

Nitrogen

Colorless, odorless, nonflammable inert gas.

CAS Number	7727 - 37 - 9
UN Number	1977
Shipping Name	Nitrogen, Refrigerated Liquid
Hazard Class	2.2
Label	Nonflammable Gas

Applications

In its liquid state nitrogen is used for food freezing, plastic and rubber deflating and grinding, cooling, metal treating, biological sample preservation, pulverization, and other temperature-related applications.

Physical Properties

Chemical formula	N ₂	Triple point temperature	-346.01°F (-210.0°C)
Molecular weight	28.013	Specific heat, BTU/lb, °F	
Specific Gravity (Air = 1)		At constant pressure (1 atm)	
70°F (21.1°C) 1 atm	0.9669	70°F (21.1°C)	0.2484
Specific Volume, cu ft		At constant volume (1 atm)	
70°F (21.1°C) 1 atm	13.80	70°F (21.1°C)	0.1774
Density, saturated vapor		Ratio of specific heats at 70°F (21.1°C)	1.4014
lb/cu ft, 1 atm	0.2874	Coefficient of viscosity, micropoises	
Normal boiling point, 1 atm	-320.6°F (-195.9°C)	77°F (25°C), 1 atm	178.7
Heat vaporization, BTU/lb	85.6	Thermal conductivity, 32°F (0°C)	
Critical pressure		BTU/ (sq ft) (hr) (°F)/ft	0.0139
Absolute atmospheres	33.52	Ionization potential, volts	14.5
Absolute psig	492.9	Excitation potential, first	
Critical point temperature	-232.40°F (-146.9°C)	resonance potential, volts	6.3
Triple point pressure			
Absolute atmospheres	0.1238		
Absolute psig	1.819		

Nitrogen *(continued)*

Nitrogen Specifications (Units in ppm [v/v] unless shown otherwise)

Limiting Characteristics	Formulary Spec	Liquid CGA G-10.1 Type II, Grade L	Gaseous CGA G-10.1 Type I, Grade F	MTG Typical
Nitrogen Min. %*	99	99.998	99.9	99.999
Water	1000	4	32	1.5
Dewpoint, °F	N.A.	-90	-60	-100
Oxygen	N.A.	10	1000	5

*Nitrogen includes trace quantities of neon, helium and small quantities of argon

Currently, the United States Department of Agriculture (USDA) has no specification for liquid nitrogen in food applications

However, the Food and Drug Administration (FDA) considers nitrogen a G.R.A.S. substance - Generally Regarded As Safe as a food additive. Matheson Tri-Gas also produces hi-purity liquid nitrogen for customers requiring stringent purity standards

Conversion Data

	WEIGHT		GAS		LIQUID	
	POUNDS Lb	KILOGRAMS Kg	CUBIC FEET SCF	CUBIC METERS Nm ³	GALLONS Gal	LITERS L
1 Pound	1.0	0.4536	13.803	0.3627	0.1481	0.5606
1 Kilogram	2.205	1.0	30.42	0.7996	0.3262	1.2349
1 Ton	2000	907.2	27,606	725.4	296.2	1121
1 SCF Gas	0.07245	0.03286	1.0	0.02628	0.01074	0.04065
1 Nm ³ Gas	2.757	1.2506	38.04	1.0	0.4080	1.5443
1 Gal Liquid	6.745	3.060	93.11	2.447	1.0	3.785
1 L Liquid	1.782	0.8083	24.60	0.6464	0.2642	1

SCF (standard cubic feet) gas measured at 1 atmosphere and 70°F.

Liquid measured at 1 atmosphere and boiling temperature.

All values rounded to nearest 4/5 significant numbers.

Nm³ (normal cubic meter) gas measured at 1 atmosphere and 0°C.