

GPS Safety Summary

Substance Name:

Isobutyraldehyde

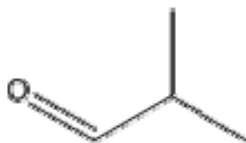
1. General Statement

Isobutyraldehyde is produced in the plant of Oxochimie in Lavéra (France) by 'Oxo' reaction of syngas on propylene (hydroformylation).

It is used as an intermediate for the manufacture of other chemicals.

2. Chemical Identity

Name:	Isobutyraldehyde or Isobutanal
Brand names:	ISOBUTYRALDEHYDE
Chemical name (IUPAC):	2-methylpropanal
CAS number:	78-84-2
EC number:	201-149-6
Molecular formula:	C ₄ H ₈ O
Structure:	



3. Use and applications

Isobutyraldehyde is industrially manufactured and used as a chemical intermediate under strictly controlled conditions.

Isobutyraldehyde is mostly transformed into Isobutanol (refer to Arkema's Isobutanol GPS Safety Summary), and Neopentylglycol, a building block for paints and coatings resins. It is also transformed into Isobutydine diurea (IBDU), a fertilizer.

Isobutyraldehyde is not sold to consumers.

4. Physical / Chemical properties

Isobutyraldehyde is a highly flammable, volatile liquid organic substance with the following physicochemical properties:

Property	Value
Physical state	Liquid at 20°C and 1013 hPa
Colour	Colourless
Odour	Slightly stinging
Molecular weight	72.1 g/mol

Density	0.78 g/cm ³ at 25.8°C
Vapour pressure	231 hPa at 25°C
Freezing / boiling points	-65.9°C / 64.4°C at 1013 hPa
Flash point – flammability	-5°C at 1013 hPa – highly flammable liquid and vapour
Self-ignition temperature	180°C at 1013 hPa
Explosive / oxidizing properties	Not expected based on structure
Water solubility	60 g/L at 25°C
Octanol-water partition coefficient (Log K _{ow})	0.77 at 25°C

5. Health Effects

Like any reactive chemical, isobutyraldehyde can be hazardous if not handled properly.

Effect Assessment	Results
Acute Toxicity Oral / inhalation / dermal	May be harmful if swallowed. Slightly harmful by inhalation of vapours or by contact with skin.
Irritation / corrosion Skin / eye / respiratory tract	Mildly irritating to skin. Irritating to eyes. Vapours are not acutely irritating to the respiratory tract.
Sensitisation	Does not cause allergic skin reactions.
Toxicity after repeated exposure Oral / inhalation / dermal	After repeated inhalation exposure, the predominant effect is local irritation which can result in damage to the olfactory epithelium at high concentrations.
Genotoxicity / Mutagenicity	Based on the available data, not expected to cause genetic effects.
Carcinogenicity	Does not cause cancer in long-term animal studies.
Reproductive / Developmental Toxicity	Does not cause birth defects, adverse reproductive effects or damage to reproductive organs in laboratory animals.

6. Environmental Effects

On short-term, Isobutyraldehyde is harmful to fish and algae and slightly harmful to aquatic invertebrates. No long-term data are available.

Isobutyraldehyde is unlikely to persist in the environment since it biodegrades rapidly in sewage treatment plants. If released to air, photochemical degradation is expected to occur. Due to its very low octanol-water partition coefficient (log K_{ow} = 0.77), it is not expected to bind to soil or sediment or to accumulate in the food chain, *i.e.*, the bioaccumulative potential is negligible.

Effect Assessment	Result
Aquatic Toxicity	Acute: harmful. Chronic: not classified.

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 are not exposed to Isobutyraldehyde since it is transformed into other chemicals.

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

Workers:

Isobutyraldehyde is industrially manufactured and used almost entirely within closed systems, always under strictly controlled conditions, thus minimizing the occupational exposure potential.

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

When used under strictly controlled conditions as recommended in the Safety Data Sheet (see Chap. 8), exposure is negligible and risks are adequately controlled.

7.2 Environment

Isobutyraldehyde is industrially manufactured and used mostly in closed systems in a continuous or batch process, always under strictly controlled conditions, and consumed when used as an intermediate, thus minimizing release to the environment.

Procedures, controls and risk management measures are in place, which limit the environmental exposure.

If accidentally released to the environment, Isobutyraldehyde would partition to the atmosphere due to its volatility and partly to water where it would rapidly biodegrade.

When used under strictly controlled conditions as recommended in the Safety Data Sheet (see Chap. 8), exposure is negligible and risks are adequately controlled.

8. Risk Management recommendations

Human health measures	
Organizational	<p>Only use for the purpose of chemical transformation (intermediate).*</p> <p>Implement high standards of occupational hygiene*.</p> <p>Ensure operatives are well informed of the hazards and trained to minimise exposures*.</p> <p>Maintain clear and up-to-date handling procedures and control their application*.</p> <p>Collect the latest available Safety Data Sheet.</p> <p>Handle and store according to the indications of the Safety Data Sheet.</p>

Engineering controls	Manufacture and use in rigorously contained (closed) systems.* Use material of high integrity for loading and unloading.* Reduce exposures to a minimum and ensure their regular monitoring.* Provide appropriate ventilation or aspiration in working areas.* Purge and ventilate systems before cleaning/maintenance worker entry.* Should be handled in well ventilated areas. Prevention of inflammation should be in place. Ensure that eyes and handwash stations and safety showers are close to workstation locations.	
Protection	Eye/Face protection:	Tightly fitting safety goggles
	Skin protection:	Protective clothes, boots
	Hand protection:	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. Treat or incinerate any waste.*		

*: Taken together, these specific risk management measures enable to respect strictly controlled conditions of manufacture and use along the whole life-cycle.

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	
– Flammable liquids: Category 2. – Eye irritation: Category 2.	
Signal word	
Danger	
Pictograms	
– GHS02: Flame	
– GHS07: Exclamation mark	

Hazard statements
<ul style="list-style-type: none"> – H225: Highly flammable liquid and vapour. – H319: Causes serious eye irritation.
Additional classification according to Globally Harmonized System (GHS)
<ul style="list-style-type: none"> – Acute toxicity – Oral: Category 5; May be harmful if swallowed. – Skin irritation: Category 3; Causes mild skin irritation. – Acute aquatic toxicity: Category 3; Harmful to aquatic life.

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: 2012/11/20
- 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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