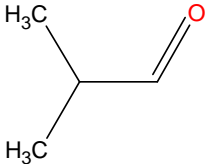


### 1. PRODUCT NAME

<b>a/ trade name</b>	
– in Polish	Aldehyd izomastłowy
– in English	Isobutyraldehyde
– in German	Isobuyraldehyd
<b>b/ chemical name</b>	
– in Polish	Izobutanal; 2-metylopropanal
– in English	Isobutanal; 2-methylpropanal
– in German	Isobutanal; 2-methylpropanal
<b>c/ proper shipping name</b>	ISOBUTYRALDEHYDE (ISOBUTYL ALDEHYDE)
<b>d/ chemical formula</b>	
– molecular formula	C <sub>4</sub> H <sub>8</sub> O
– semi-structural formula	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CHO
– structural formula	
<b>e/ PKWiU:</b>	20.14.61.0
<b>f/ CN:</b>	2912 19 00

### 2. QUALITY REQUIREMENTS

#### 2.1. General requirements

Isobutyraldehyde is a colourless and clear liquid, with the specific odour which is pungent, acrid and penetrating.

#### 2.2. Physical-chemical properties

Item	Specification	Value	Unit	Test method	Foreign equivalent
1	Colour	max.	10	[Pt-Co] PN-C-04534-01:1981 PN-EN ISO 6271:2016-01	ISO 2211 ISO 6271
2	Acid number	max.	1	[mg KOH/g] Internal method of Grupa Azoty ZAK S.A.	No equivalent
3	n-Butyraldehyde content	max.	0.15*	[wt %] Internal method of Grupa Azoty ZAK S.A. (GC)	GC
4	Water content	max.	1.5	[wt %] PN-ISO 760:2001	ISO 760
5	Isobutyraldehyde content	min.	99.7*	[wt %] Internal method of Grupa Azoty ZAK S.A. (GC)	GC

<sup>1</sup> These values give no consideration to the water content in the product.

### 3. APPLICATION(s)

Isobutyraldehyde makes a feed for the synthesis of alcohols, acids, amines and esters. It is used in the chemical processes for the production of plasticisers, pharmaceuticals, crop protection products, synthetic resins, fragrances, solvents and various additives which are used in numerous branches of the industry (antioxidants, wetting agents, perfume components, improving agents, etc.).

Isobutyraldehyde has been registered as a transported isolated intermediate. Pursuant to the REACH Regulation, it must be used for chemical processing in order to be transformed into another substance only.

### 4. STORAGE STABILITY

When the storage and transport conditions as per sections 7) and 8) are observed, the product will maintain its quality parameters as per section 2) above over the period of three months from the date of loading.

### 5. QUALITY DOCUMENT

Unless the client's order (or contract) demands otherwise, each tank vehicle of the product shall be provided with the quality certificate to evidence that the product quality parameters satisfy the requirements listed in the contract and/or in this Specification.

### 6. PACKING

#### 6.1. General requirements

Isobutyraldehyde is available in bulk shipments, in stainless steel rail tank cars or road tankers, and/or in tank-containers which have been approved for that type of cargo.

Other types of containers are also allowable, if they protect the product sufficiently to maintain its quality, and if they provide safety in transport, storage, handling and use. In that case, the client should:

- Submit the valid certificate which permits the use of that type of containers in storage and transport, in accordance with RID/ADR.
- Place marking on the containers, in accordance with applicable regulations.

#### 6.2. Labelling applicable for client's unit containers

Marking of the client's unit containers shall specify:

a/ According to Regulation (EC) № 1272/2008:

<i>Identification data:</i>	name, address and phone number of the supplier (or suppliers)
<i>Information on product amount</i>	nominal amount of the product in the packages which are made available to the public, unless that amount has been specified elsewhere on the package
<i>Product identifier:</i>	
<i>Substance name:</i>	“Isobutyraldehyde”
<i>EC number:</i>	“EC number 201-149-6”
<i>CAS number:</i>	“CAS number 78-84-2”
<i>Hazard Pictograms:</i>	

GHS02: flame



GHS07: exclamation mark



Signal Word: “Danger”

Hazard statements:

H225: “Highly flammable liquid and vapour.”

H319: “Causes serious eye irritation.”

