

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

1.1 Product identifier

Trade name	<i>Isobutanol</i>
Stock number:	B23091
CAS Number:	78-83-1
EC number:	201-148-0
Index number:	603-108-00-1

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

Identified use: No further relevant information available.
SU24 Scientific research and development

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier:	Alfa Aesar GmbH & Co.KG A Johnson Matthey Company Zeppelinstr. 7b 76185 Karlsruhe / Germany Tel: +49 (0) 721 84007 280 Fax: +49 (0) 721 84007 300 Email: tech@alfa.com www.alfa.com
Informing department:	Product safety Tel + +049 (0) 7275 988687-0
1.4 Emergency telephone number:	Carechem 24: +44 (0) 1235 239 670 (Multi-language emergency number) Poison Information Center Mainz www.giftinfo.uni-mainz.de Telephone: +49(0)6131/19240

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

 GHS02 flame

Flam. Liq. 3 H226 Flammable liquid and vapour.

 GHS05 corrosion


Eye Dam. 1 H318 Causes serious eye damage.

 GHS07

Skin Irrit. 2 H315 Causes skin irritation.

STOT SE 3 H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC

 Xi; Irritant

R37/38-41: Irritating to respiratory system and skin. Risk of serious damage to eyes.

R10-67: Flammable. Vapours may cause drowsiness and dizziness.

Information concerning particular hazards for human and environment:

Other hazards that do not result in classification

Has a narcotizing effect.

No information known.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard pictograms

The substance is classified and labelled according to the CLP regulation.



GHS02 GHS05 GHS07

Signal word

Hazard statements

Danger

H226 Flammable liquid and vapour.

H315 Causes skin irritation.

H318 Causes serious eye damage.

H335-H336 May cause respiratory irritation. May cause drowsiness or dizziness.

Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

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

P405 Store locked up.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards

Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

SECTION 3: Composition/information on ingredients

3.1 Substances

CAS# Designation: 78-83-1 Isobutanol

Identification number(s):

EC number: 201-148-0

Index number: 603-108-00-1

SECTION 4: First aid measures

4.1 Description of first aid measures

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.

After skin contact

Seek immediate medical advice.

Instantly wash with water and soap and rinse thoroughly.

After eye contact

Seek immediate medical advice.

Rinse opened eye for several minutes under running water. Then consult doctor.

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After swallowing Seek medical treatment.
4.2 Most important symptoms and effects, both acute and delayed No further relevant information available.
4.3 Indication of any immediate medical attention and special treatment needed No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing agents Carbon dioxide
Alcohol-resistant foam
Fire-extinguishing powder
5.2 Special hazards arising from the substance or mixture If this product is involved in a fire, the following can be released:
Carbon monoxide and carbon dioxide
5.3 Advice for firefighters
Protective equipment: Wear self-contained breathing apparatus.
Wear full protective suit.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources
6.2 Environmental precautions: Do not allow material to be released to the environment without proper governmental permits.
Do not allow product to reach sewage system or water bodies.
Do not allow to enter the ground/soil.
6.3 Methods and material for containment and cleaning up: Keep away from ignition sources.
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Ensure adequate ventilation.
Keep away from ignition sources.
6.4 Reference to other sections See Section 7 for information on safe handling
See section 8 for information on personal protection equipment.
See Section 13 for information on disposal.

SECTION 7: Handling and storage

7.1 Precautions for safe handling Keep containers tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation/exhaustion at the workplace.
Information about protection against explosions and fires: Protect against electrostatic charges.
Fumes can combine with air to form an explosive mixture.
Keep ignition sources away - Do not smoke.
7.2 Conditions for safe storage, including any incompatibilities
Storage Requirements to be met by storerooms and containers: No special requirements.
Information about storage in one common storage facility: Store away from oxidising agents.
Further information about storage conditions: Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
7.3 Specific end use(s) No further relevant information available.

SECTION 8: Exposure controls/personal protection

Additional information about design of technical systems: Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

8.1 Control parameters

Components with critical values that require monitoring at the workplace:

78-83-1 Isobutanol (100,0%)

AGW (Germany)	Long-term value: 310 mg/m ³ , 100 ppm 1(I);DFG, Y
PEL (USA)	Long-term value: 300 mg/m ³ , 100 ppm
REL (USA)	Long-term value: 150 mg/m ³ , 50 ppm
TLV (USA)	Long-term value: 152 mg/m ³ , 50 ppm

Additional information: No data

8.2 Exposure controls

Personal protective equipment
General protective and hygienic measures The usual precautionary measures should be adhered to in handling the chemicals.
Keep away from foodstuffs, beverages and food.
Instantly remove any soiled and impregnated garments.
Wash hands during breaks and at the end of the work.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.
Breathing equipment: Use breathing protection with high concentrations.
Protection of hands: Check protective gloves prior to each use for their proper condition.
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
Material of gloves Impervious gloves
Penetration time of glove material Not determined
Eye protection: Tightly sealed safety glasses.
Face protection
Body protection: Protective work clothing.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information

Appearance:

