

**FAQs on the Use, Storage, Disposal and Replacement of Class B Firefighting Foam Containing Persistent Organic Pollutants (POPs)**

July 2025

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# Purpose

These frequently asked questions (FAQ) and the [guidance](https://www.sepa.org.uk/regulations/waste/guidance/) (published in Dec 2022 and revised in July 2025) are aimed at firefighting foam producers, users, contractors specialising in installing, maintaining, servicing and decontaminating firefighting foam systems, disposal contractors, and regulators who need to understand the changes that may be required for the use, storage, or disposal of Class B firefighting foams, and/or any other firefighting foams, containing Persistent Organic Pollutants (POPs).

The main purpose of this FAQ is to inform users of the restrictions and bans of foam containing the following three POPs:

* PFOA (perfluorooctanoic acid, its salts and PFOA-related compounds) restricted for all uses from 4 July 2025;
* PFHxS (perfluorohexane sulphonic acid, its salts and PFHxS-related compounds) restricted since 2023; and
* PFOS (perfluorooctane sulphonic acid), restricted since 2011.

The FAQs will particularly focus on PFOA as the most recent restrictions and bans apply to them.

# Persistent Organic Pollutants (POPs) Background

## What are POPs?

POPs are organic chemical substances that present a long lasting and global risk to the environment and human health due to their toxicity, persistence in the environment, bioaccumulation through the food chain, gradual build up to harmful levels in living organisms, and long-range environmental transport across a wide geographical range. POPs are present in a variety of manufactured materials including car parts, electronic equipment, soft furnishings, and some firefighting foams.

## What’s the problem with POPs?

Many Persistent Organic Pollutants (POPs), including PFOS and PFOA from the per- and polyfluoroalkylated substances (PFAS) group, are proven to have harmful impacts on the environment and human health.

One of the main concerns regarding these chemicals is that they are persistent, meaning they break down very slowly, if at all, and remain in the environment for very long periods of time. They are often referred to as “forever chemicals”. PFOA is environmentally persistent, with a long half-life. PFOA and PFOS may persist in soil for over 30 years after the application of aqueous film-forming foam (AFFF) and subsequently leach and infiltrate into the groundwater. PFOA is categorised as a persistent organic pollutant and is also categorised as carcinogenic to humans (Group 1), based on sufficient evidence of cancer in experimental animals and strong mechanistic evidence in exposed humans.

Many PFAS dissolve in water, meaning they can be transferred by surface water or groundwater, and can end up in drinking water supplies or taken up by crop plants from the soil. As they are not broken down by most wastewater treatment plants, discharge to sewer is not an effective treatment method, and ultimately leads to accumulation in the natural environment.

The [Stockholm Convention](https://www.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx) was developed to address these concerns and to protect human health and the environment. The UK is a signatory to the Convention and the requirements are transposed into UK legislation. ￼

The Stockholm Convention requires either elimination of the production and use of the chemicals listed under Annex A, the restriction of the production and use of the chemicals listed under Annex B, or the reduction of the unintentional releases of chemicals listed under Annex C with the goal of continuing minimisation and, where feasible, ultimate elimination ([Listing of POPs in the Stockholm Convention](https://www.pops.int/TheConvention/ThePOPs/AllPOPs/tabid/2509/Default.aspx)). In addition, the Convention requires that wastes containing POPs above the relevant threshold level should be disposed of in such a way that the POP content is destroyed or irreversibly transformed.

A large range of chemicals have been categorised as POPs (currently 39), including three from the PFAS group of manmade chemicals that can be found in some firefighting foams.

* PFOS and its derivatives, listed in Annex B since 2009;
* PFOA, its salts and related compounds, listed in Annex A since 2019;
* PFHxS, its salts and related compounds, listed in Annex A since 2022; and
* Long-chain perfluoro carboxylic acids (LC-PFCAs), their salts and related compounds, listed in Annex A since May 2025.

## What engagement have regulators had on the restrictions?

SEPA engaged with various stakeholders including the Scottish Fire & Rescue Services, airports, firefighting foam distributors, regulated sites, and petroleum companies.

If after reading the details in this FAQ guidance you need further information, regarding the disposal of any foam you hold please contact nationalwaste@sepa.org.uk. If you have any questions about the containment or transition to other firefighting foam, please contact ied@sepa.org.uk, with “*PFOA Firefighting Foam”* as the title to your email.

**POPs in Firefighting Foam**

## Are firefighting foams containing PFOA still produced?

The production of firefighting foams containing PFOA, its salts and PFOA‐related compounds, is not permitted. Any manufacturer with stocks of PFOA containing firefighting foam should treat these foams as waste and dispose of accordingly.

## Can I still use PFOA containing firefighting foam?

**After** 4 July 2025 all use of firefighting foams containing PFOA are prohibited.

It is therefore essential that where a foam system is required to protect people, the environment, or assets at a site, a non-POP containing foam is installed **before** 4 July 2025.

In the lead up to the ban, the use of existing stocks (either mobile or fixed systems) of firefighting foams containing PFOA were restricted from January 2023. Firefighting foams containing PFOA were permitted **until** 4 July 2025 for flammable liquid vapour suppression and extinguishing flammable liquid fires (Class B fires), but with the specific restriction that all releases must be contained.

## Can I use firefighting foam containing PFOA systems for training and testing?

The use of firefighting foam that contains or may contain PFOA is not permitted for training or testing **after** 4 July 2025.

**What is the difference between a stockpile and waste?**

In line with the UK POPs Regulations, a stockpile is any POPs (subject to any of the exceptions specified in the regulations) containing materials or products exceeding 50kg being produced, imported, supplied, stored, or used for a permitted reason.

A POP or POPs containing material will be a waste if there is no permitted reason for the production, import, supply, storage or use for that POP or POPS containing material.

**Can I stockpile PFOA containing firefighting Foams?**

As of 4 July 2025, there is no permitted production, importation, or supply of firefighting foam containing PFOA. Therefore, all PFOA containing foam and foam products, including unused firefighting foams, are a POPs waste and are no longer classed as a stockpile.

**What should I do with my waste PFOA containing foam?**

Firefighting foams that have been removed from service and that you are being discarding are wastes, and you need to comply with all legislation relating to the transfer of hazardous waste and its disposal. **How should I manage and dispose of obsolete or used firefighting foam?**

The law does not allow the use of substances, mixtures and articles containing PFOA, its salts and PFOA related compounds after 4 July 2025, the unused firefighting foams are a POPs waste.

Firefighting foam containing PFOA classed as a POPs waste may include unused firefighting foams removed from fixed delivery systems and handheld extinguishers, post-discharge foam (which is likely to be mixed with water and the remains of the flammable substance and other contaminants), and wash waters from decontaminating equipment (again mixed with water and other contaminants, such as anti-foam and soap).

You must not discharge unwanted PFOA firefighting foams to sewer as this would be committing an offence. These chemicals may pass through the sewage works and contaminate the environment and drinking water. The discharged POPs waste may also contaminate sewage sludge used on agricultural land to produce food.

Under duty of care obligations, operators must ensure that any facility receiving the waste has the capability and legal permission to correctly undertake that disposal. As firefighting foams containing PFOA are POPs and therefore hazardous waste (including all cleaning streams), the waste must be accompanied by a special waste consignment note and disposed of in a way that assures destruction of the POP material.

You are obliged to dispose of POPs waste in “an environmentally sound manner”. The waste must be disposed of or recovered in a manner that ensures the POP content is destroyed or irreversibly transformed, so that the remaining waste and any releases do not exhibit the characteristics of POPs. For example, disposal in a hazardous waste incinerator (that is, with a residence time of 2 seconds at 1100°C), or use of another method that is equally effective at destroying POP.

Whichever methods are to be used; we recommend that you notify SEPA prior to dispatching the waste firefighting foam to the disposal site. If the method is not disposal in a hazardous waste incinerator or co-incinerator (e.g., cement kiln), you should discuss this with SEPA prior making any decision of the disposal route.

As there are few suitable sites in the UK for the disposal of POPs waste, there may be insufficient capacity to incinerate all the anticipated material within the appropriate legal timescales. Therefore, it is recommended that you discuss with your waste disposal contractor the likely timing of your transition project.

Proof of appropriate disposal must be documented and kept available for SEPA.

It is appropriate to assume the PFOA content of the foam will be above the 0.025 mg/kg threshold. Additionally, it is likely that the PFOA content of contaminated mixtures formed when PFOA containing firefighting foam is used to extinguish a fire, or when existing foam delivery systems are flushed to remove PFOA based firefighting foam to allow the equipment to be reused for replacement foams, will also be above the 0.025 mg/kg threshold. The disposal methods described below will be appropriate for those waste streams. Also see, **Can I concentrate up weak streams before destroying the POPs?**

## Are there alternatives to high temperature incineration?

Practical benchmark parameters for assessing the disposal technology performance are a minimum destruction efficiency (DE) of 99.999%, and a destruction removal efficiency (DRE) as a supplement requirement of 99.9999%, where applicable. As neither DE nor DRE account for the possible transformation of the original POP into unintentionally produced POPs, the possible release of unintentionally produced POPs should be considered when choosing a particular operation.

Technical guidance on PFOA is not yet available. However, there is guidance on the destruction techniques for PFOS and there is sufficient similarity between PFOS and PFOA for that guidance to be deemed appropriate for PFOA destruction (see *Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF)* Basel Convention Technical Guidelines).