## Precautionary statements:

- P210: "Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking."
- P241: "Use explosion-proof equipment."
- P243: "Take action to prevent static discharges."
- P305+P351+P338: "IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing."
- P337+P313: "If eye irritation persists: Get medical Get medical advice/attention."
- P303+P361+P353: "IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower."

## b/ According to RID/ADR:

- Shipping name „ISOBUTYRALDEHYDE”
- UN № „UN 2045”
- Warning label № 3 „Flammable liquids”



or



- UN certification sign for the container (directly on the container)

## c/ Safety signs as per PN-92/N-01256-01:

- sign № 19 "No open flames. No smoking."



## d/ Inscription

- "Spent packages must be transferred to an authorised waste collecting company."

## e/ Additional labelling required by national/local legislation

## 7. STORAGE

### 7.1. Requirements for warehouses

- The requirements of Directive 94/9/EC must be satisfied within the equipment and protective systems intended for use in potentially explosive atmospheres (ATEX).
- The provisions of Directive 1999/92/EC must be adhered to within the minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.
- Keep containers tightly closed, in cool and well ventilated places.
- Local exhaust ventilation systems, to eliminate vapours from the places of their emission, and general ventilation systems in rooms.
- Liquid-impervious floors which make it possible to collect the spilled material and prevent its entry to the sewage system.

### 7.2. Storage conditions

- Store in leak-proof tanks with nitrogen blanketing.
- Use non-sparking tools only and ex-proof equipment.
- Do not smoke and keep open flame devices away.
- Eliminate any ignition sources.
- Store under neutral blanketing, e.g. nitrogen blanketing.
- Fire-extinguishers should be readily available in storage rooms.
- Use under strictly controlled conditions only, in accordance with the Regulation (EC) № 1907/2006, Art. 18(4).

### 7.3. Recommendations for occupational hygiene

- Do not breathe vapours. Observe the occupational safety and health rules when handling.
- Use safety goggles, protective gloves and protective clothing when working in direct contact with n-butyraldehyde; use respiratory protection when ventilation is not sufficient.
- Adding to personal protection items, full protective suits should be used.

## 7.4. Recommendations for joint storage

- Incompatible substances: bases, acids, oxidisers, some amines and alcohols
- Temperature class: T3
- Other comments: Organic fibrous materials, when contaminated with isobutyraldehyde, may catch fire in contact with air.  
Bases and numerous organic substances, like alcohols, amines, oxidisers and acids, may initiate violent and exoenergetic reactions.  
Vapours of isobutyraldehyde are heavier than air and they may travel over a long distance and finally contact a source of ignition.  
Combustion gases from organic materials are generally classified as toxic substances which are absorbed by inhalation.  
Toxic gases/vapours may be released in a fire.

## 8. TRANSPORT

### 8.1. General requirements

Isobutyraldehyde is transported in stainless steel rail tank cars or road tankers, and/or in tank-containers which have been approved for the carriage of isobutyraldehyde. The tank vehicles and containers should be thermally insulated. The gas space above the liquid should be filled with nitrogen (for oxygen-free atmosphere).

The tankers and containers must be checked for cleanness before loading from the formal point of view (washing/cleaning certificates) and from the actual point of view - internal inspection.

The client's unit containers must meet the requirements as per Section 6.

Isobutyraldehyde is a dangerous goods in accordance with transport regulations.

### 8.2. Labelling applicable for means of transport as per RID/ADR

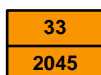
#### a/ road vehicles (trucks)

- reflective orange-coloured warning panels



#### b/ rail tankers, tank containers and road tankers

- orange-coloured warning panel with the hazard identification number and UN number



- warning label № 3: "Flammable liquids"



or



## 9. OTHER INFORMATION

Isobutyraldehyde is Kosher-certified.

## 10. REFERENCE DOKUMENTS

Product Sheet	PM-003-02 "Isobutyraldehyde. Material Safety Data Sheet."
PN-C-04534-01:1981	Chemical analysis. Determination of colour of chemical products by Hazen units (platinum-cobalt scale).
PN-EN ISO 6271:2016-01	Clear liquids -- Estimation of colour by the platinum-cobalt colour scale
PN-ISO 760	Determination of water - Karl Fischer method (General method)

## 11. IN PLACE OF

PM-003-01-3.0 "Isobutyraldehyde. Specification."