Form:	Liquid
Colour:	Colourless
Smell:	Sweetish

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Odour threshold:	Not determined.
pH-value (80 g/l) at 20 °C:	7
Change in condition	
Melting point/Melting range:	-108 °C
Boiling point/Boiling range:	107-108 °C
Sublimation temperature / start:	Not determined
Flash point:	28 °C
Inflammability (solid, gaseous)	Not applicable.
Ignition temperature:	390 °C
Decomposition temperature:	Not determined
Self-inflammability:	Not determined.
Danger of explosion:	Product is not explosive. However, formation of explosive air/steam mixtures is possible.
Critical values for explosion:	
Lower:	1,7 Vol %
Upper:	12 Vol %
Steam pressure at 20 °C:	4-40 hPa
Density at 20 °C	0,802 g/cm ³
Relative density	Not determined.
Vapour density	Not determined.
Evaporation rate	Not determined.
Solubility in / Miscibility with	
Water at 20 °C:	100 g/l
Partition coefficient (n-octanol/water):	Not determined.
Viscosity:	
dynamic at 20 °C:	3,95 mPas
kinematic:	Not determined.
9.2 Other information	No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity	No information known.
10.2 Chemical stability	Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided:	No decomposition if used and stored according to specifications.
10.3 Possibility of hazardous reactions	No dangerous reactions known
10.5 Incompatible materials:	No information known.
10.6 Hazardous decomposition products:	Carbon monoxide and carbon dioxide

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.

LD/LC50 values that are relevant for classification:

Oral	LD50	2460 mg/kg (rat)
Dermal	LD50	4200 mg/kg (rabbit)
Inhalative	LC50/4H	2630 mg/m ³ /4H (rabbit)

Skin irritation or corrosion:	Causes skin irritation.
Eye irritation or corrosion:	Causes serious eye damage.
Sensitization:	No sensitizing effect known.
Germ cell mutagenicity:	The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for this substance.
Carcinogenicity:	No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH. The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for this substance.
Reproductive toxicity:	The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for this substance.
Specific target organ system toxicity - repeated exposure:	No effects known.
Specific target organ system toxicity - single exposure:	May cause drowsiness or dizziness. May cause respiratory irritation.
Aspiration hazard:	No effects known.
Subacute to chronic toxicity:	The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.
Additional toxicological information:	To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

SECTION 12: Ecological information

12.1 Toxicity	No further relevant information available.
Aquatic toxicity:	No further relevant information available.
12.2 Persistence and degradability	No further relevant information available.
12.3 Bioaccumulative potential	No further relevant information available.
12.4 Mobility in soil	No further relevant information available.
Additional ecological information:	
General notes:	Do not allow material to be released to the environment without proper governmental permits. Water hazard class 1 (Assessment by list): slightly hazardous for water. Do not allow undiluted product or large quantities of it to reach ground water, water bodies or sewage system. Avoid transfer into the environment.
12.5 Results of PBT and vPvB assessment	
PBT:	Not applicable.
vPvB:	Not applicable.
12.6 Other adverse effects	No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods	
Recommendation	Hand over to disposers of hazardous waste. Must be specially treated under adherence to official regulations. Consult state, local or national regulations for proper disposal.
Uncleaned packagings:	
Recommendation:	Disposal must be made according to official regulations.



SECTION 14: Transport information

UN-Number	UN1212
ADR, IMDG, IATA	

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14.2 UN proper shipping name ADR IMDG, IATA	1212 ISOBUTANOL (ISOBUTYL ALCOHOL) ISOBUTANOL (ISOBUTYL ALCOHOL)
14.3 Transport hazard class(es) ADR	
	
Class Label IMDG, IATA	3 (F1) Flammable liquids. 3
	
Class Label	3 Flammable liquids. 3
Packing group ADR, IMDG, IATA	III
14.5 Environmental hazards:	Not applicable.
14.6 Special precautions for user Kemler Number: EMS Number:	Warning: Flammable liquids. 30 F-E,S-D
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
Transport/Additional information:	
ADR Excepted quantities (EQ): Limited quantities (LQ) Transport category Tunnel restriction code	E1 5L 3 D/E
UN "Model Regulation":	UN1212, ISOBUTANOL (ISOBUTYL ALCOHOL), 3, III

SECTION 15: Regulatory information

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

Australian Inventory of Chemical Substances

Substance is listed.

Standard for the Uniform Scheduling of Medicines and Poisons National regulations

Substance is not listed.

Information about limitation of use:

Employment restrictions concerning young persons must be observed.
For use only by technically qualified individuals.

Classification according to VbF:

A II

Technical instructions (air):

Class	Share in %
NK	100.0

Water hazard class:

Water hazard class 1 (Assessment by list): slightly hazardous for water.

Other regulations, limitations and prohibitive regulations
ELINCS (European List of Notified Chemical Substances)

Substance is not listed.

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.

Substance is not listed.

REACH - Pre-registered substances

Substance is listed.

15.2 Chemical safety assessment:

A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS:
Abbreviations and acronyms:

Health, Safety and Environmental Department.
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organization
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
VbF: Verordnung über brennbare Flüssigkeiten, Österreich (Ordinance on the storage of combustible liquids, Austria)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)
Flam. Liq. 3: Flammable liquids, Hazard Category 3
Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1
STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3