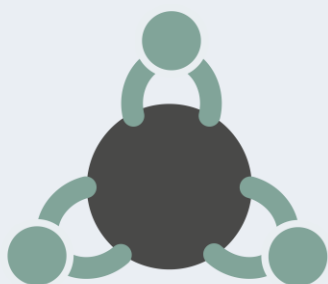


Supply chain dialogue on PFAS

- a guide for dialogue with suppliers on phasing out PFAS
Version 1.2, July 2026



The Danish EPA's PFAS Partnership with Industry

Title: Supply chain dialogue on PFAS – A guide to dialogue with suppliers on phasing out PFAS
v1.2 (July 2026)

Purpose: The purpose of this guide is to support private companies in their dialogue with suppliers to identify, reduce and phase out PFAS in products and processes.

Prepared by: The Danish Technological Institute and inVirke as part of the PFAS Partnership

Based on: “Procurement guide for public and private purchasers” prepared by inVirke and Danish Technological Institute for The Danish Environmental Protection Agency. The guide has been adapted, by condensing the primary source and translated using AI software, for use as a practical tool in supplier dialogue for private companies.

This guide contains links to external websites, databases and tools. The PFAS Partnership and Danish Technological Institute accept no responsibility for the accuracy, completeness or timeliness of the content on these external sites. Links are included as a supplement to the guide and do not constitute an endorsement of the sites in question or their content.

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1. Introduction

Purpose and target audience

Per- and polyfluoroalkyl substances (PFAS) are a group of over 10,000 substances. These substances are also known as 'forever chemicals' because, once released into the environment, they do not break down and can therefore accumulate in such large quantities that they may be harmful to the environment and humans. Furthermore, the removal and destruction of PFAS is complex and incredibly expensive. Read more about PFAS on page 5.

The EU has already banned a number of PFAS, and the European Chemicals Agency (ECHA) has published a legislative proposal to restrict the use of the entire group of PFAS. This means that virtually all sectors and their supply chains will be affected. However, identifying the use of PFAS can be difficult. PFAS are rarely listed in a product's ingredients declaration, and companies are often unaware that their products contain PFAS due to complex supply chains. In practice, PFAS may be used in a product even if the finished product ends up containing less than 0.1%.

The purpose of this guide is to make it easier for buyers to identify products that are likely to contain PFAS and to engage in an informed dialogue with suppliers regarding the phase-out of PFAS. The guide can contribute to a shared understanding of the challenges posed by PFAS, helping buyers ask more consistent questions and set more uniform requirements for suppliers.

It is important to emphasise that the primary purpose of the supplier dialogue is to determine whether PFAS are present in the product or process at all, not necessarily to demand laboratory evidence. Many suppliers do not have test data, but they possess knowledge of their materials, formulations and processes that can be used for an informed assessment.

The dialogue is also about addressing the dilemma that it may be necessary to compromise on product performance requirements in order to avoid PFAS. Fortunately, the development of alternatives is well underway, so it is a matter of setting the right level of ambition based on the existing options.

The guide is aimed at procurement officers in private companies and can be used regardless of whether you have experience in setting requirements for the phase-out of harmful chemicals, or whether you are in the process of building up expertise in this area.

How to use the guide

The guide is intended as a reference work that you can consult as needed. It provides practical guidance on identifying PFAS in your procurement and on conducting an informed dialogue with your suppliers regarding the phase-out of PFAS.

Some chapters include appendices with detailed checklists, specific suggestions for communicating with suppliers and other relevant tools. As knowledge about PFAS and possible alternatives is developing rapidly, the guide refers to digital databases and other tools that are regularly updated.

A list of abbreviations can be found in Appendix F.

PFAS at a glance

What are PFAS?

PFAS is a collective term for a group of more than 10,000 chemical substances containing carbon-fluorine bonds. PFAS are also referred to as fluorinated substances, perfluorinated substances, polyfluorinated substances, PFCs, fluorocarbons, etc.

The *OECD* has defined PFAS as: *Fluorinated substances containing at least one fully fluorinated methyl or methylene carbon atom (which contains neither H, Cl, Br nor I), in other words, PFAS are all chemicals containing at least one fully fluorinated methyl group (-CF₃) or one fully fluorinated methylene group (-CF₂-).*

For non-chemists, this definition can be difficult to make sense of. Instead, you can search for the CAS number or the chemical name in the freely accessible [PRIO database](#) to find out whether the substance is a PFAS. The database is not exhaustive but covers the majority of PFAS on the market.

Why are PFAS used?

PFAS have a wide range of properties and are therefore used across many industries. Examples include UV resistance, heat tolerance, chemical resistance, water and stain repellency, electrical insulation, fire retardancy, low friction and non-stick properties. PFAS are often highlighted in applications such as textiles, shoes, sealants, foam insulation, paint and non-stick cookware. But this is just a very small selection of where the substances are used.

Why are PFAS a problem?

PFAS are problematic because the substances are persistent or can break down into persistent substances. When substances are persistent, they can accumulate in such large quantities that they can be harmful to the environment and humans. It is known that the best-studied PFAS can affect the liver and the immune system, lead to lower birth weight and affect fertility and/or the unborn child. Furthermore, some PFAS are also suspected of being endocrine disruptors and carcinogenic.

The PFAS debate encompasses many different viewpoints and claims, from authorities, companies and interest groups alike. This section provides an overview of the most common perceptions regarding the typical main categories, without claiming to be exhaustive or to present clearly documented knowledge on all points:

- **F-gases:** Fluorinated gases (e.g. HFCs, HFOs) used in refrigeration and heating systems, fire extinguishing agents and as propellants.
- **Short- and long-chain PFAS:** Low-molecular-weight substances, often liquid or solid, where known problematic substances such as PFOA and PFOS were previously used in, for example, textiles and fire-fighting foams.
- **Fluoropolymers:** High-molecular-weight plastic materials such as PTFE (Teflon®), often used in non-stick cookware, industrial gaskets, seals and medical equipment.
- **Perfluoropolyether (PFPE):** High-molecular-weight liquids primarily used as lubricants. Both fluoropolymers and PFPE are used in lubricants and can be found, for example, in consumer products such as bicycle oil or in professional and industrial applications where resistance to high temperatures, harsh chemicals, vacuum conditions, etc. is required.

To understand the impact of these types of PFAS, one can look at the three phases of a product's life cycle.

Production: There is broad consensus that the manufacture of PFAS – regardless of type – has historically caused significant local pollution. Emissions of PFAS from factories have in many places led to both environmental and health problems for local communities and employees. Some interest groups and industry stakeholders emphasise that, in principle, it is possible to produce PFAS without environmental emissions if all waste streams are managed and destroyed correctly. However, there is uncertainty as to whether this is always successful in practice, and whether destruction technologies are sufficiently effective and applied consistently.