The PFOS specific guidance refers the reader to section IV.G.2 and 3 in the *General technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants (General POPs)* in relation to technologies for the destruction and irreversible transformation of POPs in wastes.

Table 4 of the guidance provides advice on PFOS disposal techniques, which includes:

* hazardous waste incineration;
* cement kiln co-incineration;
* gas phase chemical reduction (GPCR); and
* supercritical water oxidation (SCWO) and subcritical water oxidation.

## How should I manage the waste transfers of obsolete or used firefighting foam?

When hazardous waste is transferred it must be accompanied by a special waste consignment note, which properly describes the waste, to ensure it can be managed safely and without harm to the environment.

To transfer waste firefighting foam to a disposal site, the operator must ensure that:

* any contractor employed to remove the waste is registered as a waste carrier, and
* the special waste consignment note clearly indicates the presence of the PFOA, including its classification as hazardous and a POP.

You must also comply with your duty of care obligations. Duties include a requirement to properly store waste and only transfer it to someone authorised to handle it. For further information and to check whether your contractor is registered, go to Special waste | Scottish Environment Protection Agency (SEPA) and Duty of Care - Code of Practice.

If you transport waste as part of your business activities, you must be registered as a professional collector and transporter of waste. If you use a third party to carry your waste, that contractor must be a registered waste carrier. For further information please see Waste carriers and brokers | Scottish Environment Protection Agency (SEPA)..

For details of classification for PFOA, and therefore the labelling and packaging requirements, see **How should waste firefighting foam containing PFOA be** classified?

## What happens if I ignore, or cannot comply with, legal requirements?

You may be found guilty of an offence under any of Regulations 5 to 7 to [The Persistent Organic Pollutants Regulations 2007](https://www.legislation.gov.uk/uksi/2007/3106/contents), and be liable for the penalties detailed in Regulation 11. SEPA is the competent and enforcing authority in Scotland for the UK POPs Regulations.

If you are unsure about your ability to comply with the restrictions for firefighting foam containing PFOA, you should email NationalWaste@sepa.org.uk.

## Is there a requirement to notify SEPA of POPs stockpiles

As there is no permitted production, importation, or supply of firefighting foam containing PFOA from the 4 July 2025 onwards, all PFOA containing foam and foam products including unused firefighting foams are a POPs waste and no longer classed as a stockpile. Therefore, the notification of stockpiles under POPs Regulations is no longer a statutory requirement.

# Containment of Firefighting Foams

## What is effective containment of firefighting foam?

Containment must be impervious to flammable substances and the firefighting foam and needs to be of sufficient capacity to retain the maximum quantity of flammable substance and firefighting foam. If you are uncertain about the appropriateness of your containment arrangements, please discuss with SEPA.

For the purposes of this FAQ guidance, ‘‘contained” means that, irrespective of what level of containment is used, the capacity and design need to be such that there is no release to the environment.

## What does containment mean in relation to PFOA-containing firefighting foams?

Containment minimises the environmental harm of an uncontrolled release or controlled use of PFOA foam to extinguish a fire.

The requirement for containment includes stocks of firefighting foam kept on site; any unintended deployment of that foam (such as spills or accidental releases of foam concentrate or foam solution); foam used for testing purposes (if applicable, although alternative testing methods should be adopted wherever possible); and intentional foam deployment during on-site incidents.

Containment should be external to, and structurally independent of, both the firefighting storage vessel and the flammable substance storage vessel(s). That is, it should serve as secondary containment for the primary containment vessels. The containment must be impervious to the flammable substances and to the firefighting foam and needs to be of sufficient capacity to retain the maximum quantity of flammable substance and firefighting foam that could arise. The maximum containment requirement is likely to be for intentional deployment of foam during a loss of containment incident on site, with the foam automatically mixed with water at the appropriate 1, 3 or 6% rate.

The foam should be contained to a location that allows for clean-up and correct treatment and disposal. Foam, and liquids contaminated with foam, should not be routed to a wastewater treatment facility as most wastewater treatment plants cannot remove PFAS from the liquid waste stream. The location of the containment may also be important if there are sensitive receptors locally.

Only fixed firefighting foam systems that are used or installed within suitably impervious bunds are likely to meet the containment requirement. Suitable bunds need to be in accordance with Class 3 of the containment Classification System outlined in CIRIA C736, that is, they must provide the highest degree of integrity (see section 2.6 to CIRIA C736).

Firefighting foam used by fire crews to extinguish other fires involving flammable liquids are less likely to meet containment requirements. Each flammable liquid storage facility should be assessed to determine whether existing bunding arrangements would provide adequate and appropriate containment if foam were used for a fire in the flammable liquid storage vessels. For (potential) spillages of flammable liquids in areas that are not bunded, the use of PFOA containing firefighting foam is not permitted.

Note however, that recent experience with firefighting foam releases from fixed systems within bunded areas indicate that, because foam systems are designed to blanket surfaces and spread widely, very few bunds effectively contain the foam when deployed, even when compliant with CIRIA C736 Class 3.

SEPA expects operators to minimise, as far as practicable, the area and volume of wastewater containing POPs that requires containment. To minimise environmental damage, disposal and clean-up costs, and further risk of contamination, containment should be provided within secondary containment bunds rather than through tertiary containment, site drainage, and retention ponds.

If you are uncertain about the appropriateness of the containment arrangements at a site, please discuss with SEPA.

## What should I do if my firefighting foam system operates?

Although the requirement is to contain any foam when used, this is very difficult to achieve, and contamination of the ground is likely to occur. Therefore, procedures for clean-up are essential. Every release of any type of firefighting foam should be treated as an incident and reported to SEPA (and records kept at the site).

If a firefighting foam system with PFOA containing foams deploys, either accidentally/unintended, or to tackle a fire, it should be treated as an incident and reported to SEPA immediately.

Due to concerns about containment of foams once used, deployment of any firefighting foam system (irrespective of the type of firefighting foam) should also be reported to SEPA to allow discussion on the appropriate clean-up of the site. Records of all releases of firefighting foams should be kept assisting with future site decontamination that may be required.

You should seek to contain the foam. Start collecting the foam into suitable vessels as soon as possible to minimise contamination of the ground and water environment at the site, and to allow subsequent appropriate disposal. For each event of foam use or accidental spillage or leakage, proof of appropriate management and disposal of the foam concentrates, water-added foams, and fire run-off waters should be documented and kept available for SEPA.

You should flush the pipework and nozzles (as would be normal to re-instate the system after any activation), and the bund or containment vessel (e.g., sump) to where the foam deployed, and collect all wash water for disposal. See **How do I verify successful decontamination has been achieved?** And **Washing and disposal of cleaning liquids**.

# Waste obligations for PFOA containing firefighting foam

## How should waste firefighting foam containing PFOA be classified?

Any firefighting foam with concentrations above the thresholds in Annex I to Regulation (EU) 2019/1021[[1]](#endnote-2) is classified as a POP. See **Is there a de minimus concentration of PFOA that represents trace contamination?**

In addition, for waste management purposes, PFOA meets the criteria to be treated as hazardous waste under paragraph 1 on *Assessment of hazardous properties of waste* in Assessment and Classification of the annex.

The active concentration of PFOA in firefighting foam is between 0.1 and 1%. Many Material Safety Data Sheet (MSDS) do not specify the PFOA content in detail. In the absence of evidence otherwise, it is appropriate to assume that all PFOAs have a concentration >0.3%, and HP10 is applicable to all foam stockpiles, meaning all waste firefighting foams containing PFOA are hazardous. Therefore, any waste firefighting foams containing PFOA need to be managed as hazardous waste. See all sections in **Destroying the POPs Content of Waste.**

Waste contaminated with firefighting foam containing PFOA generated through the deployment of the foam system (e.g., in the event of a fire) at the standard mixing application rates of 1, 3 or 6%, are likely to have a concentration at the point of use (post mixing) of 0.03–0.45% w/w of the applied foam. As a precautionary approach, and in the absence of testing otherwise, it is appropriate to assume that all have a concentration “up to 0.45%”. Therefore, all post mixing foam should also be treated a hazardous.

In addition to the hazard statement, there are two precautionary statements for PFOA: Prevention Precautionary statement: *P273: Avoid release to the environment*; and Disposal Precautionary statement: and *P501: Dispose of contents/container in accordance with all local, regional, national and international regulations.*

All foam systems and vessels used to transfer any foam materials should be labelled *P273: Avoid release to the environment*, and every special waste consignment note should include this information.

Similarly, all foam systems and vessels used to transfer any foam materials should be labelled with the disposal precautionary statement *P501: Dispose of contents/container in accordance with all local, regional, national and international regulations.* Unless another disposal method has been agreed with SEPA, the last part of the statement should be “*high temperature incineration*”, thus *P501: Dispose of contents/container to high temperature incineration*. Note additional information and possible future alternative disposal methods in **Destroying the POPs Content of Waste.**

If you intend to use an alternative disposal method or other wording, please contact nationalwaste@sepa.org.uk.

