



BIOGON® Food-grade gases

BIOGON® N (E 941) liquid nitrogen (nitrogen, N₂)



Application area Liquid nitrogen is used in the food industry for cooling, freezing, MAPAX® modified atmosphere packaging, and inerting. During cooling and freezing, the heat of vaporization of the cold liquid nitrogen is utilized in the rapid cooling/freezing process.

When compressed liquid carbon dioxide passes through a nozzle at atmospheric pressure, dry ice is formed. To produce 1 kg of dry ice, about 2 kg of liquid BIOGON® C is needed. Dry ice sublimates, meaning it transitions directly from a solid to a gas without becoming liquid first. As dry ice sublimates, it absorbs heat from its surroundings, making it an excellent cooling option for food. This is because its cooling effect is twice as strong as regular ice, and it does not leave water residue.

Carbon dioxide also dissolves in water. The colder the water, the more carbon dioxide it can dissolve. When carbon dioxide is dissolved in water, it forms carbonic acid.

Product specification BIOGON® N (E 941) liquid nitrogen, N₂

Product name	Purity	Impurities unit ppm					Odor, taste	Material- number
	vol %	H ₂ O	O ₂	CO	CnHm*	NO/NO ₂		
BIOGON® N liquid	N ₂ ≥99,95	≤20	≤20	≤10	≤100	≤10	None	105328

All BIOGON® products comply with Swedish and European food legislation requirements. These include regulations such as (EC) No 852/2004, Regulation (EC) No 178/2002, Regulation (EC) No 1333/2008, and Regulation (EC) No 231/2012. The gases in the BIOGON® product group contain no allergens. No genetically modified organisms (GMOs) are involved in the manufacturing process of BIOGON® gases.

Properties and Origin Liquid nitrogen is a colorless and odorless liquid that is lighter than water. In its gaseous form, nitrogen is a colorless, tasteless, and odorless gas. Nitrogen does not burn and does not support combustion. Atmospheric air contains 78.09% nitrogen by volume, and nitrogen gas is slightly lighter than air. Nitrogen is inert and does not react with products. Liquid nitrogen is extracted from the air through distillation in an air separation plant.

Properties and origin

Liquid carbon dioxide is a colorless liquid that is heavier than water. In its gaseous form, it is colorless with a sharp, pungent odor and taste. Carbon dioxide does not burn and does not support combustion. Atmospheric air contains about 4 percent carbon dioxide, while exhaled air contains about 4 percent by volume.

In its gaseous form, carbon dioxide is approximately 1,4 times heavier than ordinary air. Solid carbon dioxide (dry ice) has a temperature of -78 °C and does not melt like regular ice under atmospheric pressure; instead, it sublimates directly to gas. It reacts vigorously with strong bases, especially at elevated temperatures.

Carbon dioxide is extracted as a byproduct from various processes such as the production of fertilizers, ethanol, biodiesel, and from natural sources. For food-grade carbon dioxide, the gas undergoes extensive purification to meet the purity standards set by authorities. It must be stored at a pressure greater than 5,2 bar to remain in liquid form.

Physical data

Type of gas/designation	Nitrogen, N ₂	
Boiling point	-196 °C	
Vapoization, 1 bar	199 kJ/kg	
Heat capacity (15 °C)	1,04 kJ/kg K	
Conversion factors	<u>1 Nm³ = 1,419 l</u>	<u>= 1,148 kg</u>
	<u>1 l = 0,705 Nm³</u>	<u>= 0,808 kg</u>
	<u>1 kg = 0,872 Nm³</u>	<u>= 1,237 l</u>
Critical values	<u>Critical temperatur</u>	<u>-147,1 °C</u>
	<u>Critical pressure</u>	<u>33,9 bar</u>
	<u>Critical density</u>	<u>0,311 kg/l</u>

1 Nm³ = 1 m³ vid 15 °C, 1 atm (technical atmosphere). The liter designation is used for gas in liquid phase.

Safety

Linde is committed to maintaining a high level of safety and protection for both personnel and the environment. Please review our safety data sheets before using the product, available on [linde.se](https://www.linde.se)

Delivery form

Chilled liquid.