



CF4 Tetrafluoromethane, R-14

Product Specification Sheet

Document 1-246/20
Last Revised 2/14/2020

CF4 – Tetrafluoromethane – R14

Carbon Tetrafluoromethane (R-14, CF₄) is a source of fluorine or carbon fluoride free radicals used in a variety of wafer etch processes. Tetrafluoromethane is used with oxygen to etch polysilicon, silicon dioxide, and silicon nitride. It is relatively inert under normal conditions and is an asphyxiant. Under RF plasma conditions, the fluorine free radicals are typically in the form of CF₃ or CF₂. A higher purity of tetrafluoromethane results in superior control of the process, which results in better dimensional and profile control. Other halocarbons, as well as the presence of air or oxygen, are detrimental to the control of the anisotropic etch.

Specifications

CF4 Commercial Grade Maximum Impurities	
Tetrafluoromethane	99.9%
Nitrogen + Oxygen	75 ppm
Hexafluoroethane + Carbon Dioxide	6 ppm
Mass Content of Water	< 1 ppm
Acidity	< 0.1 ppmw

CF4 High Purity Grade Maximum Impurities	
Tetrafluoromethane	>99.999%
Oxygen + Argon	< 1 ppm
Nitrogen	< 4 ppm
Carbon Dioxide + Carbon Monoxide	< 1 ppm
Other Halocarbons	< 2 ppm
Sulfur Hexafluoride	< 1 ppm
Moisture	< 1 ppm
Acidity (as Hydrogen Fluoride)	< 0.1 ppmw

Physical Constants	
Chemical Formula	CF ₄
Molecular Weight	80.0005
Specific Volume@ +70°F (+21.1°C)	4.396 ft ³ /lb., 0274 m ³ /kg
Critical Pressure	542.3. psia, 37.39 bar
Critical Temperature	-50.17°F, -45.65°C
Specific Gravity @ 70°F, 1 atm (Air=1)	3.04
Hazardous Class	2.2
Label	Nonflammable Gas
General Description	Colorless, Odorless