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# Global Fluorine-Free Firefighting Foam Concentrates Supply, Demand and Key Producers, 2026-2032

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## Abstracts

The global Fluorine-Free Firefighting Foam Concentrates market size is expected to reach $ 790 million by 2032, rising at a market growth of 4.0% CAGR during the forecast period (2026-2032).

Fluorine-Free Firefighting Foam Concentrates (F3) are concentrated liquid fire-extinguishing formulations that contain no intentionally added fluorinated surfactants, including PFAS-based ingredients, and are designed to be proportioned with water and aerated to generate a stable foam blanket for fire suppression. They are primarily used for Class B flammable-liquid fires involving hydrocarbons such as gasoline, diesel, jet fuel, and crude oil, while alcohol-resistant fluorine-free formulations can also be used on water-miscible polar solvents such as alcohols, ketones, and esters. Unlike conventional AFFF, fluorine-free foams generally extinguish fires through a durable foam blanket rather than formation of a fluorinated aqueous film, thereby isolating the fuel surface from oxygen, suppressing vapor release, providing cooling, and reducing the risk of re-ignition.

## Key Findings

Fluorine-Free Firefighting Foam Concentrates are moving from specialty alternatives toward mainstream Class B fire protection in regulated end markets

Synthetic Fluorine-Free Foam is the principal product platform, while protein-based formulations serve more specialized performance and procurement requirements

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Petrochemical Plant Fire Suppression and Oil & Gas Terminal Fire Protection form the core industrial demand base

Europe and North America are at the forefront of transition, while Asia-Pacific offers expanding replacement and new-build opportunities

## Market Trends

The development direction of Fluorine-Free Firefighting Foam Concentrates is shifting from simply eliminating fluorinated chemistry toward achieving a more balanced combination of extinguishing efficiency, burn-back resistance, foam stability, equipment compatibility, storage stability, and environmental performance. Regulatory changes are increasingly converting environmental compliance from an optional purchasing consideration into a core product-selection criterion. In October 2025, the European Commission adopted restrictions on PFAS in firefighting foams with sector-specific transition periods, while the U.S. Federal Aviation Administration continues to support the transition of aircraft rescue and firefighting operations toward fluorine-free foam technologies. As a result, product development is increasingly focused on higher-performance synthetic formulations, improved foam drainage and burn-back characteristics, compatibility with existing proportioning and delivery systems, and products capable of serving multiple fuel-risk environments. End users are also paying greater attention to the total transition process, including system cleaning, concentrate replacement, equipment calibration, training, inventory management, disposal of legacy foam, and operational validation. This change is gradually moving competition from formulation supply alone toward integrated product performance, technical support, certification capability, and transition-service competence.

## Market Dynamics

### Drivers

Demand growth for Fluorine-Free Firefighting Foam Concentrates is primarily driven by the replacement of fluorinated firefighting foams, tightening environmental requirements, modernization of industrial fire protection systems, and stronger safety requirements in high-risk flammable-liquid environments. The regulatory transition is especially relevant to airports, petrochemical facilities, fuel terminals, marine operations, and other sites where firefighting foam inventories and fixed systems have traditionally relied on

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fluorinated formulations. The European Union's phased restriction of PFAS in firefighting foams and the continued U.S. aviation-sector transition toward F3 solutions provide direct structural support for replacement demand. Beyond regulation, operators increasingly require foam products that combine environmental compliance with reliable extinguishment, acceptable burn-back resistance, long storage life, and compatibility with existing equipment. Expansion and upgrading of oil, gas, petrochemical, aviation, marine, and industrial infrastructure also create incremental demand for new foam inventories and fire suppression systems.

## Restraints

The main restraint for Fluorine-Free Firefighting Foam Concentrates is that replacement is not always a simple one-for-one chemical substitution. Foam performance depends on fuel type, application rate, expansion characteristics, discharge equipment, water quality, system configuration, and operating procedure. Users may therefore need to conduct system testing, adjust proportioning equipment, revise firefighting procedures, or modify discharge hardware when replacing legacy foam. The need to remove residual fluorinated concentrate from tanks, pipelines, pumps, vehicles, and fixed systems can further increase conversion cost and operational complexity. For applications involving large hydrocarbon fires or demanding burn-back conditions, buyers tend to adopt conservative qualification procedures because firefighting performance has direct safety implications. These factors can lengthen product approval cycles and reduce the speed of replacement, particularly at facilities where existing systems remain technically functional and capital budgets for conversion are constrained.