Further research is required on wash waters and whether all are hazardous for transfer purposes. It is likely that the concentration is >0.3% for first and second wash, but not by final wash of system ready for another foam to be filled. Note that the transfer classification does not alter the disposal requirement, but see also **Is there a de minimus concentration of PFOA that represents trace contamination?**

## Is there a de minimus concentration of PFOA that represents trace contamination?

In accordance with Part A of Annex I to Regulation (EU) 2019/1021, PFOA or any of its salts are restricted in concentrations above 0.025 mg/kg (or 0.0000025% by weight), and any individual PFOA-related compound or a combination of PFOA-related compounds are restricted above a concentration of 1 mg/kg (or 0.0001% by weight) when present in substances, mixtures or articles. Below the respective concentrations, the PFOA present is assumed to be unintentional trace contamination. See [The Persistent Organic Pollutants (Amendment) Regulations 2025](https://www.legislation.gov.uk/uksi/2025/296/introduction/made) and points 1 to 4 in column ‘Specific exemption on intermediate use or other specification’ of the PFOA row in the table in Part A of Annex I (page 50) to retained [Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (recast)](https://www.legislation.gov.uk/eur/2019/1021/data.pdf).

It is appropriate to assume that the PFOA content of the foam will be above the 0.025 mg/kg threshold. Additionally, it is likely that the PFOA content of contaminated mixtures, formed when PFOA containing firefighting foam is used to extinguish a fire or when existing foam delivery systems are flushed to remove PFOA based firefighting foam to allow the equipment to be reused for replacement foams, will also exceed the 0.025 mg/kg threshold. Therefore, the disposal methods described below will be appropriate for those waste streams. Also see **Can I concentrate up weak streams before destroying the POPs?**

## After removing it from service, can I store firefighting foam containing PFOA until a disposal route becomes available?

After 4 July 2025, all firefighting foam containing PFOA, including foam removed from service, must be treated as waste, and should be disposed of in a timely manner. Where immediate disposal is not possible, temporary storage for up to 12 months is permitted without the need for a full Waste Management Licence (WML) or Pollution Prevention and Control (PPC) permit, provided it complies with the conditions of a [Paragraph 41 waste management exemption](https://www.sepa.org.uk/regulations/waste/activities-exempt-from-waste-management-licensing/).

Discuss with SEPA if there are difficulties in arranging timely disposal.

Transfer of waste to a waste disposal site must be compliant with the special waste consignment note requirements in [The Special Waste Regulations 1996](https://www.legislation.gov.uk/uksi/1996/972/data.pdf). See also **How should I manage and dispose of obsolete or used firefighting foam?**

**The** law does not allow the use of substances, mixtures and articles containing PFOA, its salts and PFOA related compounds after 4 July 2025, the unused firefighting foams are a POPs waste.

Firefighting foam containing PFOA classed as a POPs waste may include unused firefighting foams removed from fixed delivery systems and handheld extinguishers, post-discharge foam (which is likely to be mixed with water and the remains of the flammable substance and other contaminants), and wash waters from decontaminating equipment (again mixed with water and other contaminants, such as anti-foam and soap).

You must not discharge unwanted PFOA firefighting foams to sewer as this would be committing an offence. These chemicals may pass through the sewage works and contaminate the environment and drinking water. The discharged POPs waste may also contaminate sewage sludge used on agricultural land to produce food.

Under duty of care obligations, operators must ensure that any facility receiving the waste has the capability and legal permission to correctly undertake that disposal. As firefighting foams containing PFOA are POPs and therefore hazardous waste (including all cleaning streams), the waste must be accompanied by a special waste consignment note and disposed of in a way that assures destruction of the POP material.

You are obliged to dispose of POPs waste in “an environmentally sound manner”. The waste must be disposed of or recovered in a manner that ensures the POP content is destroyed or irreversibly transformed, so that the remaining waste and any releases do not exhibit the characteristics of POPs. For example, disposal in a hazardous waste incinerator (that is, with a residence time of 2 seconds at 1100°C), or use of another method that is equally effective at destroying POP.

Whichever methods are to be used; we recommend that you notify SEPA prior to dispatching the waste firefighting foam to the disposal site. If the method is not disposal in a hazardous waste incinerator or co-incinerator (e.g., cement kiln), you should discuss this with SEPA prior making any decision of the disposal route.

As there are few suitable sites in the UK for the disposal of POPs waste, there may be insufficient capacity to incinerate all the anticipated material within the appropriate legal timescales. Therefore, it is recommended that you discuss with your waste disposal contractor the likely timing of your transition project.

Proof of appropriate disposal must be documented and kept available for SEPA.

It is appropriate to assume the PFOA content of the foam will be above the 0.025 mg/kg threshold. Additionally, it is likely that the PFOA content of contaminated mixtures formed when PFOA containing firefighting foam is used to extinguish a fire, or when existing foam delivery systems are flushed to remove PFOA based firefighting foam to allow the equipment to be reused for replacement foams, will also be above the 0.025 mg/kg threshold. The disposal methods described below will be appropriate for those waste streams. Also see, **Can I concentrate up weak streams before destroying the POPs?**

## Are there alternatives to high temperature incineration?

Practical benchmark parameters for assessing the disposal technology performance are a minimum destruction efficiency (DE) of 99.999%, and a destruction removal efficiency (DRE) as a supplement requirement of 99.9999%, where applicable. As neither DE nor DRE account for the possible transformation of the original POP into unintentionally produced POPs, the possible release of unintentionally produced POPs should be considered when choosing a particular operation.

Technical guidance on PFOA is not yet available. However, there is guidance on the destruction techniques for PFOS and there is sufficient similarity between PFOS and PFOA for that guidance to be deemed appropriate for PFOA destruction (see *Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF)* Basel Convention Technical Guidelines).

The PFOS specific guidance refers the reader to section IV.G.2 and 3 in the *General technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants (General POPs)* in relation to technologies for the destruction and irreversible transformation of POPs in wastes.

Table 4 of the guidance provides advice on PFOS disposal techniques, which includes:

* hazardous waste incineration;
* cement kiln co-incineration;
* gas phase chemical reduction (GPCR); and
* supercritical water oxidation (SCWO) and subcritical water oxidation.

How should I manage the waste transfers of obsolete or used firefighting foam?

Other useful links include:

* GPP 26 on [Guidance for Pollution Prevention (GPP) documents, NetRegs](https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/); and
* [Special waste | Scottish Environment Protection Agency (SEPA)](https://www.sepa.org.uk/regulations/waste/special-waste/).

# Destroying the POPs Content of Waste

If a waste contains POPs above the concentration limits specified in the relevant Stockholm Convention listing (i.e., it qualifies as a POPs Waste) it must be destroyed. The POPs waste must be sent to a suitably authorised disposal or recovery site that can destroy or irreversibly transform the POPs using one of the following methods:

* physico-chemical treatment, such as chemical destruction.
* incineration on land.
* using the waste as a fuel or other means to generate energy, that is, co-incineration (not permitted for material containing PCBs).

The appropriate method to use will be based on:

* the properties of the POP.
* the type of waste containing the POP.
* other chemicals or materials present in the waste.

If you treat POPs waste and the treatment does not reliably destroy the POPs, any waste that results from the treatment, and contains these POPs, is also POPs waste. You must destroy the POPs in this treated waste even if the concentration is below the limits in point 1 of the PFOA entry in the table in Part A of Annex I (page 50) to retained [Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants](https://www.legislation.gov.uk/eur/2019/1021/data.pdf) (see also **Is there a de minimus concentration of PFOA that represents trace contamination?**). Dilution is not permitted.

For further information on your responsibilities see:

* [Firefighting | NetRegs | Environmental guidance for your business in Northern Ireland & Scotland](https://www.netregs.org.uk/environmental-topics/emergency-response/firefighting/);
* [Duty of care: code of practice for managing controlled waste - gov.scot (www.gov.scot)](https://www.gov.scot/publications/duty-care-code-practice/) and
* [Special waste | Scottish Environment Protection Agency (SEPA)](https://www.sepa.org.uk/regulations/waste/special-waste/)

## How should I manage and dispose of obsolete or used firefighting foam?

The law does not allow the use of substances, mixtures and articles containing PFOA, its salts and PFOA related compounds after 4 July 2025, the unused firefighting foams are a POPs waste.

Firefighting foam containing PFOA classed as a POPs waste may include unused firefighting foams removed from fixed delivery systems and handheld extinguishers, post-discharge foam (which is likely to be mixed with water and the remains of the flammable substance and other contaminants), and wash waters from decontaminating equipment (again mixed with water and other contaminants, such as anti-foam and soap).

You must not discharge unwanted PFOA firefighting foams to sewer as this would be committing an offence. These chemicals may pass through the sewage works and contaminate the environment and drinking water. The discharged POPs waste may also contaminate sewage sludge used on agricultural land to produce food.

Under duty of care obligations, operators must ensure that any facility receiving the waste has the capability and legal permission to correctly undertake that disposal. As firefighting foams containing PFOA are POPs and therefore hazardous waste (including all cleaning streams), the waste must be accompanied by a special waste consignment note and disposed of in a way that assures destruction of the POP material.

You are obliged to dispose of POPs waste in “an environmentally sound manner”. The waste must be disposed of or recovered in a manner that ensures the POP content is destroyed or irreversibly transformed, so that the remaining waste and any releases do not exhibit the characteristics of POPs. For example, disposal in a hazardous waste incinerator (that is, with a residence time of 2 seconds at 1100°C), or use of another method that is equally effective at destroying POP.

Whichever methods are to be used; we recommend that you notify SEPA prior to dispatching the waste firefighting foam to the disposal site. If the method is not disposal in a hazardous waste incinerator or co-incinerator (e.g., cement kiln), you should discuss this with SEPA prior making any decision of the disposal route.

As there are few suitable sites in the UK for the disposal of POPs waste, there may be insufficient capacity to incinerate all the anticipated material within the appropriate legal timescales. Therefore, it is recommended that you discuss with your waste disposal contractor the likely timing of your transition project.

