#### Frequency and duration of use

Avoid carrying out activities involving exposure for more than 4 hours

#### Other given operational conditions affecting workers exposure



# SAFETY DATA SHEET



**Isobutanol**  
**10250**

Version / Revision 5.01

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

**Number of the contributing scenario** 3  
**Contributing exposure scenario controlling worker exposure for PROC 15**

## Product characteristics

Liquid\*\*\*

## Frequency and duration of use

8 h (full shift)

## Other given operational conditions affecting workers exposure

Indoor and outdoor use

**Technical conditions and measures to control dispersion from source towards the worker**

provide a basic standard of general ventilation (1 to 3 air changes per hour).

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 2.5E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.74E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.59E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 9.73E-5 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 6.85E-5 mg/l; RCR: < 0.01

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>]. The RMMs described above suffice to control risks for both local and systemic effects. \*\*\*

Proc 10	EE(inhal): 185.25
Proc 15	EE(inhal): 30.88

### Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.

Proc 10	RCR(inhal): 0.598
Proc 15	RCR(inhal): 0.1

## Number of the ES 13

Short title of the exposure scenario

**Polymer processing**

## List of use descriptors

### Sector of uses [SU]

SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

### Process categories [PROC]

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

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  
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)

## **Environmental release categories [ERC]**

ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

## **Product characteristics**

Refer to attached safety data sheets

## **Further explanations**

Industrial use

Assessment tool used:

Chesar 3.2

Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Assumes an advanced standard of occupational Health and Safety Management System\*\*\*

## **Contributing Scenarios**

### **Number of the contributing scenario**

1

### **Contributing exposure scenario controlling environmental exposure for ERC 4**

#### **Further specification**

SpERC ESVOC 4.21a.v1 (ESVOC 44), release factors for (Sp)ERC were modified.

#### **Amounts used**

Daily amount per site: 16.67 to

Annual amount per site: 5000 to

Fraction of EU tonnage used in region: 1\*\*\*

#### **Other given operational conditions affecting environmental exposure**

Indoor/Outdoor use\*\*\*

#### **Technical conditions and measures at process level (source) to prevent release**

Release fraction to air from process: 10%

Release fraction to wastewater from process: 0%

Release fraction to soil from process: 0.001%

Release factor to external waste : 0 %\*\*\*

#### **Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil**

Typical measures to maintain workplace concentrations of airborne VOCs and particulates below respective OELs: e.g. thermal wet scrubber, gas removal and/or air filtration, particle removal and/or thermal oxidation and/or vapour recovery, adsorption. Onsite treatment off-air. Upgrade Systems in place or implement additional treatment. Assumed Efficiency: 80 %\*\*\*

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

Size of municipal sewage system/ treatment plant (m<sup>3</sup>/d): 2000

Water flow in sewage/river (m<sup>3</sup>/day): 18000

The minimum grade of elimination in the sewage plant is (%): 87.49

Do not apply industrial sludge to natural soils\*\*\*

### **Number of the contributing scenario**

2\*\*\*

### **Contributing exposure scenario controlling worker exposure for PROC 1\*\*\***

#### **Product characteristics**

Liquid\*\*\*

#### **Frequency and duration of use**

8 h (full shift)\*\*\*

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

Version / Revision

5.01

## Other given operational conditions affecting workers exposure

Indoor and outdoor use\*\*\*

## Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).\*\*\*

## Number of the contributing scenario

3\*\*\*

## Contributing exposure scenario controlling worker exposure for PROC 2\*\*\*

## Product characteristics

Liquid\*\*\*

## Frequency and duration of use

8 h (full shift)\*\*\*

## Other given operational conditions affecting workers exposure

Indoor and outdoor use\*\*\*

## Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).\*\*\*

## Number of the contributing scenario

4\*\*\*

## Contributing exposure scenario controlling worker exposure for PROC 3\*\*\*

## Product characteristics

Liquid\*\*\*

## Frequency and duration of use

8 h (full shift)\*\*\*

## Other given operational conditions affecting workers exposure

Indoor and outdoor use\*\*\*

## Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).\*\*\*

## Number of the contributing scenario

5\*\*\*

## Contributing exposure scenario controlling worker exposure for PROC 4\*\*\*

## Product characteristics

Liquid\*\*\*

## Frequency and duration of use

8 h (full shift)\*\*\*

## Other given operational conditions affecting workers exposure

Indoor and outdoor use\*\*\*

## Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour).\*\*\*

## Number of the contributing scenario

6\*\*\*

## Contributing exposure scenario controlling worker exposure for PROC 8a\*\*\*

## Product characteristics

Liquid\*\*\*

## Frequency and duration of use

8 h (full shift)\*\*\*

## Other given operational conditions affecting workers exposure

Indoor use\*\*\*

## Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

## Number of the contributing scenario

7\*\*\*

## Contributing exposure scenario controlling worker exposure for PROC 8b\*\*\*

## Product characteristics

Liquid\*\*\*

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

Version / Revision 5.01

## Frequency and duration of use

8 h (full shift)\*\*\*

## Other given operational conditions affecting workers exposure

Indoor use\*\*\*

## Technical conditions and measures to control dispersion from source towards the worker

provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).\*\*\*

## Number of the contributing scenario

8\*\*\*

## Contributing exposure scenario controlling worker exposure for

PROC 9\*\*\*

## Product characteristics

Liquid\*\*\*

## Frequency and duration of use

8 h (full shift)\*\*\*

## Other given operational conditions affecting workers exposure

Indoor use\*\*\*

## Technical conditions and measures to control dispersion from source towards the worker

Provide a basic standard of general ventilation (1 to 3 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).\*\*\*

## Exposure estimation and reference to its source

### Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 2.49E-3 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 9.71E-3 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.46E-4 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 9.56E-4 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 0.038 mg/kg dw; RCR: 0.542
Sewage Treatment Plant (Effluent)	PEC: 0 mg/l; RCR: < 0.01

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m<sup>3</sup>].\*\*\*

Proc 1	EE(inhal): 0.031***
Proc 2	EE(inhal): 15.44***
Proc 3	EE(inhal): 30.88***
Proc 4	EE(inhal): 61.77***
Proc 8a	EE(inhal): 15.44***
Proc 8b	EE(inhal): 3.861***
Proc 9	EE(inhal): 15.44***

### Risk characterisation

RCR(inhal): inhalative risk characterisation ratio.\*\*\*

Proc 1	RCR(inhal): < 0.01***
Proc 2	RCR(inhal): 0.05***
Proc 3	RCR(inhal): 0.1***
Proc 4	RCR(inhal): 0.199***
Proc 8a	RCR(inhal): 0.05***
Proc 8b	RCR(inhal): 0.012***
Proc 9	RCR(inhal): 0.05***

### Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Usage of release factors allows downstream users to verify in a first approximation, if the combination of local

# SAFETY DATA SHEET



**Isobutanol**  
**10250**

**Version / Revision** 5.01

---

usage and production conditions meets the defined release quantities resulting from this exposure scenario (calculated as  $M(\text{site})$  [see amounts used, contributing scenario 1] x release factor [Technical conditions and measures at process level (source) to prevent release; contributing scenario 1])

For specific information regarding the SPERC used please refer to the ESIG webpage  
<https://www.esig.org/reach-ges/environment/>\*\*\*

**associated uses:**

Should consumer uses be associated with this exposure scenario, please contact OQ for further details  
Other combinations of operational conditions may also be safe. Please contact OQ in case your local operational conditions differ from the ones described above and you are unsure if they are also safe\*\*\*