Use: The risk assessment of PFAS during use depends heavily on the type and product category:

- **Fluoropolymers:** These are generally considered by industry and several authorities to be stable and inert during the use phase, as they are not absorbed by the body under normal conditions. Nevertheless, it is often noted that high temperatures (e.g. on an overheated pan) can break down the PFAS polymer and release smaller PFAS compounds. Concerns have also been raised about the possibility that unreacted PFAS monomers may leach out over time, but the extent, risk and potential health effects remain a matter of debate.
- **F-gases:** The consumption of F-gases is rarely considered a health concern for the user, but emissions into the atmosphere have a well-documented impact on the climate, as many of these gases have a high global warming potential (GWP). Furthermore, several of the gases can be converted into, for example, trifluoroacetic acid (TFA), which is currently found worldwide and is considered harmful for the environment and human health.
- **Short- and long-chain PFAS:** This group is widely regarded as the greatest concern in terms of health and the environment, as the substances can accumulate in humans and the environment and are associated with various health effects, including liver damage, endocrine disruption and possibly cancer. The risk of human exposure depends on the product (e.g. cosmetics, waterproofing) and the degree of contact.

Disposal: When products containing PFAS are disposed of, there is broad consensus that gases, low-molecular-weight substances and fluoropolymers can all cause long-term environmental impact. Degradation or destruction requires very high temperatures (often >1,100°C), and if the products are not handled correctly, PFAS emissions into the environment may continue – either as volatile compounds (e.g. F-gases), as emissions from landfilled short- or long-chain PFAS, or as accumulation of non-degradable fluoropolymers in the environment. Here, several sources point out that even fluoropolymers, which are not considered hazardous during the use phase, will remain in the environment and degrade only very slowly or not at all.

There is still disagreement regarding the actual environmental and health effects of certain types of PFAS, particularly with regard to polymeric PFAS and newer F-gases, as well as which technologies for purification and destruction actually protect people and the environment. Nevertheless, the precautionary principle is increasingly shaping legislation, policy and public procurement, and there is a broad effort to phase out all unnecessary uses of PFAS.

Read more about PFAS on [the Danish Environmental Protection Agency's website](#).

2. Mapping of procurement areas and product groups where PFAS may be present

The first step towards phasing out products containing PFAS is to gain an overview of where PFAS might be hidden in your procurement. Once you know which product groups potentially contain PFAS, you can prioritise dialogue with suppliers and set the right requirements in your procurement and tendering.

By being proactive, you as procurers can significantly reduce your company's or organisation's contribution to overall PFAS pollution. Some product areas are well-known sources of PFAS, e.g. water- and dirt-repellent textiles and cookware with non-stick coatings, where it is relatively straightforward to identify the high-risk products. Other areas are more complex, as PFAS can be hidden amongst thousands of substances in specialised applications (typically in industrial processes). These require a more in-depth assessment.

Correspondingly, there is a significant difference in how easy it is to obtain products without intentionally added PFAS. Some products, such as electronics and medical equipment, almost inevitably contain PFAS, as functional alternatives are not yet available. In other product groups, such as kitchenware, alternatives without intentionally added PFAS already exist. You can read more about this in Chapter 3.

Map procurement areas and product groups in two steps

We recommend mapping your procurement areas and product groups in two steps and drawing up a list of the products you wish to investigate further in dialogue with existing and/or potential suppliers:

1. List known PFAS applications:

Table 1 lists the most well-known and common uses of PFAS within a range of procurement areas and examples of products. It is not exhaustive, but you can use the table to gain an overview of obvious sources of PFAS within your procurement. For each procurement area, Appendix A contains a detailed review of the typical uses of PFAS, with further product examples and descriptions of environmental and health risks, which you can then explore in more depth.

2. Look out for PFAS red flags in other products:

For procurement areas not included in Table 1, you will need to take a broader approach to identify sources of PFAS.

Table 2 lists key properties of PFAS and potential industrial applications that these properties give rise to. As the use of PFAS is not always obvious, key PFAS properties can be seen as warning signs and used to indicate the likely presence of PFAS.

What does 'PFAS-free' and 'intentionally added PFAS' mean?

Products marketed as “PFAS-free”, “fluorine-free” or “PFC-free” are not necessarily completely free of PFAS. This is because a distinction is made between intentionally added PFAS and unintentional presence.

Intentionally added PFAS

Intentionally added PFAS refers to PFAS that has been added to a product or during production to provide a specific function. This may be as an active ingredient (e.g. to provide water, dirt or oil repellency, a non-stick effect, fire resistance, etc.) or as an additive/auxiliary substance used during manufacture (e.g. a lubricant, processing aid or surface treatment), where PFAS imparts a technical property and is added as a deliberate choice. Deliberately added PFAS also includes PFAS in sub-components or materials that form part of the end product.

Unintended PFAS content

In the case of unintentional PFAS content, PFAS has not been intentionally added, but the product may still contain traces of PFAS. This may be due to contamination from raw materials sourced from suppliers who use PFAS in other products; contamination from production equipment used for both PFAS-containing products and products without intentionally added PFAS; or the presence of PFAS below the detection limits of analyses, in quantities that cannot be detected using current technology. A detailed explanation with examples can be found in Appendix C.

Important: No laboratory test can guarantee that a product is 100% free of PFAS, as extremely small quantities may be present below the detection limit. Manufacturers are therefore advised to avoid using the term “PFAS-free”, even if they can document that no PFAS has been intentionally added and the content in analyses is below relevant limit values. In this guidance, the term “without intentionally added PFAS” is therefore used for products to which PFAS has not been actively added, even though traces of PFAS below selected limit values or the detection limit may occur unintentionally.