Proof of appropriate disposal must be documented and kept available for SEPA.

It is appropriate to assume the PFOA content of the foam will be above the 0.025 mg/kg threshold. Additionally, it is likely that the PFOA content of contaminated mixtures formed when PFOA containing firefighting foam is used to extinguish a fire, or when existing foam delivery systems are flushed to remove PFOA based firefighting foam to allow the equipment to be reused for replacement foams, will also be above the 0.025 mg/kg threshold. The disposal methods described below will be appropriate for those waste streams. Also see, **Can I concentrate up weak streams before destroying the POPs?**

## Are there alternatives to high temperature incineration?

Practical benchmark parameters for assessing the disposal technology performance are a minimum destruction efficiency (DE) of 99.999%, and a destruction removal efficiency (DRE) as a supplement requirement of 99.9999%, where applicable. As neither DE nor DRE account for the possible transformation of the original POP into unintentionally produced POPs, the possible release of unintentionally produced POPs should be considered when choosing a particular operation.

Technical guidance on PFOA is not yet available. However, there is guidance on the destruction techniques for PFOS and there is sufficient similarity between PFOS and PFOA for that guidance to be deemed appropriate for PFOA destruction (see *Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF)* [Basel Convention Technical Guidelines](http://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/TechnicalGuidelines/tabid/8025/Default.aspx)).

The PFOS specific guidance refers the reader to section IV.G.2 and 3 in the *General technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants (General POPs)* in relation to technologies for the destruction and irreversible transformation of POPs in wastes.

Table 4 of the guidance provides advice on PFOS disposal techniques, which includes:

* hazardous waste incineration;
* cement kiln co-incineration;
* gas phase chemical reduction (GPCR); and
* supercritical water oxidation (SCWO) and subcritical water oxidation.

## How should I manage the waste transfers of obsolete or used firefighting foam?

When hazardous waste is transferred it must be accompanied by a special waste consignment note, which properly describes the waste, to ensure it can be managed safely and without harm to the environment.

To transfer waste firefighting foam to a disposal site, the operator must ensure that:

* any contractor employed to remove the waste is registered as a waste carrier, and
* the special waste consignment note clearly indicates the presence of the PFOA, including its classification as hazardous and a POP.

You must also comply with your duty of care obligations. Duties include a requirement to properly store waste and only transfer it to someone authorised to handle it. For further information and to check whether your contractor is registered, go to [Special waste | Scottish Environment Protection Agency (SEPA)](https://www.sepa.org.uk/regulations/waste/special-waste/) and [Duty of Care - Code of Practice](https://www.gov.scot/publications/duty-care-code-practice/)[.](http://apps.sepa.org.uk/rocas/)

If you transport waste as part of your business activities, you must be registered as a professional collector and transporter of waste. If you use a third party to carry your waste, that contractor must be a registered waste carrier. For further information please see [Waste carriers and brokers | Scottish Environment Protection Agency (SEPA)](http://www.sepa.org.uk/regulations/waste/waste-carriers-and-brokers/)..

For details of classification for PFOA, and therefore the labelling and packaging requirements, see **How should waste firefighting foam containing PFOA be** classified?

## Can I transfer PFOA firefighting foams internationally?

Firefighting foam that contains or may contain PFOA is not permitted to be exported or imported, except for the purpose of environmentally sound disposal.

## Will the firefighting foam supplier take back my obsolete foam?

Where an operator has purchased firefighting foam for use to protect people, the environment, and/or assets at a site, the operator is now the legal owner of that foam and is responsible for its removal and disposal. Duty of care does not extend to requiring a supplier to take back substances supplied. It is optional whether the supplier with take back foam of foam appliances. Also, see **Do these regulations apply to handheld fire extinguishers?**

## Is my stock of POP foam regarded as a COMAH chemical?

Yes, but only if there is a large quantity of foam. This has been raised as part of the Regulation 34 Control of Major Accident Hazards Regulations 2015 (COMAH) post implementation review. Spillage of a POP foam could be viewed as similar to accidents involving carcinogens, due to the long-term potential for very significant impacts.

# Washing and disposal of cleaning liquids

## Why do I need to clean my existing firefighting foam delivery system?

PFOA, and other types of PFAS, agglutinate to form supramolecular assemblies that form a resilient coating on all surfaces of firefighting foam systems. If not removed during system decontamination, it will gradually breakdown, months or even years later. Particularly, if the system is refilled with fluorine free firefighting foam, such as F3 which appears to be quite good at breaking down the coating. This causes ‘rebound’ or ‘bounce back’ of concentrations of PFAS detected in the replacement foams.

Effective cleaning of all parts of the system is required to enable it to be refilled and remain PFOA free, protecting the environment and health of firefighters. This is especially important when firefighters use replacement foam without breathing apparatus, as repeated exposure to aerosols containing PFAS can occur if the system is not assured to be fluorine free.

## How clean do I need to make my existing firefighting foam delivery system?

Decontamination of firefighting and fire suppression equipment is essential to limit carryover of PFASs from old foam usage. This is true whether you intend to refill with C6 or F3 firefighting foam or remove the equipment from service. See **How should I decontaminate my existing firefighting foam delivery system?** and **Do I need to clean equipment that previously held C8 firefighting foam before decommissioning?**

It is considered that a PFAS concentration limit of 1 ppm is achievable using relatively simple cleaning process. In the UK, for materials not to have to comply with POPs disposal requirements, the concentration limits are set as follows for substances, mixtures or articles:

* PFOA of any of its salts: equal to or below 0.025 mg/kg (0.0000025% by weight).
* Any individual PFOA-related compound or a combination of PFOA-related compounds: equal to or below 1 mg/kg (0.0001% by weight).

See also **Is there a de minimus concentration of PFOA that represents trace contamination?**

A concentration of 1 mg/kg equates to 1 ppm, and 0.025 mg/kg equates to 25 ppb. Simple cleaning processes are unlikely to be sufficient to render equipment clean enough for disposal unless the equipment is treated as hazardous waste, or clean enough to be refilled with replacement foam. Simple cleaning process are likely to result in replacement foam being too highly contaminated with PFOA. Highly contaminated new foam could not be used legally and would immediately become POPs waste requiring disposal.

The EU has proposed extending the deadline from 4 July to 3 December 2025 and revising the unintended trace contamination limit from 0.025 mg/kg to 10mg/kg for 3 years. The EU proposal acknowledges that some sites are unable to meet the timings or concentration requirement due to the significant work involved in replacing parts of foam delivery systems and cleaning existing system parts sufficiently to use fluorine free foams. However, the EU proposed extension does not apply in the UK.

## How should I decontaminate my existing firefighting foam delivery system?

Due to their chemical stability and low surface energy, PFAS are difficult to capture and destroy, making decontamination efforts challenging.

Decontamination is often complex for industrial sites with delivery systems that can involve several tanks, kilometres of pipework and numerous nozzles. For a firefighting system that has never contained PSOS or PFOA firefighting foams and instead contained PFOA-related compounds only (i.e., not PFOA or any of its salts), simple cleaning processes may be sufficient. Simple cleaning processes are subject to appropriate testing to confirm effectiveness. However, for firefighting foams containing PFOA or any of its salts, which is likely to be the case, more complex cleaning processes may be required.

Where the practice has been to always flush the system after use to prepare the system for future use (typically, pipework and nozzles) some PFOA (and other PFAS) will remain present, but the concentrations and soaking into the materials of construction will not be as significant.

A simple cleaning process maybe appropriate where:

* The firefighting system has never contained PFOS or PFOA firefighting foams, instead only PFOA-related compounds; or
* Parts of the system, such as sprinklers and piping that are only exposed to the foam solution, resulting in significantly lower concentrations of PFAS, and have been refilled with water, further diluting any residual PFAS (e.g., wet sprinkler systems); or
* Parts of the system are impractical to hot soak, for example, multi-floor sprinkler piping with open heads that cannot retain soaking solution, or closed head sprinkler systems and deluge systems that cannot be held at elevated temperatures without scaffolding, pipe heating and insulation for the duration of the cleaning, particularly where piping spans kilometres across multiple floors/levels, as used in some chemical plants; and

A simple cleaning processes may involve:

* 1. Draining as much of the existing foam from the tank as possible (and dispose of as detailed in **Destroying the POPs Content of Waste**);
	2. Flushing the tank and pipes with hot water and scrubbing where possible and retaining all the wash water. It is recommended that each stage of wash water is retained separately to facilitate the most appropriate treatment and disposal of each;
	3. Reverse flushing the system to reach parts not reached with a flush towards the nozzles. Crystalised PFOA has been found that the backs of valves.
	4. Analysing the vessel/system using total oxidisable precursor (TOP) assay to confirm PFAS cleanout has achieved the required concentration level. Testing the final rinse will provide the PFAS concentrations/mass at that time. However, the final test will not determine the PFAS mass remaining in the systems. See **For how long do I need to sample the system to be sure all former firefighting foam is all removed?**;
	5. Refilling the tank with replacement foam.

Where the system including storage vessels has been exposed to concentrated foam, the simple cleaning method illustrated above is unlikely to achieve the required residual PFOA levels. As PFOA is hydrophobic (water repelling), hot water flushing is known not to be particularly effective. The hydrophobic nature of the PFAS tail group causes the PFAS to leave the water phase and bind to solid surfaces, making decontamination more difficult. The non-waste concentration level (0.025 mg/kg) will not be sustained due to bounce back and large volumes of wash waters will be generated. In most instances, more complex cleaning methods will be required.

