Stable isotopes of nitrogen available from ISOFLEX

Isotope	Z(p)	N(n)	Atomic Mass	Natural Abundance	Enrichment Level	Chemical Form
N-15	7	8	15.00010897	0.37%	>96.00%	KNO_3

Nitrogen was discovered in 1772 by Daniel Rutherford. Its name derives from the Greek words *nitron* + *genes,* meaning “nitre” and “forming,” and the Latin word *nitrum*.

Nitrogen is a colorless, odorless, tasteless gas that is diamagnetic and converts to a colorless liquid. At ordinary temperatures, nitrogen is very stable and chemically inert to most substances, although elevated temperatures and pressures change this. Carbides of certain metals, such as cerium and uranium, react with nitrogen at very high temperatures, forming their nitrides; nitrogen also combines with alkali and alkaline earth elements at ordinary temperatures to form their nitrides. At low pressure and under electric discharge conditions, nitrogen produces a greenish-yellow glow, which continues to glow after the discharge. Such active nitrogen readily reacts with many unreactive elements in cold, such as mercury and sulfur, forming their nitrides.

Gaseous nitrogen has numerous uses in chemical, food, metal and electrical industries. It is needed in commercial production of ammonia and in the preparation of many nitrides. It is also the starting material in making cyanamide salts, cyanides and nitrogen oxides for producing nitric acid.

Nitrogen is also used in gas chromatography, as a carrier gas, to provide an inert atmosphere in chemical reactions, to prevent oxidation reactions, to reduce fire or explosion hazards, and to dilute a reacting gas. In the food industry it is used to prevent mold growth, spoilage from oxidation, and insect infestation. Other applications of nitrogen gas include pressurizing cable jackets, preventing carburization in welding and soldering, inflating balloons, agitating liquid baths, and cooling catalytic reactors in petroleum refining. Liquid nitrogen is used in the rapid freezing of food as well as its packaging, storage and transportation; for preserving blood, tissue and bone marrow; for cryopulverizing plastics, resins, waxes, spices and scrap rubber to achieve small particle size; and for deforming stainless steel to make high-strength wires for springs.

Properties of Nitrogen

Name	Nitrogen
Symbol	N
Atomic number	7
Atomic weight	14.0067
Standard state	Gas at 298 °K
CAS Registry ID	7727-37-9
Group in periodic table	15

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Properties of Nitrogen (continued)

Group name	Pnictogen
Period in periodic table	2
Block in periodic table	p-block
Color	Colorless
Classification	Non-metallic
Melting point	-210.1 °C
Boiling/liquefying point	-195.79 °C
Thermal conductivity	2.583 W/(m·K)
Electronegativity	3.04
Heat of vaporization	2.79 (per mole nitrogen atoms) $kJ \cdot mol^{-1}$
Heat of fusion	0.36 (per mole nitrogen atoms) $kJ \cdot mol^{-1}$
Density of gas	1.03 g/cm^3
Bond length	1.10 Å
Oxidation states	-3, +1, +2, +3, +4, +5
First ionization energy	1402.3 $kJ \cdot mol^{-1}$
Critical temperature (solid)	-146.94 ºC
Critical pressure (solid)	33.46 atm
Electron configuration	$[He]2s^2 2p^3$