Table 1 : Application areas, function of PFAS and examples of products

Procurement area	Function of PFAS	Examples of products in which PFAS may be used
Textile and leather products	Water and dirt repellency (DWR treatment); breathable waterproof membranes (PTFE)	Outerwear (rain and ski wear), workwear/PPE, footwear, outdoor equipment (tents, rucksacks), upholstery fabrics, carpets, impregnating agents.
Cookware	Non-stick surfaces (PTFE coatings on cookware)	Frying pans, saucepans, waffle irons, toast/panini grills, air fryers, ovens, hobs, baking trays, worktops
Fire-fighting foam	Foam-forming film (AFFF) for firefighting; surfactants reduce surface tension	Fire training foam, AFFF for Class B (liquid fires), AR-AFFF (alcohol-resistant), foam extinguishers
Building materials	Weather, water and dirt repellency; durability (UV, heat, chemicals); reduced friction	Roofing materials and membranes, joint sealants, paints and varnishes, sealants, floor polishes, foaming agents, plumbing tape (thread tape)
Electronics	Insulation, fire retardancy, chemical/thermal stability, low friction, dirt-repellent, poor conductivity	Cables and wires (including optical cables), coating of e.g. printed circuit boards and screens, semiconductors (photolithography), electronic components, coolants, hard drives, batteries, cleaning agents for electronics
Industrial equipment	High chemical and heat resistance; lubricity; sealing properties in harsh environments	Pumps/valves (gaskets, O-rings), chemical hoses, liners, compressor and turbine lubricants, fuel cell membranes, conveyor belts, bearings
Personal care products	Water and oil repellency; long shelf life; smooth consistency	Make-up (foundation, mascara, lipstick), skin cream, sunscreen, hair products, dental floss, shaving foam, face masks
Laboratory and medical equipment	Non-stick surfaces; sterilisability (high heat/chemical resistance); biocompatibility; inert	Implants (e.g. vascular prostheses), surgical instruments (coating), catheters, medical tubing/filters, laboratory seals and containers (PTFE-coated) and surgical textiles
Adhesives and lubricants	Reduced surface tension for better wetting; low friction; chemical resistance; non-flammable; chemical and heat resistant	Adhesives (water- and solvent-based, labels), thread-sealing tape (PTFE tape), special-purpose grease/oil (containing PTFE/PFPE), bicycle chain oil
Refrigerants	Refrigeration/freezing properties in closed systems (many HFC gases are PFAS)	Refrigeration systems containing HFCs (e.g. R-134a) or HFOs (HFO-1234ze(E)) in refrigerators, freezers, air conditioning, heat pumps, refrigerated vehicles
Toys	Dirt- and water-repellent surface treatments; softening coatings	Textile parts on soft toys/dolls (stain-resistant clothing), "water-repellent" toys, foam play mats, inflatable toys (paddling pools)
Cleaning products	Surfactants for improved cleaning (lower surface tension)	Industrial cleaning products (alkaline/basic with fluorinated surfactants, carpet cleaners, car wax, glass cleaner, floor polish, degreasing spray)
Office supplies	Water- and oil-repellent treated paper; friction-reducing sprays (HFC "air")	Carbonless copy paper, water-repellent notepads/envelopes, ink/toner (containing fluorine for improved flow), compressed air in cans (HFC-based), surface-treated office furniture fabric
Food packaging (PFAS in cardboard and paper food packaging is banned in Denmark)	Fat and water barriers in paper packaging; non-stick coatings for cooking	Baking paper, popcorn bags, burger wrappers, pizza boxes, paper cups/plates, takeaway containers, paper/bamboo straws

Non-food packaging	Fluorinated barrier coatings (including plasma-fluorinated plastic); anti-static or dirt-repellent coatings	Packaging for electronics, tools, cosmetics, chemicals and industrial equipment
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Table 2 : Key properties of PFAS and potential industrial applications

Key properties of PFAS	Potential industrial applications
Significantly reduces surface tension Therefore used as a surfactant, wetting agent and dispersant	Cleaning agents (alkaline, for hard surfaces); foam stabilisers; film-forming agents, e.g. in paint, fire-fighting foam; etching fluids; pesticide formulations (increases effectiveness); coatings; digital printing (improves ink spreading); high-bonding adhesives
Repels both water and oil/grease Used therefore for impregnation and to make materials resistant to dirt and liquids	Impregnation/stain protection for textiles (clothing, carpets, furniture), leather, and paper; food packaging (e.g. pizza boxes, popcorn bags); fire-fighting foam (AFFF – Aqueous Film Forming Foam); "easy-clean" coatings for hard/porous surfaces; protection of electronics against moisture and dirt
Has high chemical and thermal stability Used therefore as insulation, corrosion protection and in materials that must withstand extreme conditions, e.g. insulation	Electronics (insulating materials, components); chemical protective suits; seals, gaskets, valves, pipe linings in the chemical industry; industrial processes at high temperatures; chemically resistant coatings; hydraulic fluids; certain types of fire-fighting foam (ensures the foam's durability)
Is highly weather-resistant (e.g. against UV radiation) Is therefore used as long-lasting coatings that retain colour and gloss	Paints, varnishes and coatings, particularly for outdoor use on cars, buildings and ships; outdoor textiles, e.g. awnings, sails; sunshade products
Has extremely low friction Is therefore used as a non-stick coating, for lubrication and low-friction treatment	Non-stick coatings (e.g. PTFE/Teflon® for cookware, industrial moulds, cables, surgical needles/cannulas); lubricants (dry lubricants, grease for mechanical parts, bearings, gears); polishes and waxes
Has emulsifying properties Used therefore as an emulsifier to stabilise mixtures of oil and water	Pesticide formulations; dyes and pigment dispersions; textile and leather finishing agents; cosmetics; paints, varnishes and printing inks; polymerisation, e.g. in the manufacture of fluoropolymers
Forms thin, stable films Used therefore to create protective and uniform surfaces	Film-forming agents in fire-fighting foams (AFFF); protective and functional coatings; anti-static treatments; aerosol suppressants in chrome plating processes
Can form membranes with selective permeability and high gas permeability (for certain types) Used therefore as a barrier against undesirable substances such as water	Waterproof and breathable textiles, e.g. Gore-Tex® and similar membranes in outerwear, footwear; medical implants and barriers; filtration equipment (air, liquid, e.g. in the chemical industry, water purification); fuel cells (proton exchange membranes)
Has anti-fog properties Used therefore to prevent condensation on surfaces	Coatings for glass, plastic and metal, e.g. in visors, spectacles, car windows, mirrors
Has good dielectric properties and low electrical conductivity Used therefore as an electrical insulator	Cable and wire insulation; electronic components (capacitors, printed circuit boards); semiconductor manufacturing (processing aids)
Is flame-retardant and gives materials 'anti-drip' properties Is therefore used as an additive in, for example, plastics that need to be flame-retardant	Please note in particular that "halogen-free" flame retardants are not necessarily PFAS-free, as "halogen-free" refers to the use of bromine and chlorine, and not fluorine, which can be misleading as fluorine is chemically a halogen.

3. Dialogue with suppliers regarding PFAS-free products

In order to set requirements for your suppliers regarding products without intentionally added PFAS, it may be necessary to gain more knowledge about the suppliers' existing products and about PFAS alternatives on the market.

Here you will find guidance on how to ask your existing suppliers questions about PFAS, gain an overview of possible PFAS-free alternatives, and how to conduct a broader market dialogue.

Ensure that suppliers understand what PFAS are

Awareness of PFAS is high in the Nordic countries, but broadly speaking, it is not common knowledge in most parts of the world. It may therefore be necessary to assume that many of your suppliers are unfamiliar with the term PFAS, and that when first raising the subject of PFAS, it would be beneficial to begin by explaining to suppliers what PFAS is and what the expected upcoming EU legislation means:

- **State the official definition of PFAS:** PFAS (per- and polyfluoroalkyl substances) are defined as all chemical substances containing at least one fully fluorinated methyl group ($-\text{CF}_3$) or one fully fluorinated methylene group ($-\text{CF}_2-$).
- **Draw attention to illegal PFAS:** It is not unusual to hear the phrase "no, we do not use PFOS" when asking suppliers whether they use PFAS. You can therefore list the PFAS that are already banned or restricted in the EU, including PFOS, PFOA, PFHxS and C9-C14 PFCA, and explain that you are enquiring about these substances as well as many others, as the EU's proposed restrictions cover all PFAS. You may wish to include the (non-exhaustive) lists of specific chemicals falling under the designations [PFOS](#), [PFOA](#), [PFHxS](#) and [C9-C14 PFCA \(Appendix B.1\)](#).
- **Mention some well-known brands and materials where PFAS are present but which are not yet restricted in the EU:** You can mention well-known brands and products containing PFAS to help suppliers understand what they should look out for (non-exhaustive): Teflon®, Gore-Tex® (older generations), Novec™, Scotchgard™ (latest generations), Zonyl™, Capstone®, GenX, Forafac™, Foraperle®, Freon®/HFC/HFO, Stainmaster®, Dupont™ Krytox™, Kalrez®, PTFE, PVDF, ETFE, PFA, PFPE, PCTFE, FEP, FKM, FFKM, Viton, Nafion™. Some of these are subject to climate or pesticide regulations (e.g. certain HFCs/HFOs/Freon®), but not yet the broad PFAS ban.
- **Help suppliers understand how PFAS are used:** PFAS are rarely listed directly in ingredient declarations. The substances may be hidden under terms such as "stain resistance", "waterproofing", "water repellency", "flame retardancy" or similar. You can therefore provide suppliers with some examples of typical functions of PFAS within the relevant product group.