Effective decontamination requires more complex cleaning processes involving chemicals, heat, and attrition used together, therefore:

1. Drain as much as possible of the existing foam from tank, and dispose of as detailed in **Destroying the POPs Content of Waste**;
2. Rinse with antifoam to remove residual foam after emptying;
3. Use of chemicals cleaning agents rather than water as the washing liquid, with;
	1. extended soaking with the chemical agent based on the asset size, typically a decontamination cycle will be 16 to 24 hours;
	2. elevated temperature, typically between 40-80°C appears to be the optimum, but this will be dependent on foam system materials of construction, the chemical cleaning agent used and the pressure; and
	3. attrition using high pressure;
4. Perform a final flush with water in both reverse and forward directions to remove any crystalised residues and rinse the system;
5. Analyse the vessel/system using total oxidisable precursor (TOP) assay to confirm PFAS cleanout has achieved the required concentration level, see **For how long do I need to sample the system to be sure all former firefighting foam is all removed?**;
6. Refill the tank with replacement foam.

This combination appears to remove up to 95% of the resilient coating on surfaces in firefighting foam systems. Note, 100% will never be removed. The decontamination focus should be on removing sufficient quantities of the obsolete foam so that, even if small residual concentrations rebound over time, the new foam remains within the regulatory thresholds.

Ask the contractor for details of how they will evidence that the decontamination has been successful (see **For how long do I need to sample the system to be sure all former firefighting foam is all removed?**).

Techniques found to **not** be effective, include:

* Water washing – not considered effective at PFAS removal due to hydrophobic nature of PFAS;
* Pressure washing – not considered effective at improving PFAS removal;
* Modulated pulsed air – not considered effective at improving PFAS removal;

See also [EU Annex XV restriction report for PFAS in FFF](https://echa.europa.eu/documents/10162/0/rest_pfas_fff_axvreport_en.pdf/5ee6f85d-8339-cf1c-34c8-cfcb2861bde7?t=1645608390512), [Appendices to EU Annex XV Restriction report for PFAS in FFF](https://echa.europa.eu/documents/10162/071a3b0e-afab-8775-9323-426268d0df0e) and [US DoD Demonstration and Validation of Environmentally Sustainable Methods to Effectively Remove PFAS from Fire Suppression Systems](https://sepub-prod-0001-124733793621-us-gov-west-1.s3.us-gov-west-1.amazonaws.com/s3fs-public/2024-08/ER20-5364%20Final%20Report.pdf?VersionId=pq1O1eg8jDKsHW0E.4TJkqC1XI8aaoKb)

## For how long do I need to sample the system to be sure all former firefighting foam is all removed?

If the system has not been adequately cleaned, then bounce back will gradually occur. Testing of the replacement foam will show increasing levels of PFAS in the new foam as the old foam coating is progressively broken down over a period of years. Depending on how long the system was used for PFAS containing foams and how thick the coating on all surfaces in the system was, the concentration will increase over a period of years to contaminate the new foam to a level that means that it is a PFOA containing C8 foam, etc.

Therefore, once the system has been cleaned, it is important to analyse the system for residual PFAS. Analysis of samples from the surfaces of the system is required to demonstrate that decontamination has been effective. The sampling needs to be by aggressive swabbing methods to assess the mass of PFAS on the surfaces, with total oxidisable precursor (TOP) assay required to analyse the sample. Examining the PFAS concentration in the cleaning solutions does not reflect the concentrations of PFAS remaining on surfaces.

Once the system is refilled with replacement foam it is not possible to swab the surfaces, and monthly or quarterly sampling of the new firefighting foam over the first couple of years is required to verify that the decontamination was effective. The frequency and duration of sampling will be dependent on whether early samples detect C8 foam presence, and whether this concentration is increasing.

## What should I do with the washing solutions generated from cleaning my existing firefighting foam delivery system?

Dilution does not change the classification as hazardous, so all wash solutions are hazardous and need to be disposed of as such.

Because PFAS are hydrophobic, water alone is not a good washing solution to decontaminate firefighting foam systems.

Using the complex cleaning method in **How should I decontaminate my existing firefighting foam delivery system?** there will be three cleaning fluid streams. One with firefighting foam and anti-foaming agent, a second with the chemical cleaning agent and firefighting foam, and a third with rinse water and some firefighting foam. Each of these require appropriate treatment to destroy the POPs content.

For the first wash with antifoam and the second wash with cleaning agent, it is likely the concentration of PFOA will be high, and high temperature incineration may be required. (see **How should I manage and dispose of obsolete or used firefighting foam?** )

Weaker streams may be treated by passing through a multi-stage activated carbon filter system. This should result in water that is below the trace contamination threshold and spent activated carbon. Water should be checked before disposal to a suitable wastewater treatment plant. The spent activated carbon should be transferred as hazardous waste and destroyed in a high temperature incinerator.

## Can I concentrate up weak streams before destroying the POPs?

The cost of destruction or long-term storage increases almost linearly with volume, making the pre-concentration of contaminated water a crucial economic factor. Various methods, including in-situ treatment, adsorption, and filtration technologies like nanofiltration and reverse osmosis, are being explored to capture and concentrate PFAS. However, issues like saturation, regeneration, and competition with other substances hinder their long-term effectiveness.

## Do I need to clean equipment that previously held C8 firefighting foam before decommissioning?

Yes, even if the equipment is to be processed in a smelter that achieves temperatures >1100°C, sufficient to destroy the POP, a cleaning process is required. The cleaning process is necessary to prevent contamination of vehicles/containers used to transfer the obsolete equipment to the recycling site, accidental spill during decommissioning, leachate of PFAS at the recycling site and issues from a lack of environmental control. All recycling options require a full cleaning process. See details in **How should I decontaminate my existing firefighting foam delivery system?**

As the owner of an asset contaminated with PFAS, it is your responsibility under the duty of care to appropriately decontaminate and dispose of that equipment to prevent the re-use of assets that should be decommissioned. Where equipment can be satisfactorily decontaminated to allow re-use, this should be done prior to any re-use or sale of the equipment.

## How do I verify successful decontamination has been achieved?

Analysis of samples from the surfaces of the system is required to demonstrate that decontamination has been effective. The sampling needs to be by aggressive swabbing methods to assess the mass of PFAS on the surfaces. Total oxidisable precursor (TOP) assay is required to analyse the sample. Examining the PFAS concentration in the cleaning solutions does not reflect the concentrations of PFAS remaining on surfaces.

Typical decontamination verification procedures used to confirm a successful clean prior to employing new foam include three key types of evidence:

1. Percentage reduction of PFAS mass on the surface swab pre- and post-decontamination.
2. PFAS mass uptake – AOF/TOF analysis of up to five samples obtained from the circulated chemical solution at regular intervals during circulations/soaking. This analysis indicates the PFAS mass being desorbed from the interior surface. Once these concentrations plateau, it suggests that no remaining PFAS mass is being desorbed. Note: this is not the same as there being no PFAS mass remaining.
3. Rebound concentrations – based on the final swab, the remaining PFOA mass on the asset surface can be determined, and the potential concentrations of PFOA in the new F3/C6 foam calculated, assuming that all residual PFOA rebounds.

# Non-Industrial Sites and Uses

## Do these regulations apply ‘Offshore’?

Yes, the restrictions are universal and globally applicable and do not differentiate between onshore and offshore (e.g., ships and oil platforms), therefore the same restrictions and controls apply in all circumstances.

All UK registered vessels will need to comply, irrespective of where they are at sea, and all foreign flagged vessels are required to comply whenever in UK controlled waters.

## Do these regulations apply on military establishments?

Yes, the restrictions are universal and globally applicable and do not differentiate between commercial and military uses. The same restrictions and controls apply in all circumstances. Therefore, an establishment, anywhere in the world, including ships and floating docks, which is under the control of the Secretary of State for the purposes of the Ministry of Defence, or any headquarters or organisation base in the UK designated for the purposes of the [International Headquarters and Defence Organisations Act 1964](https://www.lexisnexis.com/uk/legal/citationlinkHandler.faces?bct=A&service=citation&risb=&UK_ACTS&$num!%251964_5a_Title%25) or any service authority of a visiting force as defined in [Part 1](https://www.lexisnexis.com/uk/legal/citationlinkHandler.faces?bct=A&service=citation&risb=&UK_ACTS&$num!%251952_67a%25$part!%251%25) of the Visiting Forces Act 1952, is required to comply with all restrictions.

## Do these regulations apply to handheld fire extinguishers?

Yes, the restrictions are universal and globally applicable and do not differentiate between industrial, commercial or domestic uses. The same restrictions and controls apply in all circumstances. Taxis and other commercial vehicles, commercial premises and households with a fire extinguisher in a vehicle or building will need to dispose of that extinguisher. As many handheld fire extinguishers are supplied on contract to commercial premises, in some instances the supplier will take back the extinguisher for disposal of the contents.

For most handheld fire extinguisher users, an alternative fire extinguisher type or extinguishing method will be more appropriate than replacing the unit with a POP free foam. For example, a power filled extinguisher or fire blanket may be more suitable.

