

Global Nitrosyl Fluoride Gas Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Nitrosyl Fluoride Gas market size is expected to reach \$ 19.81 million by 2032, rising at a market growth of 12.7% CAGR during the forecast period (2026-2032).

In 2025, global Nitrosyl Fluoride Gas capacity 10 Tons, sales reached approximately 9 Tons, with an average market price of around 870 USD/Kg, industrial gross margin 41%.

Nitrosyl fluoride is a highly reactive fluorine-containing nitrogen oxide whose commercial value is increasingly tied to differentiated semiconductor etch chemistry rather than conventional bulk fluorination. The molecule has a molecular weight of 49.0045 g/mol and a normal boiling point of approximately -59.9°C , making containment, purification and delivery central elements of the product proposition. Semiconductor-oriented technology covers purity levels from 99% to >99.99% and >99.999%, with tighter specifications extending beyond headline assay to F_2/NO , nitrogen oxides, moisture and other trace gases. Air Liquide's process disclosures, for example, contemplate F_2/NO below 1%, with preferred thresholds of 0.1% and 0.01%, while water can be controlled below 20 ppmw in high-selectivity etch applications. This study defines the addressable market as merchant industrial- and electronic-grade NOF, including commercial NOF-containing process mixtures on a 100%-NOF-equivalent basis, while excluding laboratory reagents, analytical standards and NOF generated in situ inside customer processes without a merchant-gas transaction.

The industrial technology stack has moved beyond basic synthesis toward high-purity conversion, by-product suppression, cylinder compatibility and reproducible point-of-use delivery. Direct reaction of fluorine with nitric oxide— $\text{F}_2 + 2\text{NO} \rightarrow 2\text{FNO}$ —is one of the most relevant routes for electronic-grade production, with F_2/NO ratios controlled at or

below 1/2 to suppress formation of $\text{F}\cdot\text{NO}$. Recent Chinese process development uses the same underlying chemistry while diluting fluorine with inert gas and precooling the feed before reaction. Alternative industrial pathways include $\text{NO}/\text{O}_2/\text{HF}$ chemistry producing NOF in an HF medium for aromatic fluorination, as well as legacy nitrosyl-sulfuric-acid/HF and nitrite/HF processes. For semiconductor supply, however, competitive advantage resides less in the stoichiometry than in deep purification, trace-gas analytics, moisture control, surface passivation and packaging. Air Liquide has disclosed Ni-P-coated 4130X cylinders and compatible high-cleanliness delivery hardware, while Resonac has demonstrated kilogram-scale NOF storage in a 10-liter vessel and storage-pressure windows extending from 0.05 to 5 MPa.

Selective dry etching of silicon nitride in advanced memory architectures is the clearest commercial use case, because increasingly complex 3D structures place a premium on material selectivity rather than fluorine-radical generation alone. Air Liquide's disclosed process space covers SiN or polysilicon selectivity to SiO_2 of roughly 10–3,000, with narrower preferred ranges of 20–2,000, and high-aspect-ratio structures extending from approximately 10:1 to 1,000:1. SK Specialty has separately disclosed FNO reaction-gas concentrations of at least 20 vol%, preferably at least 25 vol%, with plasma-processing pressures around 100 mTorr to 1 Torr. These conditions shift procurement criteria toward controlled impurity fingerprints, premix consistency, cylinder stability, flow repeatability and wafer-level process qualification. Outside semiconductors, NOF chemistry is also applicable to diazotization/fluorination routes for aryl fluorides, while 2025 research has investigated NOF-based GaN surface treatment; both remain secondary to semiconductor etch as merchant-gas demand drivers.