When first contacting suppliers, you can use the letter template provided in Appendix B. The appendix also contains product-specific texts on typical functions and occurrences of PFAS, so the template can be adapted to the relevant procurement area.

Ask suppliers to check further up the supply chain

Incomplete or incorrect answers will often be due to your suppliers not knowing whether there are PFAS in the product. This may be because they are wholesalers or only responsible

for assembling the product. Consequently, they may only have general information about which substances have been used further back in the supply chain. The further away you are from production, the greater the risk that you will be unable to obtain the necessary documentation regarding ingredients. Therefore, you can also ask the supplier to check further up the supply chain during your initial enquiry, if they are unsure how to respond to you.

Ask suppliers clarifying questions

A supplier's initial response rarely provides a complete overview of PFAS use. If the response is unclear, incomplete or does not address all aspects of your enquiry, you should therefore follow up with further, more precise questions regarding both the product's composition and its specific properties. Depending on the product in question, such questions may include:

1. Has anything been added to the product to make it extra stain-resistant, water-repellent or heat-resistant?
2. Does the product contain any special adhesives, surface treatments, dyes or sprays?
3. Are there parts of the product that are flame-retardant, or designed to withstand heavy wear, grease, chemicals or oil?
4. Do you use products from other suppliers (e.g. paint, plastic, textiles) where it may be difficult to identify all additives?
5. Do you know whether the manufacturer markets any 'special properties', e.g. 'easy to clean', 'extra durable' or similar, which may be due to additives?

The overview below provides specific examples of responses from suppliers and suggested replies with follow-up questions. Remember that the purpose of the dialogue is to get the supplier to investigate further whether PFAS are present in any way – even when it is not obvious – and to facilitate the necessary, thorough clarification through collaboration across the entire supply chain.

If the supplier says ...	You can reply ...
"It is PFOA-free"/"Does not contain PFOS"	"Our question is not just about PFOA and PFOS, but about the entire PFAS family. Have you investigated whether the product may contain other PFAS, e.g. Teflon/PTFE, fluorinated substances or fluorine additives?"
"The product is bio-based / organic"	"We would like to know whether any additives, treatments or coatings – e.g. adhesives, surface treatments, dyes or sprays – have been used that may contain PFAS, even if the base material is bio-based."
"The product is flame-retardant/extra durable"	"What chemicals or treatments are used to impart these properties? For example, have surface treatments, sprays, adhesives or plastic components been added that may contain PFAS?"
"We use nanotechnology"	"Do you know whether your nanomaterials contain fluorinated materials, e.g. Teflon/PTFE, or other substances? Which manufacturer/product name is used?"
"It is silicone/wax/hydrocarbon-based"	"Can you confirm whether fluorinated substances or fluorine-based chemistry are also used alongside the main ingredient?"

"All information is in our safety data sheet (SDS)"	"SDSs usually only list hazardous substances above 0.1%. Can you help us find out whether PFAS are used, even in small quantities or as an additive, adhesive, impregnation or surface treatment?"
"We don't know – it's a component from another supplier"	"Would you please contact your supplier and ask if they use PFAS, e.g. fluorinated substances, non-stick treatments, or products with names such as Teflon/PTFE, Gore-Tex, Scotchgard, etc.?"
"Our product has an 'easy-clean' surface"	"How is that effect achieved? Has any impregnation, coating, spray or other substance been used or added that may contain PFAS? Can you share information about the method or supplier names?"
"We only use standard raw materials from wholesalers"	"Do you know if any raw materials have surface treatments, special additives, non-stick effects, impregnation or flame retardants? Can you send us the supplier or product names?"
"We haven't tested for PFAS"	"That's perfectly normal – but could you contact your supplier/manufacturer and ask if they are aware of the use of PFAS, or if they can supply products without added PFAS?"
"Our manufacturer says it complies with EU regulations"	"Unfortunately, compliance with current regulations does not guarantee that the product is free from new PFAS. Can the manufacturer confirm whether they are working to phase out or substitute PFAS in future products?"

Check whether the product category has any labels or certifications

It is advisable to carry out an initial market survey for PFAS-free products before planning a broader market dialogue. If there are suitable or comparable products that can replace your current product, this is an easy way to phase out PFAS.

A good place to start your market research is to check whether the product category is covered by relevant labels or certifications. Most officially recognised eco-labels guarantee that the product does not contain intentionally added PFAS or restricts the use of PFAS.

Always check the specific product group with the labelling and certification bodies, as the specific PFAS bans and limit values may in some cases vary depending on the product standard, even within the same label. Remember that the labelling criteria are updated regularly, so it is important to keep track of changes to the relevant standards.

The overview below provides an overview of credible labels/certifications where both the assessment and the setting of criteria, as well as the use of the label, are subject to independent third-party control.

Overview of credible labels/certifications

Label/certification	PFAS criteria
The Nordic Swan Ecolabel is the official Nordic environmental label. Product categories include toys, personal care products, cleaning products, paint, building boards, as well as clothing and home textiles such as furniture, duvets, pillows, towels and curtains.	As a general principle, it does not permit the addition of PFAS. The ban on the addition of PFAS covers, among other things, the following products: personal care products, cleaning products, dishwashing detergents, laundry detergents, car care products, chemical construction products, toys without textiles, textiles made from new fibres, paints, flooring that does not contain recycled wood fibres, and printed matter.