# Firefighting Philosophy and Replacement Firefighting Foams

## Should I assess the need for firefighting foams to extinguish, or prevent, fires at my site?

The first consideration when replacing existing PFOA containing firefighting foams is to assess the hazards and risks to determine whether firefighting foam is required. Over the last 40-50 years, foam has been routinely installed as the default firefighting technique without considering if it is the best approach. Due to increasing concerns about the environmental impact of surfactants and other pollutants used as fire suppressants; other firefighting techniques may be more appropriate. It is critical however to ensure that alternatives do not result in unacceptable increased risk to safety. See also **Other consideration, would a wetting agent, or just water, be better than using foam?**

The environmental regulators encourage all site operators to assess whether foam is the most appropriate way to tackle the types of fires that could occur. In addition, as C6 foams are likely to be restricted in the future to avoid “regret spend”, wherever possible, it is recommended that a change to fluorine-free firefighting foam is implemented. See also **Should I consider replacing my firefighting foam with fluorine-free (F3) alternatives?** and **Error! Reference source not found.**

The key aspects are:

* Determine the hazards.
	+ Carry out a risk assessment to determine if there is a requirement for firefighting foam, or whether a non-foam firefighting approach is more appropriate.
* Identify the systems and equipment on the site that either are, or have been in firefighting foam service, whether as a concentrate or a solution, and therefore will require cleaning to meet regulatory requirements.
	+ A management of change process will be required as it is unlikely that a like-for-like foam replacement will be possible.
* Procure any new firefighting equipment and foam if they are to be used or define and implement any system changes required.
* Develop the protocols that are required to clean out systems.
* Clean out any equipment that has been in firefighting foam service.
	+ Arrange disposal of any equipment, obsolete foam, and wash waters.
* Install and commission any new equipment and foam.
	+ Personnel will need to be trained in the use of the new foam or non-foam firefighting techniques – as the application technique may differ.
	+ Note that whilst equipment is being cleaned, new equipment is being installed and commissioned, and staff are being trained, an interim plan needs to be put in place to ensure that the facility is appropriately protected in the event of a major accident scenario.
* Ongoing systems assurance.
	+ Once the new foam is in place and the equipment is fully functioning, an assurance process is required to ensure the foams performance over its lifetime.
	+ Site specific emergency response procedures may need to be amended to reflect the use of any replacement foam, or non-foam firefighting techniques.

Note that as the site transitions to fluorine-free foam or opts to not use foam to fight fires in the future, steps in the process may reveal the need to modify the original plan. Any changes will need to be reflected as updates to this transition plan to ensure that it remains current.

It is recommended that all UK users of firefighting foam systems that may contain any PFAS also prepare a “PFAS-foam management plan”. The plan should apply best-practice risk management measures whilst continuing to use PFAS-containing foams during the transition to PFOA (or PFAS) free firefighting foam. The plan should also show the steps required in a PFAS-containing firefighting foam management plan as proposed by European Chemicals Agency (ECHA).

Generic statements that a foam product is suitable for all flammable substances may not be correct. You need to test the combination of foam concentrate and fuel (and ideally the application method) to determine effectiveness and the application rate that should be applied. Do not rely solely on statements from the supplier that it will be effective. This approach is applicable to all fuel types and foam combinations, and application systems.

## What are my options for replacing my firefighting foam with a non-POP firefighting foam?

The use of firefighting foams containing PFOA from 4 July 2025 is prohibited. Suppliers should be aware of this, and therefore any firefighting foam available to purchase should not contain PFOA.

Whilst the current focus is on the time-limited restrictions on the use of PFOA, its salts and PFOA-related compounds, with use required to cease by 4 July 2025, further restrictions on other PFAS are expected. Future measures aim to eliminate all non-essential uses of PFAS and are likely to include usage in firefighting foam within a few years.

Therefore, whilst transitioning to a C6 firefighting foam is legally possible at this time, it is recommended that you consider switching to PFAS free alternatives, known as “fluorine-free” foams. See also **Should I assess the need for firefighting foams to extinguish, or prevent, fires** at my site? **Should I consider replacing my firefighting foam with fluorine-free (F3) alternatives?** and **Other consideration, would a wetting agent, or just water, be better than using foam?**

Additionally, research has shown that most aqueous film-forming foam (AFFF) contain a mixture of PFAS, with the named substance often being about half of the PFAS content, with up to 40 other PFAS identified in some brands. Although these studies were undertaken on C8 foams, it is likely that similar results would be found for C6 based foams, due to the production processes resulting in a range of co-products (i.e., the formulation will include some PFOS and/or PFOA). Therefore, if you have or decide to transition to a C6 foam, as foam from different manufacturers have different compositions, check the PFOA, PFOS, and PFHxS content to ensure that it is well below the relevant thresholds in Annex I to [Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on POPs](https://www.legislation.gov.uk/eur/2019/1021/annex/I#commentary-key-44fc0dc1f5d822da6852422440894398).

## What are the considerations I need to be aware of replacing my firefighting foam with a non-PFAS firefighting foam?

There are technical implications for a change to a fluorine-free firefighting foam. For example:

* Fluorine-free foams must be applied in greater quantities, and for greater periods of time to extinguish a fire when compared with AFFF.
* Foam storage and delivery equipment may need to be modified.
* Where existing equipment is to be reused or discarded, it must be cleaned to ensure that it is free from contamination before being refilled or sent for disposal or recycling. Any wash water generated during cleaning should be disposed of in a similar way as used and contained foam. See **Washing and disposal of cleaning liquids**.
* Firefighters and maintenance staff need to be given training in the use and maintenance of the new foams and associated systems.

Therefore, you may wish to discuss the proposed changes to firefighting foam systems with HSE SEPA, and the Scottish Fire and Rescue Service (particularly where large tanks are involved at sites regulated under COMAH). See also **Should I consider replacing my firefighting foam with fluorine-free (F3) alternatives?**

## What should I do with my existing firefighting foam delivery system to prepare for replacement foam?

Whether you are planning to replace PFOA containing foam with a C6 (PFAS containing) foam, or a fluorine-free firefighting foam, the same principles apply. The foam system needs to be cleaned sufficiently so that only trace contamination remains, before refilling the system with the new foam. See also **Is there a de minimus concentration of PFOA that represents trace contamination?** and **Washing and disposal of cleaning liquids.**

You may also need to replace nozzles, change the proportioning rate, modify foam application rates and methods, or change discharge duration. The supplier of the new foam should be able to advise on these design details. See also **Should I try to contain firefighting foams, other than C8 foams?**

# Other PFAS in firefighting foam

## Are other PFAS used in firefighting foams?

Yes, although PFOA containing firefighting foam is possibly the most prevalent foam, other types of PFAS are contained in firefighting foams, e.g., fluoroprotein and film-forming fluoroprotein, in both standard and multi-purpose (alcohol resistant) types. Therefore, restrictions and the need for a transition process will apply to these foams as well. Although firefighting foams containing PFAS, other than the three foams currently listed in the Stockholm Convention (PFOS, PFOA or PFHxS), are legally permitted for use, it is anticipated that further restrictions will be introduced in coming years. The changes are expected in response to increasing evidence and knowledge of the hazards associated with PFAS (under the Stockholm Convention or UK legislation).

In addition, per- and polyfluoroalkylated firefighting foams with shorter chain lengths of carbons, are commonly referred to as C6 firefighting foams. Some systems may still be contaminated with PFOS firefighting foams, despite these being restricted and replaced in 2011. Note that most firefighting foams contain a range of PFAS, due to chemical reactions during production resulting in multiple by-products rather than a single product. In some cases, up to 50% of the PFAS content may consist of other PFAS.

## What are the restrictions on PFOS containing firefighting foams?

PFOS (perfluorooctane sulphonic acid) and its related substances were restricted under the Stockholm Convention in May 2009. Therefore, PFOS use is already banned, and you should have ceased using and disposed of any stockpiles by June 2011.

If you think your firefighting foam may contain PFOS, please email nationalwaste@sepa.org.uk urgently, using “Possible PFOS containing firefighting foams” as the subject to your email.

It is important that SEPA is notified of the PFOS before you undertake the steps to dispose of the foam as outlined in **How should I manage and dispose of obsolete or** used firefighting foam?

The law does not allow the use of substances, mixtures and articles containing PFOA, its salts and PFOA related compounds after 4 July 2025, the unused firefighting foams are a POPs waste.

Firefighting foam containing PFOA classed as a POPs waste may include unused firefighting foams removed from fixed delivery systems and handheld extinguishers, post-discharge foam (which is likely to be mixed with water and the remains of the flammable substance and other contaminants), and wash waters from decontaminating equipment (again mixed with water and other contaminants, such as anti-foam and soap).

You must not discharge unwanted PFOA firefighting foams to sewer as this would be committing an offence. These chemicals may pass through the sewage works and contaminate the environment and drinking water. The discharged POPs waste may also contaminate sewage sludge used on agricultural land to produce food.

Under duty of care obligations, operators must ensure that any facility receiving the waste has the capability and legal permission to correctly undertake that disposal. As firefighting foams containing PFOA are POPs and therefore hazardous waste (including all cleaning streams), the waste must be accompanied by a special waste consignment note and disposed of in a way that assures destruction of the POP material.

You are obliged to dispose of POPs waste in “an environmentally sound manner”. The waste must be disposed of or recovered in a manner that ensures the POP content is destroyed or irreversibly transformed, so that the remaining waste and any releases do not exhibit the characteristics of POPs. For example, disposal in a hazardous waste incinerator (that is, with a residence time of 2 seconds at 1100°C), or use of another method that is equally effective at destroying POP.

Whichever methods are to be used; we recommend that you notify SEPA prior to dispatching the waste firefighting foam to the disposal site. If the method is not disposal in a hazardous waste incinerator or co-incinerator (e.g., cement kiln), you should discuss this with SEPA prior making any decision of the disposal route.

