



Hydrogel: A zero-PFAS fire extinguishing technology for modern fire risks

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Hydrogel is an innovative fire extinguishing technology that eliminates PFAS chemicals, providing effective fire suppression while addressing environmental and health concerns associated with traditional firefighting foams

HYDROGEL represents a new generation of fire extinguishing agents based on breakthrough materials technology. Unlike conventional firefighting foams, Hydrogel achieves high extinguishing performance **without any fluorine chemistry**, eliminating PFAS-related environmental and human health concerns while maintaining exceptional operational effectiveness.

PFAS in firefighting agents: Performance vs consequences

PFAS (per- and polyfluoroalkyl substances) comprise a group of roughly 10,000 synthetic chemicals valued for their water-, grease- and dirt-repellent properties. These characteristics have driven widespread use in clothing, electronics, cosmetics, cookware, and – critically – firefighting foams.

In firefighting foams, PFAS compounds are used to:

- Improve spreadability and rapid flow of the foam across flammable liquid surfaces
- Increase stability at high temperatures

- Enhance smothering effectiveness for fuels such as petrol, heptane, and other hydrocarbons

However, during fire suppression or training, foam residues enter the soil and ultimately contaminate surface and groundwater. PFAS compounds are extremely persistent (“forever chemicals”), **bioaccumulative**, and, with long-term exposure, are linked to adverse health effects including cancer. Today, measurable levels of PFAS are found in the blood of most people worldwide.

Firefighters – both civilian and military – are particularly at risk due to chronic exposure. In Europe alone, the annual health-related costs associated with PFAS exposure are estimated between **€52 and €84bn if no ban is enacted**.

Accelerating PFAS regulations in Europe

To address these risks, the European Union has implemented **Regulation (EU) 2025/1988**, introducing phased restrictions on PFAS-containing fire extinguishing agents.



Regulatory timeline

- **Dec 3, 2025** – Full ban on use of PFOA
- **Apr 10, 2026** – Ban on PFHxA-containing agents for training/testing
- **Oct 23, 2026** – Ban on sales of most PFAS-containing extinguishers (alcohol-resistant types exempt)
- **Oct 23, 2027** – Ban on all PFAS-based extinguishers
- **Apr 10, 2029** – Ban on PFHxA-containing agents in civil aviation
- **Jan 1, 2031** – Complete ban on use and possession of PFAS extinguishing agents

Although this regulation represents significant progress, it still permits PFAS concentrations up to **1 ppm**, a level at which bioaccumulation and long-term health risks remain. For this reason, the Netherlands, Germany, Denmark, Sweden, and Norway have submitted a more comprehensive restriction proposal to the European

Chemicals Agency (ECHA) aiming for a total PFAS manufacturing and market ban. Final opinions are expected by the end of 2026.



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Hydrogel: A truly zero-PFAS fire extinguishing solution

Hydrogel is engineered to deliver **high-performance fire suppression** – comparable to or exceeding PFAS-based technologies – without any fluorinated compounds.

Key advantages

1. Zero Detectable PFAS (≤ 1 ppb)

Independent laboratory analyses (Intertek and Fraunhofer) confirm that Hydrogel contains **no detectable PFAS** at a measurement limit of **1 part per billion**, which is **1,000x lower** than EU Regulation 2025/1988 thresholds and fully compliant with the forthcoming ECHA proposal.

2. High-performance fire extinguishing

Hydrogel is suitable for:

- **Lithium-ion battery fires**
- **Class A** fires (solid combustibles)
- **Class B** fires (flammable liquids)
- **Class F** fires (cooking oils and fats)



The unique thermo-responsive gel structure creates strong adherence to surfaces, rapid cooling, and effective oxygen exclusion.

3. Fully recyclable and environmentally safe

After use, spent Hydrogel can be returned to Anogas BV for recycling. Its natural clay-based additives can be safely be applied as a **compost enhancer**, enabling a circular, waste-free lifecycle.

4. Certified and ready for use

Hydrogel is:

- **KIWA NTA 8133 certified**
- **Apragaz EN3-7 certified** for 6L and 9L extinguishers

It is supplied as a **premixed, ready-to-use formulation** and must be applied at ambient temperatures above 0°C.

5. European production and supply

Hydrogel is manufactured in the Netherlands and available in:

- 1000L IBCs
- 300L IBCs
- 25L jerrycans

Conclusion

With regulatory pressure intensifying and PFAS health impacts becoming unavoidable industry realities, fire safety professionals require solutions that deliver uncompromised extinguishing performance without environmental trade-offs. Hydrogel offers a future-proof, certified, and truly **Zero-PFAS** alternative – ready to meet the next generation of firefighting challenges.



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