	There is also a general ban on the addition of PFAS in a number of other Nordic Swan-labelled products, including hygiene products, flooring containing recycled wood fibres, furniture, toys containing textiles, façade panels and textiles made from recycled fibres. However, in certain product types within these areas, there may be very small quantities resulting from, for example, background contamination. Where recycled wood or textile fibres are used, the quantity must be documented through testing and must comply with a strict limit value.
EU Ecolabel is the EU's official environmental label. Product categories include, among others, cosmetics, cleaning products and textiles, including furniture covers and footwear.	It imposes strict requirements on PFAS in, for example, cosmetics, cleaning products and textiles, including upholstery for furniture and footwear. For textiles, this means, among other things, that products must not be treated with PFAS-based water-, stain- and oil-repellent agents, whilst for cosmetics, PFAS must not be used in the product.
OEKO-TEX® is an international label for textiles and related products, including, amongst others, sportswear, workwear, pram accessories, hammocks, rainwear, hats, gloves, duvets, pillows, fabrics (by the metre), children's clothing, fashion clothing and accessories.	General ban on the addition of PFAS in all OEKO-TEX® standards: STANDARD 100, ORGANIC COTTON, LEATHER STANDARD, and MADE IN GREEN. Two methods are used to detect PFAS, which must be carried out on all relevant products: 1) Uniform limit values in all standards using targeted tests for prohibited PFAS such as PFOA and PFOS. 2) All standards must comply with the limit value for measuring total fluorine content (TF), as an indicator of the presence of PFAS. Inorganic fluorine and fluorine in non-PFAS substances, such as fluorine-based dyes, are also measured in this test.
Cradle to Cradle Certified is an independent, non-profit standard that promotes products designed for a safe, circular and responsible economy. Product categories include building materials, interior products, textiles, clothing, paper, packaging, personal care products, cosmetics, electronics and furniture.	PFAS restrictions by certification level, versions 4.0 and 4.1: Bronze/Silver: PFAS-based materials are not permitted. However, PFAS may occur as an impurity or a minor additive in an otherwise non-fluorinated material, up to 1000 ppm by weight of the homogeneous material. Exception: Materials constituting < 1% of the finished product's weight may be exempt from this requirement. Exception: The use of PFAS in the material is required to comply with regulatory requirements (e.g. fire safety standards), and there are no alternative methods to meet the requirement. Gold/Platinum: PFAS-based materials are not permitted. No materials may contain PFAS in excess of 100 ppm (or specific concentration or regulatory requirements for individual PFAS, if below 100 ppm). PFAS restrictions by attainment level, version 3.1: Gold/Platinum: PFAS-based materials are not permitted. No materials may contain PFAS in excess of 100 ppm (or specific concentration limits for individual PFAS, if below 100 ppm).
Blauer Engel (Blue Angel) is the official German eco-label. Product categories	The specific PFAS bans and limit values vary depending on the product standard. For printed matter, baking paper,

include, amongst others, paper, packaging, building materials, paint, textiles, clothing, electronics, cleaning products and personal care.	textiles, fire extinguishers, artificial turf, personal care products, and building products such as interior wall plaster and fillers, there is a general ban on the addition of PFAS. In electronics, low levels of fluorinated additives may be present, and certain PFAS may be permitted subject to declaration. For other product groups, PFAS may only be present in very small quantities or are subject to documentation and declaration requirements.
TCO Certified is a global sustainability certification for IT products that focuses on four areas: climate, substances, circularity and supply chain. TCO Certified is available for all IT products, and there are product-specific standards for all-in-one PCs, desktop computers, monitors, headsets, laptops, projectors, servers, smartphones and tablets.	Restricts PFAS by only permitting substances added to the product and used in production that are on the publicly available TCO Certified Accepted Substance List. The list includes only substances assessed as safe based on GreenScreen® or ChemFORWARD.
Safer Choice certifies chemical-based products for a range of consumer and institutional cleaning purposes, as well as other applications. Certified product types include laundry detergents, floor care products, dishwashing and dishwasher detergents, and surface cleaners. It is a guarantee from the United States Environmental Protection Agency (EPA) that the ingredients in a product meet strict criteria for human and environmental health.	PFAS must not be used in Safer Choice-certified products. Any residual content must be limited to less than 0.01% (by weight) or 100 ppm in the formulation. Furthermore, no PFAS may be intentionally introduced into primary product packaging, which must be documented by a signed declaration from the packaging manufacturer.

Accept that there is no 1:1 replacement for PFAS

There is no direct replacement for PFAS, nor is there likely to be one. However, there are many alternatives to PFAS on the market, and development of alternatives is well underway in product areas where they do not yet exist. Some alternatives are even better than PFAS in specific applications, as PFAS products are also often used to minimise material complexity.

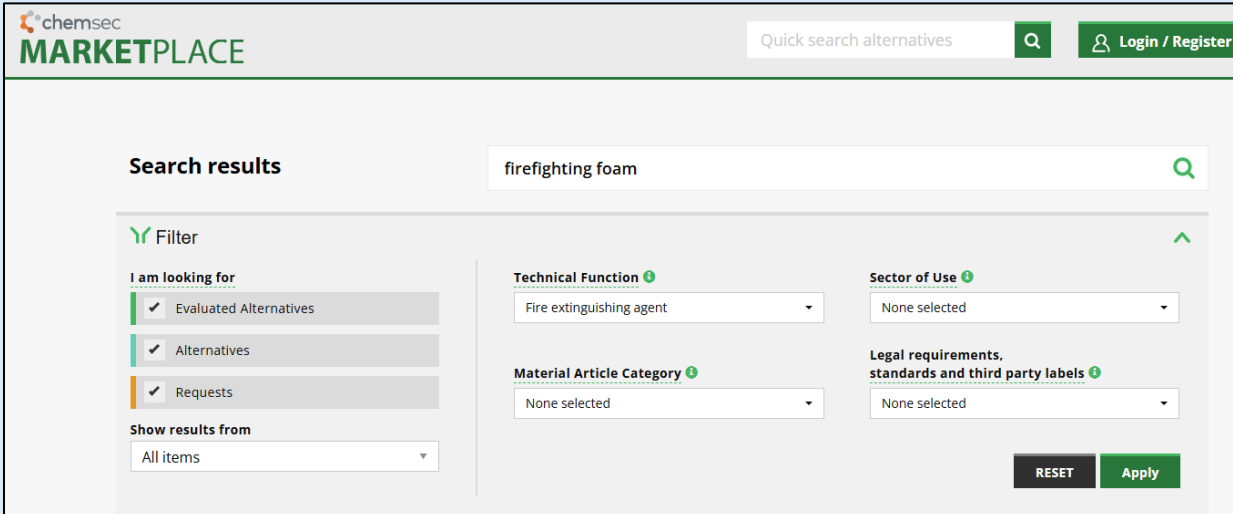
The landscape of alternatives is just as complex as the group of PFAS. Therefore, possible alternatives will always depend on the properties required for the specific application of PFAS. Alternatives are often marketed based on what they are not, rather than what they contain. Therefore, always check what PFAS has been replaced with.

There are a few publicly available databases where you can find inspiration for PFAS-free products. The common feature of these few databases is that products and information are not automatically recorded in them, and they are therefore not exhaustive. [ChemSec Marketplace](#) is a Swedish database managed by ChemSec. It is an independent organisation working to replace harmful chemicals with safer alternatives. Here you can search for PFAS-free products and find contact details for manufacturers. See the example below.

Example: Using the [ChemSec Marketplace](#) to find a replacement for firefighting foam containing PFAS

A company wants to replace its PFAS-containing firefighting foam with a more environmentally friendly solution without compromising on effectiveness and uses the ChemSec Marketplace to find possible alternatives.

By searching for “firefighting foam” and selecting “fire extinguishing agent” as the technical functionality on the platform, the company finds several alternatives without intentionally added PFAS from various suppliers.