As there are few suitable sites in the UK for the disposal of POPs waste, there may be insufficient capacity to incinerate all the anticipated material within the appropriate legal timescales. Therefore, it is recommended that you discuss with your waste disposal contractor the likely timing of your transition project.

Proof of appropriate disposal must be documented and kept available for SEPA.

It is appropriate to assume the PFOA content of the foam will be above the 0.025 mg/kg threshold. Additionally, it is likely that the PFOA content of contaminated mixtures formed when PFOA containing firefighting foam is used to extinguish a fire, or when existing foam delivery systems are flushed to remove PFOA based firefighting foam to allow the equipment to be reused for replacement foams, will also be above the 0.025 mg/kg threshold. The disposal methods described below will be appropriate for those waste streams. Also see, **Can I concentrate up weak streams before destroying the POPs?**

## Are there alternatives to high temperature incineration?

Practical benchmark parameters for assessing the disposal technology performance are a minimum destruction efficiency (DE) of 99.999%, and a destruction removal efficiency (DRE) as a supplement requirement of 99.9999%, where applicable. As neither DE nor DRE account for the possible transformation of the original POP into unintentionally produced POPs, the possible release of unintentionally produced POPs should be considered when choosing a particular operation.

Technical guidance on PFOA is not yet available. However, there is guidance on the destruction techniques for PFOS and there is sufficient similarity between PFOS and PFOA for that guidance to be deemed appropriate for PFOA destruction (see *Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF)* Basel Convention Technical Guidelines).

The PFOS specific guidance refers the reader to section IV.G.2 and 3 in the *General technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants (General POPs)* in relation to technologies for the destruction and irreversible transformation of POPs in wastes.

Table 4 of the guidance provides advice on PFOS disposal techniques, which includes:

* hazardous waste incineration;
* cement kiln co-incineration;
* gas phase chemical reduction (GPCR); and
* supercritical water oxidation (SCWO) and subcritical water oxidation.

## How should I manage the waste transfers of obsolete or used firefighting foam?

When hazardous waste is transferred it must be accompanied by a special waste consignment note, which properly describes the waste, to ensure it can be managed safely and without harm to the environment.

To transfer waste firefighting foam to a disposal site, the operator must ensure that:

* any contractor employed to remove the waste is registered as a waste carrier, and
* the special waste consignment note clearly indicates the presence of the PFOA, including its classification as hazardous and a POP.

You must also comply with your duty of care obligations. Duties include a requirement to properly store waste and only transfer it to someone authorised to handle it. For further information and to check whether your contractor is registered, go to Special waste | Scottish Environment Protection Agency (SEPA) and Duty of Care - Code of Practice.

If you transport waste as part of your business activities, you must be registered as a professional collector and transporter of waste. If you use a third party to carry your waste, that contractor must be a registered waste carrier. For further information please see Waste carriers and brokers | Scottish Environment Protection Agency (SEPA)..

For details of classification for PFOA, and therefore the labelling and packaging requirements, see **How should waste firefighting foam containing PFOA be** classified?

## What are C8 and C6 AFFF?

In simple terms, C6 relates to PFAS substances with 6 carbons and C8 is used to describe PFAS substances with 8 carbons. PFOA and PFOS, and related substances, both have 8 carbons and may be present in ‘C8 AFFFs’.

C6 AFFFs contain other PFAS with 6 carbon bonds. PFHxS containing foams are C6 AFFFs. Note: PFHxS is already restricted under the Stockholm Convention. See **Persistent Organic Pollutants (POPs) Background** and **Does my firefighting foam contain C6 fluorosurfactants (PFHxA and PFHxS), or any other PFAS?**.

To ensure that any foam used does not contain PFOS or PFOA, the ‘C8 AFFFs’, it is important to refer to the material safety data sheet for your foam which outlines the chemical composition, speak to your supplier, or undertake testing using an appropriate laboratory. Note that some AFFFs contained a mixture of C8 and C6 PFAS and should be treated as C8 AFFF.

## Does my firefighting foam contain C6 fluorosurfactants (PFHxA and PFHxS), or any other PFAS?

Perfluorohexanoic sulphonic acid (PFHxS) was added to the restriction list in Annex A to the Stockholm Convention in 2022 with no derogations. Therefore, the use of any firefighting foam that contains PFHxS was immediately banned. As few firefighting foams used in the UK contain more than trace quantities of PFHxS, no specific actions are anticipated to be required due to this restriction.

Other PFAS, such as C6 fluorosurfactants like Perfluorohexanoic acid (PFHxA), are not currently restricted in the UK but are being scrutinised with a view to their future restriction. The EU published a PFHxA restriction under EU REACH ([Commission Regulation (EU) 2024/2462 of 19 September 2024 amending Annex XVII to Regulation (EC) No 1907/2006 of the European Parliament and of the Council as regards undecafluorohexanoic acid (PFHxA), its salts and PFHxA-related substances](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202402462)). The restriction related to firefighting foams effective from 10 April 2026. Whilst this legislation currently affects countries within the EU only and does not restrict the use of C6 foams on UK installations, it may be included in UK REACH in the future. See **What do the UK and EU restriction proposals for PFAS mean for C8+ and C6 firefighting foams?**

Whilst you do not have to report stockpiles of C6 fluorosurfactant firefighting foams yet, you should expect further regulatory action in the future, potentially under POPs or REACH (or other UK legislation). Anticipate similar reporting requirements as for existing POPs.

There is the potential that C6 and C8 firefighting foam mixes are labelled as C6. Analysis has shown that all PFAS based firefighting foams are a mixture of chain lengths. Please ask your supplier or test for evidence that your C6 AFFF has not been mixed with C8, and that the incidence of chain lengths above C6 are sufficiently low to meet the de minimus concentration thresholds set out in the guidance. See also **Is there a de minimus concentration of PFOA that represents trace contamination?**

SEPA requires that you minimise the release of C6 AFFFs into the environment. This includes, minimising the use for training, preventing their release to soil or water by proper containment, ensuring any run-off water is contained and disposed of appropriately, and reporting the use or release of the foam as an incident to SEPA.

## What do the UK and EU restriction proposals for PFAS mean for C8+ and C6 firefighting foams?

The PFAS restriction proposals by both UK and EU could result in the restriction/banning of all PFAS based firefighting foams within 10 years. It is not the intention of the restriction proposals to interfere with or relax the agreed phase out timelines for already regulated PFAS, like PFOA and related substances, in firefighting foams. The regulatory ‘baseline’ assumes that these will progress as detailed in existing legislation.

The EU restriction proposal requires a maximum of 25 ppb for any PFAS, measured using targeted PFAS analysis (polymeric PFASs are excluded from quantification), or 250 ppb for the sum of PFASs measured as the sum of targeted PFAS analysis, optionally with prior degradation of precursors (polymeric PFASs are excluded from quantification). As PFAS based firefighting foam could not function as a fire suppressant at such low PFAS concentrations, the restriction will effectively result in a ban on their use in most systems. However, there is a derogation under paragraph 5(m) for *clean fire suppressing agents where current alternatives damage the assets to be protected or pose a risk to human health until 13.5 years after entry into force*. Therefore, for a limited number of sites which demonstrate that alternative (fluorine free) firefighting foams could damage the equipment that the foam protects, there may be an extension to transition time (presumably with the anticipation that future generations of fluorine free firefighting foams will be developed that do not cause such damage). Further details need to be determined relating to the meaning of “clean fire suppressing agents”. See [Advice on enforceability of EU Annex XV restriction proposal for PFAS](https://echa.europa.eu/documents/10162/c77815fb-d3b8-38f3-ca2d-de7fdd155e60).

The UK proposal is not currently as developed as the EU’s. A background dossier is being prepared for the restriction of use of PFAS in firefighting foams as the priority action from the analysis of the most appropriate regulatory management options (RMOA) on PFAS.

Note that the cessation of supply of PFAS containing firefighting foams may occur earlier than the proposed restriction dates (within years rather than a decade). The 3 main fluorosurfactants manufacturers in the USA are expected to cease production, and will be unable to supply C6 firefighting foams. Consequently, any site operator that has already transitioned to C6 may face problems refilling their firefighting foam system after use, presenting an issue for site safety. If this is a concern, it should be discussed with the SEPA and HSE.

## Should I try to contain firefighting foams, other than C8 foams?

You should minimise the release of any firefighting foam into the environment. For example, minimise use for training, prevent release to soil or water by using suitable containment systems (for details see **Containment of Firefighting Foams**

**What** is effective containment of firefighting foam) and ensure any run-off water is contained and disposed of appropriately. As all firefighting foams contain surfactants that lead to harm in the environment, this advice applies to both C6 AFFFs and to fluorine free firefighting foams.

Fluorine free foams are typically biodegradable, but have a high oxygen demand. If released into water systems, fluorine free foams deplete oxygen from the receiving water and may kill fish via asphyxiation .

The discharge to surface water of any firefighting foam or water contaminated with foam should be avoided. The details relating to containment systems should be applied to all firefighting foam systems and their deployment locations.

Fluorine free foams may be treated in a biological wastewater treatment plant if the firefighting water is added at a rate within the design capacity of the plant. The plant must be capable of treating the flammable liquids that were extinguished by the firefighting foam.

## What do I need to do about potential historical contamination of my site through the use of firefighting foams containing PFAS?