## Opportunities

The most significant opportunity lies in the large installed base of fluorinated firefighting foam systems that will require gradual replacement, generating demand not only for new Fluorine-Free Firefighting Foam Concentrates but also for testing, system conversion, equipment optimization, training, and maintenance services. Airports represent an important transition opportunity because fluorine-free foam is increasingly becoming part of formal aircraft rescue and firefighting transition programs. Petrochemical plants and oil and gas terminals provide another attractive opportunity because their large inventories of flammable liquids require high-performance foam protection and frequently involve substantial volumes of concentrate in fixed or mobile systems. Product opportunities are also emerging around concentrates offering lower

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proportioning rates, improved storage efficiency, broad fuel compatibility, better cold-temperature behavior, and enhanced burn-back resistance. Suppliers able to combine qualified formulations with technical support for transition, system compatibility evaluation, and application engineering are positioned to capture a larger portion of customer value than suppliers competing primarily on concentrate price.

### Challenges

The principal long-term challenge is maintaining reliable fire performance while formulations are redesigned around non-fluorinated chemistry. Different Fluorine-Free Firefighting Foam Concentrates can behave differently depending on foam generator design, expansion ratio, application technique, fuel properties, and environmental conditions, making standardized substitution difficult across all installed systems. FAA testing has also demonstrated that discharge configuration can influence F3 firefighting performance, highlighting the importance of matching concentrate characteristics with application equipment and operating procedures. Manufacturers must therefore sustain investment in formulation development, fire testing, certification, raw-material qualification, and application engineering. At the same time, an expanding supplier base may increase price competition before formulations, standards, and end-user preferences fully converge. Producers must also manage potential reformulation risks if environmental definitions, prohibited substance lists, testing requirements, or customer procurement specifications continue to evolve.

## Industry Chain Analysis

The upstream industry chain for Fluorine-Free Firefighting Foam Concentrates consists primarily of hydrocarbon surfactants, specialty surfactants, foam stabilizers, solvents and coupling agents, polymers, corrosion-control additives, preservatives, water-treatment inputs, protein-derived materials for relevant formulations, packaging materials, and intermediate chemical processing services. Product performance depends heavily on the balance among foaming ability, spreading behavior, drainage time, viscosity, burn-back resistance, storage stability, and compatibility with proportioning systems. Consequently, specialty formulation ingredients and performance additives generally create greater technical value than commodity inputs. Raw-material qualification is particularly important because relatively small formulation changes can affect extinguishing behavior and certification results. Packaging and logistics are also relevant because concentrates are supplied to emergency-response

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applications that require long shelf life, traceability, controlled storage, and reliable availability.

The midstream segment covers formulation design, blending, quality control, fire-performance testing, certification, filling, packaging, technical documentation, and application engineering. Value creation increasingly extends beyond manufacturing toward equipment compatibility, system-conversion support, commissioning, training, and lifecycle management. Downstream customers include petrochemical plants, oil and gas terminals, airports, marine vessels, industrial operators, emergency-response organizations, and other users operating foam-based fire protection systems. The industry's profit structure is therefore influenced not only by formulation cost but also by certification investment, specialized testing, production scale, distribution capability, customer qualification cycles, technical service resources, and the ability to secure long-term supply relationships. Suppliers with established fire-protection channels and application-engineering capabilities can generally create more value per customer than concentrate-only suppliers.

## Segment Insights

Synthetic Fluorine-Free Foam represents the central development direction within Fluorine-Free Firefighting Foam Concentrates because synthetic formulation platforms offer manufacturers substantial flexibility in controlling foam generation, viscosity, spreading, drainage, fuel tolerance, storage stability, and compatibility with different firefighting systems. Continued improvements in surfactant systems and formulation engineering are strengthening its position in industrial and aviation applications. Competition within this segment is increasingly based on certified fire performance, burn-back resistance, proportioning efficiency, low-temperature operability, and compatibility with existing hardware rather than the fluorine-free attribute alone. As users become more experienced with F3 conversion, procurement specifications are expected to place greater emphasis on demonstrated performance under specific fuels and discharge configurations.

Protein-Based Fluorine-Free Foam serves a more specialized segment where customers value stable foam blankets, heat resistance, and established protein-foam performance characteristics. Its market opportunity is more application-specific than the synthetic segment, while Others provide room for bio-based, hybrid, and emerging formulation technologies. Across all product categories, the strongest commercial opportunities are likely to concentrate in formulations that can reduce conversion

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complexity while satisfying stringent fire-performance requirements. Products capable of operating effectively through existing proportioning equipment or across a wider range of fire scenarios can lower total conversion costs for end users and improve their competitiveness in replacement projects.