The screenshot shows the ChemSec Marketplace interface. At the top, there's a search bar with 'firefighting foam' entered. Below the search bar, there are filters on the left and search criteria on the right. The filters include 'I am looking for' (Evaluated Alternatives, Alternatives, Requests), 'Show results from' (All items), 'Technical Function' (Fire extinguishing agent), 'Material Article Category' (None selected), 'Sector of Use' (None selected), and 'Legal requirements, standards and third party labels' (None selected). There are 'RESET' and 'Apply' buttons at the bottom right of the filter section.

Found 6 results

EVALUATED ALTERNATIVE

LIQUID - 100% ecological firefighting agent (A,B,C,D and F)

- LIQUID is a 100% ecological agent against all types of fires, composed of only 3 plants
- It is mixed from 0,2% to 3% with fresh water, seawater, or antifreeze
- It treats all types of fires A, B, C, D, and F



EVALUATED ALTERNATIVE

FireEx® C-M firefighting foam concentrate

FireEx® C-M is a highly effective and highly concentrated gel foam extinguishing agent for use in all class A, B and C fires (***) for class C "gaseous substances" fires, it is essential to stop / interrupt the gas supply prior to extinguishing - otherwise there is the highest risk of explosion and mortal danger, especially in the case of inflammation of the gas). FireEx® C-M offers extremely high safety for emergency personnel, especially in the case of liquid fires and plastic fires, and offers very short extinguishing times. FireEx® C-M reduces



EVALUATED ALTERNATIVE

FireEx® C-Marine firefighting foam concentrate



For each product, the company is provided with an overview of key properties, environmental impact and areas of application, as well as the supplier's contact details, so they can obtain further technical specifications and pricing information. If the product is labelled '**EVALUATED ALTERNATIVE**', ChemSec has been in contact with the supplier and assessed the alternative. If the product is labelled '**ALTERNATIVE**', it is an alternative identified by ChemSec, but they have not yet had a dialogue with the company regarding that specific product.

After obtaining samples of three promising foam types without intentionally added PFAS and testing them under representative conditions, the company has decided to proceed with a product based on plant proteins.

Invite potential suppliers to a market dialogue

If contacting your existing suppliers and searching databases does not provide a sufficient overview of alternative products without PFAS, the next step could be to invite a wider range of potential suppliers (both individually and through trade associations, etc.) to a market dialogue. The market dialogue can focus on gaining more knowledge about your opportunities and limitations regarding the phasing out of PFAS, the dialogue can help ensure that you do not unwittingly set requirements that (parts of) the market cannot meet.

The market dialogue can also provide a basis for assessing whether the market is mature enough for functional requirements.

Market dialogue can also be used to mature the market and motivate suppliers to invest in the development of alternatives without intentionally added PFAS and/or to accelerate the development of alternatives. Once EU legislation on the restriction of PFAS has been adopted, it will put pressure on suppliers, but there will be a phase-out period of at least 18 months, and for many/some applications the phase-out period may be several years. Therefore, it may be a good idea to use the market dialogue to send a signal to the market that you wish to phase out PFAS as soon as possible, and that you will favour/select those suppliers whose products have the lowest PFAS content (concentration), and who will commit to working purposefully to phase out PFAS and develop alternatives. The market dialogue will also provide suppliers with important insight into your needs and requirements regarding the product's functionality, including your willingness to compromise on product performance to avoid PFAS, as well as your considerations regarding the costs of prioritising PFAS-free products. Many alternatives will be cheaper as 'raw materials', as PFAS are generally expensive materials, but the development of alternatives can involve significant costs. There are also known alternatives to PFAS polymers that can work in some applications, whereas some of the alternative plastic types are significantly more expensive.

A market dialogue can be organised in many ways and can be both verbal and written. Here are some useful tips and examples:

- **Establish a clear framework for the market dialogue:** The best results are achieved by providing market participants with a clear framework for the dialogue, for example by basing it on (i) your current procurement patterns, (ii) your ambitions, and (iii) your preliminary considerations on how to achieve those ambitions. Providing market participants with a clear and consistent framework for the dialogue supports both the equal treatment of tenderers and ensures that input focuses on your needs and wishes – rather than the market participants' general 'sales agenda'.
- **Hold group or individual dialogue meetings:** The market dialogue can be organised as a physical or online meeting where all interested suppliers within the relevant sector are welcome and receive the same information about your needs and insight into your considerations. This can help ensure that individual companies are not favoured. You can start by presenting your ambitions and timelines for phasing out PFAS, as well as the technical and quality specifications for the product. Following this, you can invite a discussion on the challenges associated with finding alternatives without intentionally added PFAS. This gives you an opportunity to have an honest discussion with suppliers about any functional compromises you may have to accept by switching to PFAS-free products, the costs you are prepared to accept, and how you can support the development process. However, you should also be aware that the invited suppliers

may be competitors, and that there may therefore be limits to what they are willing to reveal in terms of good ideas at a joint meeting; similarly, you must ensure that no competitively sensitive information is exchanged between competitors at a joint meeting. Individual meetings may therefore be a better solution – either from the outset, or as a follow-up to a joint dialogue meeting.

- **Consider a joint market dialogue:** As market dialogue can be resource-intensive, you may wish to consider organising the dialogue within a joint procurement group or under the auspices of a trade association. A joint market dialogue can be an obvious approach if the market is immature and you wish to work together to encourage the market to invest in the development of alternatives.
- **Send a written enquiry:** A supplement or alternative to dialogue meetings could be to send a questionnaire or similar written enquiry to a broad range of suppliers to assess product and market maturity. You could also conduct a more open consultation, inviting written input on a specific product area via your website.
- **Document and share knowledge:** We recommend that you document the market dialogue, i.e. both the information you share and the feedback provided by market stakeholders. This could, for example, take the form of meeting minutes. In addition, it may be relevant to share a summary of the result of the market dialogue in a subsequent tender.

Case: Phase-out of PFAS in lighting products

A lighting company has launched a targeted initiative to phase out the use of PFAS in both its products and production processes, in response to increasing regulatory requirements and environmental concerns. PFAS are traditionally used in the lighting industry to achieve properties such as electrical insulation, heat and chemical resistance, and water and dirt repellency. PFAS may be present particularly in components such as printed circuit boards, semiconductors, cable insulation, lubricants and certain surface treatments.

To ensure compliance and proactive substitution, the company has drawn up internal guidelines covering:

- Identification of PFAS-containing materials through supplier documentation and requirements for PFAS declarations from subcontractors.
- Testing of materials where PFAS is suspected, e.g. via TOF-CIC analysis in accordance with the standards EN14582:2016 or ASTM D7359-23.
- Dialogue with suppliers – both regarding confirmation of current use and regarding opportunities for developing alternatives without intentionally added PFAS.
- Documentation of historical PFAS use in connection with exports to markets such as the US, where [reporting requirements have been introduced for all articles containing PFAS](#).

Particularly in dialogue with subcontractors, the company has found that many suppliers are unaware that PFAS covers a broad group of substances – not just the best-known ones such as PFOA and PFOS. Suppliers are therefore advised to review all process chemicals and safety data sheets for terms containing “fluorine” and to obtain updated documents.

The company is closely monitoring developments in the EU, the US and other export markets to ensure that its products and processes comply with upcoming requirements regarding documentation and the phase-out of PFAS.

