

Fluorine-Free Hydrophobic Industrial Filtration Treatment Solution

INTRODUCTION

This fluorine-free water-repellent treatment from Alkegen offers a technically advanced and future-ready solution for finishing industrial filtration felts. Engineered for compatibility with a wide range of high-performance fibres—including Polyester, Polyamide, PPS, PI, Aramid, and fibre blend felts and engineered blends—it delivers robust hydrophobic protection across the diverse filtration conditions faced in sectors such as cement production, metal smelting, and waste-to-energy incineration.

When compared to conventional C6 fluorochemical finishes, this treatment matches water-repellent performance, while offering key advantages in long-term durability. C6-based chemistries, though effective, are susceptible to hydrolytic degradation under sustained heat and humidity—a common challenge in filtration systems operating above 120 °C or exposed to acidic and moisture-laden gas streams. The fluorine-free finish demonstrates significantly improved hydrolysis resistance, ensuring that the water-repellent function remains intact over multiple operating and cleaning cycles, even under extreme conditions.

Unlike C6 treatments, which can lead to partial pore blockage and increased pressure drop over time, this finish preserves felt porosity and airflow characteristics—maintaining filtration efficiency and reducing energy penalties for end users. Furthermore, the absence of PFAS aligns with tightening global regulations and growing customer demand for safer, more sustainable materials.

This positions Alkegen as a leader in the transition to high-performance, PFAS-free filtration solutions—delivering environmental responsibility without compromising on reliability, durability, or process compatibility.



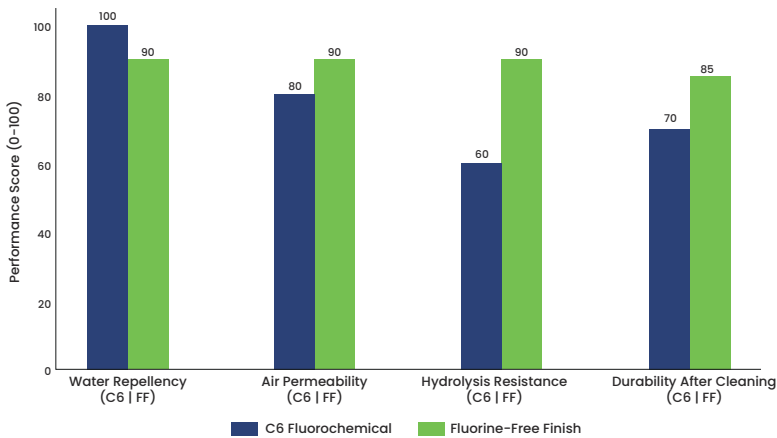
BENEFITS

Positive C6 Comparisons and Hydrolysis Advantage

- **Fluorine-free formulation** achieves water repellency levels comparable to C6-based finishes under typical industrial filtration conditions.
- **Tailored for Polyester, Polyamide, PPS, PI, Aramid, and engineered blends**, widely used in high-temperature, moisture-laden dust filtration environments such as cement, metals, and waste-to-energy sectors.
- **Demonstrates excellent hydrolysis stability**, offering superior long-term performance in hot and humid operating conditions where C6 finishes may degrade.
- **Maintains strong water repellency** after thermal exposure and mechanical abrasion, ensuring consistent protection over the filter's service life.
- **Outperforms C6 treatments** in preserving air permeability, avoiding pore blockage and supporting stable pressure drop throughout use.
- **Supports Alkegen's PFAS-free roadmap**, providing a regulatory-compliant and environmentally responsible alternative to C6 chemistry without sacrificing performance.

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Comparative Performance:
Fluorine-Free vs. C6 Water Repellent



C6 Vs Fluorine-Free Comparison

	Performance Category	C6 Fluorochemical	Fluorine-Free Finish
1	Water Repellency	Excellent initial; may decline over time in heat/humidity	High performance; stable under industrial conditions
2	Air Permeability	Moderate; some loss due to surface film buildup	Excellent; minimal impact on airflow or pore structure
3	Hydrolysis Resistance	Limited; degradation under high humidity and temperature	Strong; non-fluorinated chemistry resists hydrolysis
4	Thermal Stability	Good to moderate; depends on formulation and cure	Very good; retains properties post-curing and exposure
5	Durability After Cleaning	Declines with repeated regeneration	High durability; maintains performance over time
6	PFAS-Free Compliance	No - contains short-chain PFAS (under scrutiny)	Yes - free from regulated PFAS compounds
7	Environmental Impact	Fluorochemical persistence and disposal concerns	Lower environmental risk; easier end-of-life disposal
8	Regulatory Readiness	Increasingly restricted under EU and US regulations	Compliant with emerging PFAS restrictions globally

- Water Repellency:**
 - Fluorine-free finishes achieved spray test ratings between **70–100** across various materials.
 - Against C6 finishes **water repellency was comparable**
- Air Permeability:**
 - Fluorine-free treatments consistently preserved **high air permeability** even after curing at elevated temperatures, indicating **better airflow retention** than is typically expected from fluorinated coatings.
- Hydrolysis Stability:**
 - While hydrolysis testing was not quantified numerically, our analysis reports fluorine-free systems suggest **superior resistance to hydrolysis** compared to C6, which is prone to breakdown under heat/moisture.
- Durability After Cleaning/Stress:**
 - Fluorine-free treated samples demonstrated **significantly better resistance to wear** in standard abrasion tests (Martindale method). Unlike C6-treated materials, which showed surface degradation. Suggestion, **enhanced durability** across multiple industrial cleaning and regeneration cycles, making it more suitable for applications requiring extended operational lifespans.

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