The competitive landscape remains unusually narrow, with only a small group of specialty-gas companies showing verifiable NOF-specific process, storage or semiconductor-application capability. Air Liquide has the broadest publicly visible portfolio across selective etching and $\text{F}\cdot\text{NO}$ -controlled storage and supply; Resonac has developed an increasingly integrated patent estate around etching, storage and gas analysis; and SK Specialty disclosed dedicated FNO etch technology in 2025. The ownership structure of the Korean platform changed materially on March 31, 2025, when Hahn & Company completed the acquisition of an 85% interest in SK Specialty from SK Inc, while SK retained 15%; the transaction valued the company at approximately KRW4.172 trillion, with roughly KRW2.7 trillion attributed to the shares sold. Although this was a platform-level specialty-gas transaction rather than an NOF-specific acquisition, it transferred control of an FNO technology participant to a private-equity owner. In China, Huate Gas published a dedicated NOF preparation patent in 2026, while India's Deepak Nitrite has developed a separate NOF/HF route focused on

industrial fluorination chemistry.

The next phase of market development will be determined by process insertion in advanced NAND, qualification of second sources and conversion of laboratory-scale or patent-stage chemistry into stable multi-region electronic-gas supply. Demand growth is likely to be concentrated in high-layer-count 3D NAND and other structures where high-aspect-ratio etching and SiN/SiO₂ selectivity become more demanding. Technology development will emphasize 4N–5N-plus purity, lower F₂/NO and moisture, premixed concentrations, lower on-site hazardous inventory and more robust cylinder passivation. Supply-chain competition should favor incumbent electronic-gas companies with integrated F₂/NO sourcing, ultratrace analytics, customer-audit systems and local fab logistics, while Chinese localization creates an additional route for qualification-driven share gains. The principal constraints remain difficult handling, relatively long fab qualification cycles, a limited number of process steps, and continued competition from NF₃, F₂, other fluorinated etchants and in-situ NOF generation.

Report Scope

This report studies the global Nitrosyl Fluoride Gas production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Nitrosyl Fluoride Gas and provides market size (US\$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Nitrosyl Fluoride Gas that contribute to its increasing demand across many markets.

Highlights and key features of the study

Global Nitrosyl Fluoride Gas total production and demand, 2021-2032, (Tons)

Global Nitrosyl Fluoride Gas total production value, 2021-2032, (USD Million)

Global Nitrosyl Fluoride Gas production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (Tons), (based on production site)

Global Nitrosyl Fluoride Gas consumption by region & country, CAGR,

2021-2032 & (Tons)

U.S. VS China: Nitrosyl Fluoride Gas domestic production, consumption, key domestic manufacturers and share

Global Nitrosyl Fluoride Gas production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (Tons)

Global Nitrosyl Fluoride Gas production by Purity, production, value, CAGR, 2021-2032, (USD Million) & (Tons)

Global Nitrosyl Fluoride Gas production by Application, production, value, CAGR, 2021-2032, (USD Million) & (Tons)

This report profiles key players in the global Nitrosyl Fluoride Gas market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Air Liquide, Resonac, Guangdong Huate Gas, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Nitrosyl Fluoride Gas market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US\$ Millions), volume (production, consumption) & (Tons) and average price (US\$/kg) by manufacturer, by Purity, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Nitrosyl Fluoride Gas Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Market Segmentation

Global Nitrosyl Fluoride Gas Market, Segmentation by Purity:

?99%

?99.9%

Global Nitrosyl Fluoride Gas Market, Segmentation by Grade:

Industrial Grade

Electronic Grade

Global Nitrosyl Fluoride Gas Market, Segmentation by Application:

Semiconductor Etch

Fluoroaromatic Synthesis

Others

Companies Profiled:

Air Liquide

Resonac

Guangdong Huate Gas

Key Questions Answered

1. How big is the global Nitrosyl Fluoride Gas market?
2. What is the demand of the global Nitrosyl Fluoride Gas market?
3. What is the year over year growth of the global Nitrosyl Fluoride Gas market?
4. What is the total value of the global Nitrosyl Fluoride Gas market?
5. Who are the Major Players in the global Nitrosyl Fluoride Gas market?
6. What are the growth factors driving the market demand?

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