4. Formulation of guidelines and procurement requirements

Once you have gained a better understanding, through dialogue with existing and potential suppliers, of which of your products contain PFAS and what alternatives are available on the market, the next step is to formulate the requirements you wish to impose regarding the prohibition and/or phase-out of PFAS.

Here you will find useful advice on how to draw up guidelines for PFAS in procurement, as well as how to set product-specific requirements and associated documentation requirements to ensure compliance.

Draw up general guidelines and product-specific requirements

The requirements you can impose on a product will depend on the product category and, consequently, on the alternatives to PFAS available on the market. However, it is advisable to draw up general guidelines for PFAS in procurement, which can be integrated into your procurement policy and/or Code of Conduct for suppliers.

The general guidelines could, for example, include the following:

1. A requirement to ban PFAS if alternatives without intentionally added PFAS are available.

This applies to both the use of PFAS in products and in production, including finishing processes. PFAS may also be included in a potential Restricted Substance List (RSL) that applies to all your procurement.

Documentation requirements may include:

- **Eco-label/certification:** Reference to recognised third-party certifications (see Chapter 3) that guarantee the absence of intentionally added PFAS. The supplier must provide a valid certificate for the specific product.
- **Supplier declaration:** A written declaration from the supplier confirming that the products do not contain intentionally added PFAS. The declaration should be specific to the product/batch supplied.
- **Information on alternative chemicals:** Specification of substance names and/or CAS numbers of the chemicals used as alternatives to PFAS. This enables an assessment of the environmental and health risks of the alternative.
- **Test for total organic fluorine:** A test report from an accredited laboratory showing that the content of total organic fluorine (TOF) is below a specified limit (e.g. 100 ppm or lower). This is a screening method that indicates the total amount of organic fluorinated substances. However, the method does not distinguish between different types of fluorinated substances. If the test shows the presence of total organic fluorine, you should ask the supplier to explain that this is not due to intentionally added PFAS, but that it may, for example, be due to unintentional contamination from the production process or other fluorinated substances. You may consider contractually obliging the supplier to investigate the source of any contamination. Please note that there are several other PFAS tests, including targeted tests, where the result does not reflect the total amount of PFAS, but

either a specific group of PFAS or a specific fluorinated substance. Read more about testing methods for PFAS in Appendix E.

2. Requirements for the restriction/phase-out of PFAS within a given timeframe where no market-ready alternatives currently exist.

This also applies to both the use of PFAS in products and in production. The timeframe should be set realistically based on market maturity, technological development and the complexity of the specific application. For some products, a short phase-out period may be possible, while for others (e.g. critical medical devices) it may require a longer period or await forthcoming legislation.

Documentation requirements may include:

- **List of intentionally added PFAS:** A detailed list of substance names and/or CAS numbers for the PFAS that have been intentionally added, as well as their concentration in the product (e.g. by weight percentage).
- **Full list of ingredients (if possible):** A complete list of all the product's ingredients, including substance names and/or CAS numbers. As the list of ingredients may contain commercially sensitive information, you should specify how you will treat this data confidentially, e.g. by offering to sign a non-disclosure agreement (NDA) or by having an independent third party review the list. For certain products, it may be more relevant to focus on specific substance groups in addition to PFAS. Alternatively, so-called material transfer agreements can be entered into to gain insight into material composition, but such a legal contract can be complicated and resource-intensive.
- **Completed scorecard/chemical assessment:** Use of standardised tools to collect information on the content of PFAS and other problematic substances. This may require the supplier to state whether PFAS has been intentionally added above a certain threshold (e.g. 0.1% by weight).
- **Phase-out plan:** A concrete plan from the supplier describing the initiative and a timeline with milestones for reducing and ultimately phasing out the use of PFAS in the product in question during the contract period.

3. Requirement that suppliers ensure their suppliers do not use PFAS in materials and processes.

As PFAS in products may originate from additions to materials or use in production processes further back in the supply chain without your suppliers being aware of it, you would be well advised to explicitly require suppliers to impose requirements on their own suppliers, including documentation.

Documentation requirements may include:

- **Supplier Code of Conduct:** Documentation confirming that the supplier has a Code of Conduct or similar policy that includes requirements prohibiting the addition of PFAS or requiring their phase-out, and which is communicated to their suppliers.
- **Supplier management procedures:** A description of the supplier's processes for monitoring and verifying that their suppliers comply with the PFAS requirements (e.g. via audits, spot checks, etc.).

Appendix C contains specific suggestions for the wording of product-specific requirements, which can be used as inspiration in contracts within procurement areas where PFAS typically occur.

Case: Viking Life-Saving Equipment sets direct requirements for PFAS-free products

Viking Life-Saving Equipment A/S manufactures rescue equipment and clothing for use in demanding and regulated environments. Many of the products have high requirements in terms of durability and functionality, and in some cases specialised properties such as waterproofing, chemical resistance and flame retardancy – properties for which PFAS have traditionally been used.

Unlike more traditional phase-out processes, where companies first identify all PFAS use in materials and product components and then initiate a dialogue on phase-out, Viking's personal protective equipment division has chosen to go straight to requiring PFAS-free products from its suppliers. Viking has sent an email to all suppliers of fabrics requiring them to be OEKO-TEX certified, and suppliers must also provide a declaration that neither the product nor the production process involves PFAS. Viking's close relationship with the suppliers and ongoing data documentation (including detailed data sheets) ensure compliance with the requirements.

In the area of impregnation, Viking has mapped which products legally require PFAS properties and have, in certain cases, accepted that the transition to PFAS-free impregnation agents entails minor changes in product performance, e.g. the level of dirt-repellency of certain products.

In the development of PFAS-free membranes, Viking has initiated close collaboration with its suppliers to find new solutions, although this has so far meant that some properties are inferior to those of PFAS-based alternatives.

5. Follow-up and monitoring

If you want to ensure that your PFAS guidelines and product-specific requirements are adhered to in practice, it is a good idea to establish a systematic process for ongoing follow-up and monitoring.

Here you will find useful advice on how to ensure that everyone in the organisation is aware of and follows the guidelines, as well as how to monitor whether suppliers are complying with contractual requirements and maintain an ongoing dialogue on phasing out PFAS.

Communicate PFAS guidelines to all purchasers

In larger organisations, responsibility for procurement may be divided into product areas managed by decentralised purchasers, for example within a company's departments or in local authority institutions. If your guidelines and requirements are set centrally, it is important that all purchasers in the relevant product areas are familiar with both the guidelines and the relevant product-specific requirements, and that they have sufficient knowledge to be able to follow them in practice.

Here are some tips on how to communicate guidelines and requirements clearly and effectively:

- **Explain why PFAS is a problem:** Having sufficient knowledge is not just about understanding how the PFAS guidelines should be followed, but also why it is important to follow them. You can use the 'PFAS at a glance' box on pages 5-6 as a

starting point for explaining why it is important to avoid PFAS. You can also use information from the Danish Environmental Protection Agency's page [‘Learn more about PFAS’](#) (in Danish).