### Downstream Market Opportunities

Downstream opportunities are concentrated in locations where large quantities of flammable liquids create potentially high-consequence fire events. Petrochemical Plant Fire Suppression remains a key demand area because refineries, chemical processing units, tank farms, loading areas, and related infrastructure require reliable vapor suppression, rapid fire control, and resistance to re-ignition. Oil & Gas Terminal Fire Protection is similarly important because bulk storage tanks, transfer facilities, pipelines, and loading terminals often rely on fixed and mobile foam systems. Aviation Airport Crash Rescue provides a structurally important replacement market as airports transition firefighting practices and equipment toward fluorine-free alternatives. Marine Vessel Firefighting also creates demand where confined spaces, fuel storage, engine rooms, cargo risks, and offshore operating conditions require robust foam performance. Future market opportunities will increasingly favor suppliers capable of providing application-specific concentrates together with system assessment, conversion guidance, operator training, and technical validation.

## Regional Insights

Europe is one of the most important transition markets for Fluorine-Free Firefighting Foam Concentrates because the regulatory framework is now moving firefighting foam users toward phased replacement of PFAS-containing products. The European Commission adopted restrictions covering PFAS in firefighting foams in October 2025, with transition periods designed for different sectors. This regulatory structure is expected to sustain demand across industrial fire protection, petrochemical facilities, terminals, airports, municipal firefighting, and other professional applications. European customers are also likely to place relatively high importance on environmental documentation, certification, system compatibility, and lifecycle management, supporting suppliers with established technical and compliance capabilities.

North America is another major transition market, particularly in aviation, military-related infrastructure, petrochemical operations, and industrial fire protection. The FAA has

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established a transition framework for fluorine-free foam in aircraft firefighting, supporting broader qualification and operational adoption. Asia-Pacific offers a different growth profile. Large petrochemical, refining, terminal, port, shipbuilding, aviation, and industrial bases create substantial underlying firefighting-foam demand, while replacement timing and regulatory requirements differ by country. China provides opportunities through industrial fire protection upgrades and domestic formulation development, while Japan combines established fire-safety standards with demand from industrial, marine, aviation, and emergency-response markets. Regional competition is therefore likely to remain differentiated, with environmental regulation leading replacement in Europe and North America and infrastructure expansion, localization, and progressive substitution supporting opportunities across Asia-Pacific.

## Competitive Landscape Analysis

The competitive landscape for Fluorine-Free Firefighting Foam Concentrates combines established international fire-protection groups, specialist foam manufacturers, regional formulators, and integrated fire-equipment suppliers. Johnson Controls (ANSUL), Perimeter Solutions (SOLBERG), Angus Fire, National Foam, Dafo Fomtec, Viking Group, Dr. Richard Sthamer, BIOEX, NAFFCO, and HD Fire Protect represent participants with established positions across professional fire protection, industrial applications, or specialty foam technologies. Competition among these companies increasingly centers on demonstrated extinguishing performance, certification coverage, breadth of product portfolio, compatibility with installed equipment, global distribution, and technical assistance during foam conversion projects. Specialist suppliers such as Oil Technics (Aberdeen Foam), Foamtech Antifire, Fatsa Chemistry, KV Fire Chemicals, Delta Fire, 3F Ltd., Incendin, Firetech Equipment & Systems Pvt. Ltd., and Enforcer One (FIREBULL) provide additional competition through regional expertise, formulation specialization, or application-focused offerings. In Asia, Jiangsu Suolong Fire Science and Technology Co., Ltd., Shanghai Firetech Co., Ltd., Jiangsu Unifoam Industrial Fire Protection Co., Ltd., and Jinan Landun Fire Equipment Co., Ltd. participate in the Chinese market, while Yamato Protec Corporation, Nohmi Bosai Ltd., and Nippon Dry-Chemical Co., Ltd. provide a Japanese competitive presence. The market is not defined by a single competitive advantage: multinational suppliers benefit from installed-system relationships and broad certification capabilities, specialist foam producers compete through formulation expertise and application performance, while regional suppliers can benefit from local production, customer responsiveness, service networks, and cost structures. As fluorine-free conversion progresses, competitive differentiation is expected to shift increasingly toward verified performance under customer-specific

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operating conditions, transition support, system compatibility, supply security, and the ability to provide complete lifecycle solutions rather than concentrate supply alone.

