

Butylglycol

High-boiling, low-volatility liquid with a mild odor that is used as a solvent and starting material for syntheses. Excellent co-solvent in aqueous coating systems (water-based paints).

Chemical nature

Ethylene glycol mono-n-butyl ether, 2-Butoxyethanol, 1-Hydroxy-2-n-butoxyethane

Molecular formula	$C_6H_{14}O_2$
Molar mass	118.18 g/mol
CAS-No.	111-76-2
EC-No.	203-905-0

Delivery specification

Property	Value	Unit	Test method
Mass fraction of			
- Butylglycol	99.0 min.	%	DIN 55688
- Water	0.1 max.	%	DIN 51777, Part 1
Pt/Co color value (Hazen)	10 max.	-	DIN EN ISO 6271

Properties

Colorless, neutral, slightly hygroscopic, mobile liquid with a mild odor. The product is miscible with water and common organic solvents in all proportions at room temperature.

Butylglycol shows the reactions typical of an alcohol, such as esterification, etherification, oxidation and the formation of acetates and alcoholates. Like most ethers, it forms peroxides in the presence of atmospheric oxygen.

Physical data

The following physical data have been compiled from the literature as well as from BASF measurements and calculations. They provide no guarantee of properties in the legal sense, however.

Property	Condition	Value	Test method
Boiling range	at 1013 hPa; 95 Vol.-%; 2 – 97 ml	168 – 172°C	DIN 51751
Density	at 20°C	0.8995 – 0.9020 g/cm ³	DIN 51757
Refractive index n_{20D}		1.4190 – 1.4200	DIN 51423
Solidification point		70.4°C	
Evaporation rate	ether = 1	160	DIN 53170
Enthalpy of combustion (ΔH_c)	at 20°C	32 397 kJ/kg	
Enthalpy of vaporization (ΔH_v)	at boiling point	368 kJ/kg	
Dipole moment (μ)		2.08 D	
Hansen solubility parameters		$\delta d = 16.0 \text{ (MPa)}^{1/2}$ $\delta p = 5.1 \text{ (MPa)}^{1/2}$ $\delta h = 12.3 \text{ (MPa)}^{1/2}$ $\delta t = 20.8 \text{ (MPa)}^{1/2}$	

T [°C]	Vapor pressure P [hPa]	Density r [g/cm ³]	Viscosity η [mPa·s]
-60		0.9655	255.1
-40		0.9499	46.2
-20		0.9339	14.4
0	0.17	0.9176	6.2
20	0.89	0.9006	3.3
30		0.8924	2.5
40	3.7	0.8839	2.0
50	7.1	0.8752	1.6
60	12.5	0.8665	1.3
80	36.3	0.8488	0.9
100	90.6	0.8308	0.7
120	201	0.8124	0.5
140	404	0.7936	0.4
160	744	0.7746	0.3
171.2	1013		

T [°C]	Specific heat C _p [kJ/(kg·K)]	Surface tension σ [mN/m]
0	2.13	
20	2.26	27.8
30	2.33	27.0
40	2.40	26.2
50	2.47	25.4
60	2.55	
80	2.71	
100	2.89	
120	3.08	

Applications

Selected applications of Butylglycol are described below.

As a low-volatility solvent, Butylglycol can be used to extend the drying time of coatings and improves their flow. It is especially recommended for paints for brush-application based on cellulose nitrate, chlorinated binders or cellulose ethers, because when it is applied to dry coatings, it only softens them very slowly.

Small proportions of Butylglycol improve the brushability of, for example, alkyd resin paints and reduce their viscosity. It is also an extremely efficient flow improver for urea, melamine or phenolic stoving finishes.

Butylglycol has proved to be the most effective of a large number of organic solvents tested in a very wide range of aqueous coating systems. In particular, it improves the properties of the paint by reducing the viscosity peak when oxidatively and physically drying water-based paints, including those for stove-enamelling, are diluted with water.

As a coalescing aid, Butylglycol can significantly lower the minimum film-forming temperature (MFFT) and improve flow in many physically drying paint systems.

Butylglycol improves the evaporation behavior of the volatile constituents (e. g. in water-based stoving enamels) during hot-air or infrared drying.

Further information on the use of Butylglycol in aqueous coating systems can be found in our Technical Information Sheet "Butylglycol in water-based coating systems" (TI-CIW/ES 016 e).

Further applications of Butylglycol are as follows:

- Solvent in printing inks for leather dyes, etc.
- Component in surface cleaners, e. g. to degrease metal surfaces.
- Component in hydraulic fluids.
- Component in drilling and cutting oils (strong solvent).
- Starting material in the production of butyl glycol acetate which is also an excellent solvent.
- Starting material in the production of plasticizers, e. g. by reaction with phthalic anhydride.

Storage & Handling

Butylglycol should be stored under nitrogen. The storage temperature must not exceed 40°C and moisture are excluded. Under these conditions, a storage stability of 12 months can be expected.

As soon as the original packaging is opened, the liquid comes into contact with ambient air and this will cause the formation of large quantities of per-oxides and their degradation products. Opened containers should therefore be used up as quickly as possible.

It is recommended to use nitrogen blanketing for bulk storage tanks. Only dedicated storage tank and unloading facilities should be used.

Safety

When using this product, the information and advice given in our Safety Data Sheet should be observed. Due attention should also be given to the precautions necessary for handling chemicals.

Note

The data contained in this Technical Information is based on our current knowledge and experience as well as our investigations according to the today's state-of-the-art. In view of the many factors that may affect processing and application of the Product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the Product for specific purpose. No liability of BASF can be derived therefrom. It is the responsibility of the recipient of the Product to ensure that any proprietary rights and existing laws and legislation are observed.

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