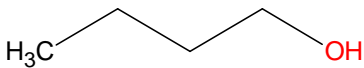


1. PRODUCT NAME

a/ trade name	
– in Polish	n-Butanol
– in English	n-Butanol
– in German	n-Butanol
b/ chemical name	
– in Polish	Butan-1-ol, n-Butanol,
– in English	Butan-1-ol, n-Butanol,
– in German	n-Butanol, n-Butylalkohol
c/ proper shipping name	BUTANOLS
d/ chemical formula	
– molecular formula	$C_4H_{10}O$
– semi-structural formula	$CH_3CH_2CH_2CH_2OH$
– structural formula	
e/ PKWiU:	20.14.22.9
f/ CN:	2905 13 00

2. QUALITY REQUIREMENTS

2.1. General requirements

n-Butanol is a colourless and clear liquid, with the specific odour.

2.2. Physical-chemical properties

Item	Specification	Value	Unit	Test method	Foreign equivalent
1	n-Butanol min.	99.8	[wt %]	Internal method of Grupa Azoty ZAK S.A. (GC)	GC
2	Isobutanol max.	0.10	[% m/m]	Internal method of Grupa Azoty ZAK S.A. (GC)	GC
3	Colour max.	5	[Pt-Co]	PN-C-04534-01:1981 PN-EN ISO 6271:2016-01	ISO 2211 ISO 6271
4	Density at 20°C min. max.	0.810 0.812	[g/cm ³]	PN-EN ISO 12185:2002	ISO 12185
5	Acids as acetic acid max.	0.005	[wt %]	Internal method of Grupa Azoty ZAK S.A.	ASTM D 1613
6	Aldehydes as butyraldehyde max.	0.05	[wt %]	Internal method of Grupa Azoty ZAK S.A.	BS 4583
7	Water content max	0.05	[wt %]	PN-EN ISO 12937:2005	ISO 12937

3. APPLICATION(s)

In the production of: esters (which are used as solvents and flavouring agents); paints and varnishes (solvent, agent which prevents fogging, improves fluidity and reduces viscosity of waterborne paints); plastics additives (plasticisers); melamine-formaldehyde and urea-formaldehyde resins (solvent or butylating agent); agricultural auxiliaries (butylamines); floatation agents; ethers of ethylene and propylene glycols.

It is also used as: solvent (in the textile and paint and varnish industries); extraction solvent in the production of medicinals; component of anti-icing blends and anti-corrosive additives.

4. STORAGE STABILITY

The product is chemically stable. 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 6 months from the date of loading.

5. QUALITY DOCUMENT

Unless the client's order (or contract) demands otherwise, each shipment 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

n-Butanol is available in bulk shipments, in steel rail tank cars, in tank-containers or in road tankers. 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.

n-Butanol may not be transported together with strong oxidisers and acids.

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>Name of substance:</i>	"Butan-1-ol"
<i>EC number:</i>	"EC number 200-751-6"
<i>CAS number:</i>	"CAS number 71-36-3"
<i>Hazard pictograms</i>	
<i>GHS02: flame</i>	
<i>DHS05: corrosion</i>	
<i>GHS07: exclamation mark</i>	
<i>Signal word</i>	"Danger"
<i>Hazard statements:</i>	
<i>H226:</i>	"Flammable liquid and vapour"
<i>H302:</i>	"Harmful if swallowed"
<i>H335:</i>	"May cause respiratory irritation"
<i>H315:</i>	"Causes skin irritation"
<i>H318:</i>	"Causes serious eye damage"
<i>H336:</i>	"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.”
- P240: “Ground and bond container and receiving equipment.”
- P241: “Use explosion-proof equipment.”
- 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.”
- P370+P378: “In case of fire: Use water spray, alcohol-resistant foam, carbon dioxide to extinguish.”
- P403+P235: “Store in a well-ventilated place. Keep cool.”
- P501: “Dispose of contents/container in accordance with regulations.”

b/ According to RID/ADR:

- Shipping name „BUTANOLS”
- UN № „UN 1120”
- Warning label № 3 „Flammable liquids”



or



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

c/ Safety signs as per ISO 7010:2011

- sign ISO 7010-P003 “No open flame; Fire, open ignition source and smoking prohibited”



d/ Handling signs as per ISO 780:1997:

- sign № 4 “Keep away from sunlight”



e/ Inscription

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

f/ Additional labelling required by national/local legislation

7. STORAGE

7.1. Requirements for warehouses

- Local exhaust ventilation systems, to eliminate vapours from the places of their emission, and general ventilation systems in rooms.
- Protection against accumulation of static electricity - ignition of organic vapours may be initiated by any static discharge.
- Sprinkler systems, to cool down tanks/containers with water spray in case of fire.
- Liquid-impervious floors which make it possible to collect the spilled material and prevent its entry to the sewage system.
- Ex-proof wiring, lighting and ventilation systems.
- The storage rooms should be cool and dry.

7.2. Storage conditions

- Keep away from ignition sources - No smoking.
- Keep container tightly closed, in cool and well ventilated places.
- Handle and open containers with care.
- Containers and tanks must be properly marked.
- Containers and tanks must be made of the materials which are resistant to the product attack.

- Hand-operated/portable fire-fighting equipment should be available in storage rooms.

7.3. Recommendations for occupational hygiene

- Avoid any direct contact with skin, eyes and clothing.
- Wash hands before meals and directly after handling the product.

7.4. Recommendations for joint storage

- Incompatible substances: strong oxidisers
- Temperature class: T3

8. TRANSPORT

8.1. General requirements

n-Butanol is transported in rail tankers, in road tankers and/or in tank-containers.

The rail tankers, road tankers and tank-containers must be checked for cleanness before loading by a person who permits them to be loaded. They need to have washing/ cleaning certificates and their approval documents need to be valid.

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

Unit containers may be transported by any covered means of transport which satisfy RID/ADR requirements.

n-Butanol is a dangerous goods in accordance with RID/ADR.

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

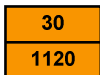
a/ road vehicles (trucks)

- reflective orange-coloured warning panels



g/ 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

n-Butanol is Kosher-certified.

10. REFERENCE DOCUMENTS

Product Sheet	PM-004-02 “n-Butanol. 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-EN ISO 12937:2005	Petroleum products -- Determination of water -- Coulometric Karl Fischer titration method
PN-EN ISO 12185:2002	Crude petroleum and petroleum products -- Determination of density -- Oscillating U-tube method.

11. IN PLACE OF

PM-004-01-3.0 “n-Butanol. Specification.”