## Report Scope

This report studies the global Fluorine-Free Firefighting Foam Concentrates production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Fluorine-Free Firefighting Foam Concentrates 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 Fluorine-Free Firefighting Foam Concentrates that contribute to its increasing demand across many markets.

## Highlights and key features of the study

Global Fluorine-Free Firefighting Foam Concentrates total production and demand, 2021-2032, (L)

Global Fluorine-Free Firefighting Foam Concentrates total production value, 2021-2032, (USD Million)

Global Fluorine-Free Firefighting Foam Concentrates production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (L), (based on production site)

Global Fluorine-Free Firefighting Foam Concentrates consumption by region & country, CAGR, 2021-2032 & (L)

U.S. VS China: Fluorine-Free Firefighting Foam Concentrates domestic production, consumption, key domestic manufacturers and share

Global Fluorine-Free Firefighting Foam Concentrates production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (L)

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Global Fluorine-Free Firefighting Foam Concentrates production by Type, production, value, CAGR, 2021-2032, (USD Million) & (L)

Global Fluorine-Free Firefighting Foam Concentrates production by Application, production, value, CAGR, 2021-2032, (USD Million) & (L)

This report profiles key players in the global Fluorine-Free Firefighting Foam Concentrates 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 Johnson Controls (ANSUL), Perimeter Solutions (SOLBERG), Angus Fire, National Foam, Dafo Fomtec, Viking Group, Dr. Richard Sthamer, BIOEX, NAFFCO, HD Fire Protect, 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 Fluorine-Free Firefighting Foam Concentrates market

## Detailed Segmentation:

Each section contains quantitative market data including market by value (US$ Millions), volume (production, consumption) & (L) and average price (US$/L) by manufacturer, by Type, 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 Fluorine-Free Firefighting Foam Concentrates Market, By Region:

United States

China

Europe

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Japan

South Korea

ASEAN

India

Rest of World

## Market Segmentation

### Global Fluorine-Free Firefighting Foam Concentrates Market, Segmentation by Type:

Synthetic Fluorine-Free Foam

Protein-Based Fluorine-Free Foam

Others

### Global Fluorine-Free Firefighting Foam Concentrates Market, Segmentation by Fuel Compatibility:

Hydrocarbon Fluorine-Free Foam

Alcohol-Resistant Fluorine-Free Foam

Multipurpose Class A/B Fluorine-Free Foam

### Global Fluorine-Free Firefighting Foam Concentrates Market, Segmentation by Proportioning Mixing Ratio:

Low Concentration (?1.0%)

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Standard Concentration (1.0%–3.0%)

High Concentration (>3.0%)

## Global Fluorine-Free Firefighting Foam Concentrates Market, Segmentation by Application:

Petrochemical Plant Fire Suppression

Oil & Gas Terminal Fire Protection

Aviation Airport Crash Rescue

Marine Vessel Firefighting

Others

## Companies Profiled:

Johnson Controls (ANSUL)

Perimeter Solutions (SOLBERG)

Angus Fire

National Foam

Dafo Fomtec

Viking Group

Dr. Richard Sthamer

BIOEX

NAFFCO

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HD Fire Protect

Jiangsu Suolong Fire Science and Technology Co., Ltd.

Oil Technics (Aberdeen Foam)

Foamtech Antifire

Fatsa Chemistry

KV Fire Chemicals

Delta Fire

3F Ltd.

Incendin

Firetech Equipment & Systems Pvt. Ltd.

Enforcer One (FIREBULL)

Yamato Protec Corporation

Nohmi Bosai Ltd.

Nippon Dry-Chemical Co., Ltd.

Shanghai Firetech Co., Ltd.

Jiangsu Unifoam Industrial Fire Protection Co., Ltd.

Jinan Landun Fire Equipment Co., Ltd.

## Key Questions Answered

1. How big is the global Fluorine-Free Firefighting Foam Concentrates market?

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2. What is the demand of the global Fluorine-Free Firefighting Foam Concentrates market?
3. What is the year over year growth of the global Fluorine-Free Firefighting Foam Concentrates market?
4. What is the total value of the global Fluorine-Free Firefighting Foam Concentrates market?
5. Who are the Major Players in the global Fluorine-Free Firefighting Foam Concentrates market?
6. What are the growth factors driving the market demand?

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