

GPS Safety Summary

Substance Name:

Isobutanol

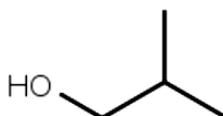
1. General Statement

Isobutanol is produced in the plant of Oxochimie in Lavera (France) by hydrogenation of Isobutyraldehyde, itself obtained by 'Oxo' reaction on propylene (hydroformylation).

The main uses of Isobutanol are solvent and intermediate for the manufacture of other chemicals.

2. Chemical Identity

Name:	Isobutanol
Brand names:	ISOBUTANOL
Chemical name (IUPAC):	2-methylpropan-1-ol
CAS number:	78-83-1
EC number:	201-148-0
Molecular formula:	C ₄ H ₁₀ O
Structure:	



3. Use and applications

Isobutanol has two main industrial uses:

- **Use as a chemical intermediate:**
 Isobutanol is transformed into a variety of other chemicals, such as isobutyl acrylate, isobutyl methacrylate or isobutyl acetate. These ingredients are used in:
 - water-based formulations for paints and coatings, inks and toners;
 - construction adhesives and pressure-sensitive adhesives;
 - coatings for textiles, wood and paper;
 - manufacture of various plastics;
 - lubricant oil additives;
 - solvents for a variety of coating resins.

- **Use as solvent:**
 Isobutanol is used alone and in mixtures with other organic solvents:
 - by industry and professionals: in coatings (paints, ink, toners, adhesives), cleaning agents, lubricants, metal working fluids/rolling oils;
 - by consumers: in coatings, cleaning agents, lubricants, consumer care products or disinfectants.

4. Physical / Chemical properties

Isobutanol is a flammable liquid organic substance with the following physicochemical properties:

Property	Value
Physical state	Liquid at 20°C and 1013 hPa
Colour	Colourless
Odour	Stinging
Molecular weight	74.1 g/mol
Density	0.80 g/cm ³ at 20°C
Vapour pressure	13.8 hPa at 25°C
Freezing / boiling points	< -90°C / 108°C at 1013 hPa
Flash point – flammability	31°C at 1013 hPa – flammable liquid
Self-ignition temperature	400°C at 1007 hPa
Explosive / oxidizing properties	Not expected based on structure
Water solubility	70 g/L at 20°C
Octanol-water partition coefficient (Log K _{ow})	1 at 25 °C

5. Health Effects

Isobutanol is a hazardous chemical which should be handled with care.

Effect Assessment	Results
Acute Toxicity Oral / inhalation / dermal	May be harmful if swallowed and in contact with skin. Of low toxicity if vapour is inhaled.
Irritation / corrosion Skin / eye/ respiratory tract	Irritating to skin. Severely irritating to eyes with irreversible damage. Vapours are irritating to the respiratory tract.
Sensitisation	Does not cause allergic skin reactions.
Toxicity after repeated exposure Oral / inhalation / dermal	Single or repeated exposure to vapours may cause CNS depression (drowsiness or dizziness). The other predominant effect is local irritation.
Genotoxicity / Mutagenicity	The substance did not cause genetic damage when tested <i>in vitro</i> and <i>in vivo</i> .
Carcinogenicity	Not anticipated to cause cancer under conditions of normal use.
Reproductive / Developmental Toxicity	Did not cause birth defects, adverse reproductive effects or damage to reproductive organs in laboratory animals.

6. Environmental Effects

Isobutanol is not classified for short- or long-term toxicity to aquatic organisms (fish, invertebrates and algae).

Isobutanol is unlikely to persist in the environment since it biodegrades rapidly in sewage treatment plants. It is not expected to bind to soil or sediment due to its negligible adsorption coefficient ($\log K_{oc} = 0.3$). If released to air, slow photochemical degradation is expected to occur. It is not expected to accumulate in the food chain, *i.e.*, the bioaccumulative potential is negligible due to the low octanol-water partition coefficient ($\log K_{ow} = 1$).

Effect Assessment	Result
Aquatic Toxicity	Acute, Chronic: of low toxicity.

Fate and behaviour	Result
Biodegradation	Readily biodegradable
Bioaccumulation potential	Not expected to bioaccumulate
PBT / vPvB conclusion	Not considered to be PBT* or vPvB**

*: Persistent, Bioaccumulative and Toxic (PBT)

** : very Persistent and very Bioaccumulative (vPvB)

7. Exposure

7.1 Human health

Consumers:

Consumers may be exposed to Isobutanol when present in mixtures used in coatings, as cleaning agents, lubricant, consumer care product or disinfectant. Dermal and/or inhalation exposure is possible, depending on the type of mixture, its container and whether gloves are used.