Restricting the use of PFOA containing firefighting foams should prevent future contamination, but will not address the legacy of ground and water contamination already present. It is recommended that all sites keep records of the types, quantities, and location of firefighting foam being stored on site, and storage time periods. In addition, records of any use/release of firefighting foam should be retained. Wherever possible, records should include details of past storage, use and spillages of foam.

# Non-PFAS Firefighting Foam

## Should I consider replacing my firefighting foam with fluorine-free (F3) alternatives?

Currently about 6 or 7 different types of PFAS-free firefighting foams are available and in commercial use. Fluorine-free firefighting foams (also known as F3 firefighting foams) are better for human health and the environment. The evidence developed by Lastfire demonstrates that for most fires, fluorine-free alternative firefighting foams are effective at extinguishing Class B fires of all scales.

When purchasing new foam concentrate, there may be changes in operating practice or storage life with fluorine free alternatives. For example, different quantities of foam may need to be applied to extinguish a fire, resulting in the need for new operating and maintenance procedures, and training of staff in new systems.

Examples of the additional considerations, and critical issues related to fluorine free firefighting foams transition are:

* Greater fuel pick-up during application – Foam solutions do not have the same hydraulic characteristics as water or C8/C6 foam solutions, therefore understanding how the foam solution will act is required. F3 firefighting foams generally require gentler application or possibly higher application rates for increased effectiveness. Staff training will be needed on the best firefighting tactics to apply the foam.
* Relatively high viscosity – This will affect mixing in the water stream, and existing proportioning systems may need to be adjusted. The viscosity has gradually been reduced as F3 products have been developed so this is less of an issue now than when F3 firefighting foams were first introduced.
* Minimum use temperature of about 0°C – To enable the system to always be usable, it is likely that trace heating and lagging of tanks will be required.
* Hygroscopic (absorb moisture from the air) – There is the requirement to minimise the air-concentrate interface. Storage tanks should be kept full and different tank geometry considered.
* Shorter shelf life (about 10 years) than C8 firefighting foams (which have a shelf life up to 25 years) – A long term premix storage stability and shorter shelf life could influence systems where foam solution is stored for long periods (e.g., wet pipe foam sprinkler systems).

There is more information on how to select a replacement firefighting foam in the [AFFF Phase Out in the Arctic: Transition Manual](https://oaarchive.arctic-council.org/items/b59e5d94-8213-47e8-8993-07c66de60c24).

To prevent the continued emission of PFOA from the historic residue, you must also consider decontaminating installations and equipment that have already been in contact with firefighting foams containing PFOA or PFOS and related substances. See **Washing and disposal of cleaning liquids**.

You may wish to discuss your proposed changes to your firefighting foam system with SEPA and the Scottish Fire and Rescue Service (particularly where large tanks are involved at sites regulated under COMAH).

If you already have fluorine free firefighting foams, be cautious when using and disposing of the foam. Although fluorine free, it will contain surfactants that may harm the environment.

One important consideration is that “Fluorine Free” does not mean that the product does not have environmental or health issues. Fluorine free foams are also not always completely fluorine free, particularly if made in the same factory that previously supplied PFAS containing firefighting foam due to cross-contamination. Any substance released to the environment in large quantity may result in harmful consequences. As a result, environmental protection is best achieved by the prevention of releases. In the case of AFFF, a solution is to provide containment means when possible. See details in **Should I try to contain firefighting foams, other than C8 foams?** and **Containment of Firefighting** Foams

What is effective containment of firefighting foam**.**

## In terms of alternative firefighting foams, can SEPA recommend which are the best environmentally?

Manufacturers are producing a variety of performance level B and performance level C fluorine and halogen free firefighting foam. The environmental regulators cannot recommend specific suppliers or products.

## How effective is fluorine free foam (F3) at extinguishing oil fuel fires?

See the [AFFF Phase Out in the Arctic: Transition Manual](https://oaarchive.arctic-council.org/items/b59e5d94-8213-47e8-8993-07c66de60c24) and Lastfire for details about the use of F3 foams.

## How effective is fluorine free foam (F3) at extinguishing solvent fires?

Solvents need to be assessed separately depending on whether the solvent is polar or non-polar. Some F3 products are suitable for polar solvents and therefore suitable on water soluble fuels such as ethanol and IPA. The F3 foams work on the same principle as the AFFF Alcohol Resistant (AR) foams.

As with AFFF AR, the issue is that performance and effectiveness vary considerably from solvent to solvent or, that a foam that extinguishes a fire almost immediately disappears, and does not prevent re-ignition.

Non-polar solvents have many of the same characteristics as oil fuels. Many of the F3 products suitable for oil fuels are likely to be suitable for non-polar solvents.

However, generic statements that an F3 product is suitable for all flammable substances should be treated with caution. You need to test the combination of foam concentrate and fuel (and ideally the application method) to determine effectiveness and the application rate that should be applied. Do not rely solely on statements from the supplier that it will be effective. This approach is applicable to all fuel types and foam combinations, and application systems.

## Other consideration, would a wetting agent, or just water, be better than using foam?

As part of the transition away from PFOA containing firefighting foams, it is recommended that you review the firefighting philosophy for your site. See **Firefighting Philosophy and Replacement Firefighting Foams**

If water is a suitable extinguishing medium, an assessment of the containment system will be required as larger volumes of water may need to be retained. This may involve linked collection tanks for firefighting water if existing bunds have insufficient capacity, or remotely located tanks where the existing plant layout restricts retention volume.

# Further help

Further information on the use, storage, and disposal of POPs, can be found online at [www.gov.uk](http://www.gov.uk) by searching “persistent organic pollutants”.

The environmental regulators work with businesses to help them comply with environmental regulations. If you have any questions, please do not hesitate to contact us:

* If your site is located in England: chemicalrestrictions@environment-agency.gov.uk.
* If your site is located in Wales: chemicals@naturalresourceswales.gov.uk.
* If your site is located in Northern Ireland: NIEAChemicals@daera-ni.gov.uk.
* If your site is located in Scotland: nationalwaste@sepa.org.uk.

# References

**Stockholm Convention**

[Stockholm Convention](https://www.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx)

[Listing of POPs in the Stockholm Convention](https://www.pops.int/TheConvention/ThePOPs/AllPOPs/tabid/2509/Default.aspx)

**GB legislation**

[Regulation (EU) 2019/1021 on persistent organic pollutants](https://www.legislation.gov.uk/eur/2019/1021/contents)

[The Persistent Organic Pollutants (Amendment) (EU Exit) Regulations 2020](https://www.legislation.gov.uk/uksi/2020/1358/made))

[The Persistent Organic Pollutants Regulations 2007](https://www.legislation.gov.uk/uksi/2007/3106/made)

**Technical Information on PFAS**

[PFAS explorer](https://hcdc.hereon.de/PFAS-explorer/)

[Annex XIII to Regulation (EC) No 1907/2006 REACH](https://www.legislation.gov.uk/eur/2006/1907/annex/XIII)

[PBT assessment - ECHA](https://echa.europa.eu/understanding-pbt-assessment)

[ECHA Regulation of PMT substances and guidance development](https://echa.europa.eu/documents/10162/83231354/presentation_pmt_regulation_and_clp_guidance_development_en.pdf/cf66fb0a-468a-4ed5-d0e4-3153aa52aa37?t=1717072083615)

[EurEau Briefing note on PMT/vPvM substances](https://www.eureau.org/resources/briefing-notes/3934-briefing-note-on-moving-forward-on-pmt-and-vpvm-substances/file)

[EA Poly- and perfluoroalkyl substances (PFAS): sources, pathways and environmental data - report](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1012230/Poly-_and_perfluoroalkyl_substances_-sources_pathways_and_environmental_data_-_report.pdf).

[PFAS Uncovered: What You Need to Know About These Lingering (Not Forever) Chemicals - Features - The Chemical Engineer](https://www.thechemicalengineer.com/features/pfas-uncovered-what-you-need-to-know-about-these-lingering-not-forever-chemicals/)

**PFAS treatment/destruction**

[Unravelling PFAS: Challenges and Advances in Contaminant Remediation - Features - The Chemical Engineer](https://www.thechemicalengineer.com/features/unravelling-pfas-challenges-and-advances-in-contaminant-remediation/)

[Breaking Down Barriers: Innovations in PFAS Destruction - Features - The Chemical Engineer](https://www.thechemicalengineer.com/features/breaking-down-barriers-innovations-in-pfas-destruction/)

[Regulators on the Frontline - Features - The Chemical Engineer](https://www.thechemicalengineer.com/features/regulators-on-the-frontline/)

[PFAS Monitoring: Novel Approaches for Air and Water Detection - Features - The Chemical Engineer](https://www.thechemicalengineer.com/features/pfas-monitoring-novel-approaches-for-air-and-water-detection/)

[Destroying PFAS… and environmental anxiety - Features - The Chemical Engineer](https://www.thechemicalengineer.com/features/destroying-pfas-and-environmental-anxiety/)

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If you are a user of British Sign Language (BSL), the Contact Scotland BSL service gives you access to an online interpreter, enabling you to communicate with us using sign language. [contactscotland-bsl.org](http://contactscotland-bsl.org/)

1. See also Article 3, the exemption applicable under Article 4(1b), and the detail in the full amended text of Part A Annex I in [EU Regulation 2019/1021 on POPs (as amended)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02019R1021-20210315#tocId25), and in particular in the row on PFOA, paragraphs 1 and 6 in column 4 to that table. [↑](#endnote-ref-2)