Indirect exposure via the environment is negligible due to the biodegradability and negligible bioaccumulative potential.

Workers:

Isobutanol is industrially manufactured within closed systems or other processes minimizing the occupational exposure potential. Exposure may occur either in manufacturing facilities or in facilities using Isobutanol. Workers may be exposed during cleaning, maintenance, transfer, sampling and analysis.

The industrial use as a chemical intermediate and the formulation (mixing) also occur within closed systems or other processes minimizing exposure. Exposure potential during industrial and professional uses in coatings, cleaning agents, lubricants, metal working fluids or rolling oils is related to the specific processes involved (spraying, roller application, treatment of articles, high-energy lubrication or greasing).

Procedures, controls, collective and personal risk management measures are in place, which limit the occupational exposure during the manufacture and use of the substance. Workers who might accidentally come into contact with the undiluted substance should follow the safety measures recommended in the Extended Safety Data Sheet.

Based on the risk assessment, the risk is controlled when activities are carried out under conditions recommended in the Extended Safety Data Sheet (see Chap. 8 and Exposure Scenarios).

7.2 Environment

Isobutanol is industrially manufactured and generally used in closed systems in a continuous or batch process, or chemically transformed into other substances, minimizing release to the environment. These correspond to point sources. The professional uses in coatings, cleaning agents, lubricants, metal working fluids or rolling oils are wide dispersive uses, *i.e.* they are widespread. Potential releases may occur via wastewater and exhaust gases.

For industrial and professional uses, procedures, controls and risk management measures are in place, which limit the environmental exposure.

The main expected release compartment is the atmosphere due to the volatility, and wastewater due to the solubility. Any release to wastewater would biodegrade rapidly in waste water treatment plants. The fraction reaching the atmosphere is expected to be slowly photodegraded.

Based on the risk assessment, the risk is controlled when activities are carried out under conditions recommended in the Extended Safety Data Sheet (see Chap. 8 and Exposure Scenarios).

8. Risk Management recommendations

Human health measures		
Organizational	Collect the latest available Safety Data Sheet. Implement good basic standards of occupational hygiene. Ensure operatives are well informed of the hazards and trained to minimise exposures. Handle and store according to the indications of the Safety Data Sheet.	
Engineering controls	Should be handled in well ventilated areas. Prevention of inflammation should be in place. Provide appropriate local exhaust ventilation at points of emission. Ensure that eye- and handwash stations and safety showers are close to workstation locations.	
Protection	Eye/Face protection:	Tightly fitting safety glasses
	Skin protection:	Plasticized flexible apron, boots
	Hand protection:	Neoprene or butyl-rubber gloves complying with EN374
	Respiratory protection:	Respirator if ventilation is insufficient
Environment protective measures		
Do not release into the environment. Do not let product enter drains.		

9. Regulatory Information / Classification and Labelling

9.1 Regulatory Information

This substance has notably been registered and assessed under:

- EU Regulation EC 1907/2006 (REACH)
- OECD SIDS (Screening Information Data Set) program

9.2 Classification and labelling

Under GHS, substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the eSDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers and emergency responders) can better understand the hazards of the chemicals in use. Substances registered for REACH are classified according to CLP (EC) 1272/2008, implementation of the GHS in the European Union.

Classification	
<ul style="list-style-type: none">– Flammable liquids: Category 3.– Skin irritation: Category 2.– Serious eye damage: Category 1.– Specific target organ toxicity - single exposure (inhalation): Category 3.	
Signal word	
Danger	
Pictograms	
<ul style="list-style-type: none">– GHS02: Flame	
<ul style="list-style-type: none">– GHS05: Corrosion	
<ul style="list-style-type: none">– GHS07: Exclamation mark	
Hazard statements	
<ul style="list-style-type: none">– 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.	
Additional classification according to Globally Harmonized System (GHS)	
<ul style="list-style-type: none">– Acute toxicity – Oral: Category 5; May be harmful if swallowed.– Acute toxicity – Dermal: Category 5; May be harmful in contact with skin.	

10. Contact Information within Company

For further information on this substance or product safety summary in general, please contact:

- **ICCA portal where the GPS Safety Summary is posted:**
<http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/>
- Arkema-acrylics-reach-uses@arkema.com

11. Date of Issues / Revision

- Date of issue: 2012/09/04
- Date of revision:

12. Disclaimer

The information contained in this paper is intended as advice only and whilst the information is provided in utmost good faith and has been based on the best information currently available, is to be relied upon at the user's own risk.

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