- **Launch the guidelines with an internal mini-campaign:** The PFAS guidelines and product-specific requirements must, of course, be easily accessible to all buyers, e.g. via your intranet or procurement system. However, it would be beneficial to launch them with a mini-campaign explaining why you are phasing out PFAS and which procurement areas you have prioritised. Feel free to provide some examples of the types of products covered and what this specifically means for the users. Be aware that new products requiring changes to staff routines can be perceived as extra work, and staff may also be sceptical if they feel the alternatives are not as good as what they are used to. It is therefore advisable to address this yourself when introducing the new products. If you wish to test new products before rolling them out widely, it is also important to provide staff with clear guidelines on the scope and timeline of the test, as well as to minimise the extra work as much as possible and make it easy to provide feedback. It is also a good idea to explain how their feedback will be used and what you will do if the tested alternatives do not work.
- **Integrate the guidelines into existing systems:** You should make it as simple as possible for purchasers to select products that comply with the PFAS guidelines. It is therefore beneficial to integrate them into your existing procurement systems. If you use electronic product catalogues that purchasers need to use, you can ensure that they only contain products from suppliers that meet your product-specific requirements. These could, for example, be products with eco-labels that guarantee the product does not contain PFAS. If you have a chemical management system and a Restricted Substances List (RSL), the requirements should be integrated into these.
- **Establish a support function:** You can set up an internal support function where buyers can seek help if they are unsure how to proceed. The support function could consist of staff with both procurement expertise and environmental expertise. It would be beneficial if some of these were the people who helped develop your guidelines and requirements.
- **Make use of free capacity-building resources:** Some buyers may need more knowledge about PFAS to be able to engage in dialogue with suppliers regarding the phase-out of PFAS in their specific product area. Here, you can make use of some of the free sources and capacity-building resources on PFAS listed in Appendix D.
- **Provide regular updates and seek feedback:** As legislation evolves and new alternatives to PFAS continue to enter the market, you will need to update guidelines and requirements and, consequently, communicate these changes. It is advisable to provide regular updates on PFAS, for example via a ‘PFAS News’ email to the relevant procurement officers, thereby helping to maintain awareness of the guidelines. You can also use such a newsletter to solicit feedback on the guidelines. In this way, you can continuously identify any barriers to implementation and address these through further support for purchasers or adjustments to the guidelines. This could, for example, involve experiences with alternative products that do not sufficiently meet functional requirements or take users’ needs into account.

Include a follow-up clause and penalty provision in the contract

You may wish to consider including a follow-up clause in the contract specifying how and when the supplier must document compliance with the contract requirements. This can make your work of monitoring and supervising the supplier easier and more straightforward.

Examples of follow-up clauses include:

- **Periodic updating of documentation:** The supplier must submit updated documentation at least once a year, e.g. new test reports, declarations or certificates, to confirm that the products supplied continue to meet the PFAS requirements.
- **Testing on request:** You may, on an ongoing basis, require the supplier to provide current test results for total organic fluorine (TOF) or targeted PFAS analyses for specific products or batches if doubts or suspicions arise. Read more about PFAS testing methods in Appendix E.
- **Cooperation on tracing:** If PFAS are detected in supplied products, the supplier is obliged to cooperate in tracing and identifying the source, including providing information on the supply chain, production processes and any subcontractors, and, if necessary, contributing to further analyses.

At the same time, you may wish to consider potential sanctions that can be imposed if the supplier fails to comply with the requirements. These may include financial penalties, demands for product replacement or, ultimately, termination of the contract. Provisions regarding sanctions should be included in the contract.

Monitor and inspect deliveries

The ongoing monitoring and verification of whether suppliers comply with your PFAS requirements can usefully form an integrated part of your existing quality control process and/or chemical management system. Systematic monitoring and verification not only enhance product safety but also help you identify potential issues at an early stage.

The checks may include:

- **Documentation checks:** You should always check whether the documentation provided is both comprehensive and up to date, as many organisations find that the quality of the documentation is often completely inadequate. If you have requested a list of the product's ingredients and are sent a safety data sheet, you should be aware that information on PFAS is often missing. This is either because many PFAS are not yet classified as hazardous, including most polymeric PFAS, or because the PFAS content is below 0.1%, which is the threshold for the requirement to disclose classified substances. Furthermore, you should check whether the safety data sheet (SDS) is up to date in relation to the latest changes in restrictions on use and production formulations. If you require product testing, you can check whether test reports apply to the specific product batch from which your delivery originates, and whether the test was carried out by an approved laboratory in accordance with the specified test methods.
- **Checking individual substances:** If you have been sent specific substance names and/or CAS numbers for the substances used as alternatives to PFAS, these can be used for identification in the European Chemicals Agency's (ECHA) chemical database to check whether the substance contains a CF₂- or a CF₃- group, and is therefore a

PFAS. A good rule of thumb is that if “perfluoro”, “polyfluoro”, “difluoro”, “trifluoro” or, in some cases, simply “fluoro” is included in the substance name, it is likely to be a PFAS. You can also use [the PRIO database](#), where you can look up the CAS number to check whether it is a PFAS (however, the database does not contain all PFAS).

- **Random checks of products:** In addition to the product tests, you choose to require of the suppliers, you can also carry out random checks of the delivered products yourself to check whether they contain PFAS. However, this is resource-intensive, and you would be well advised to implement a differentiated testing programme, where products are selected for testing for total organic fluorine (TOF) based on suppliers’ performance and the products’ risk profile. Furthermore, you should clarify in which cases you will offer to collaborate with the supplier to trace a PFAS contamination detected during testing. This could be, for example, if you view it as an important part of efforts to prevent recurrence. Furthermore, you may choose to involve the testing laboratory in identifying possible causes of the contamination.

Support suppliers in phasing out PFAS

If you set requirements for the phase-out of PFAS within a given timeframe, you can help ensure progress in the development of products without intentionally added PFAS by supporting the suppliers’ work. This may be particularly relevant for smaller suppliers, who may have limited development resources.

You can support suppliers in various ways:

- **Provide regular updates:** You can keep up to date with developments in the relevant product area, and regularly pass on relevant information to suppliers, so that they are aware of new opportunities to phase out PFAS from their product ranges. This could take the form of a newsletter, or you could invite several suppliers to information meetings, which can easily be held online. The advantage of a meeting is that you can discuss what the new opportunities mean for your phase-out plans, costs, etc. A meeting also gives suppliers the opportunity to provide you with feedback and share their experiences and suggestions for product improvements. Such information activities can also be organised under the auspices of trade associations, as well as associations and purchasing groups for public procurers.
- **Collaborate on development:** If new relevant opportunities to develop and test alternatives without intentionally added PFAS arise during the contract period, you may choose to invest in a development partnership with one or more suppliers.
- **Suggest PFAS skills development:** If you assess that some suppliers’ knowledge of PFAS is low, you can suggest they make use of some of the free PFAS competence development opportunities and guide them towards those most relevant to them (see Appendix D). There are also many companies offering courses in PFAS competence development. However, you should be aware that most courses focus on ‘PFAS remediation’, i.e. the removal and destruction of PFAS, which is not relevant. Instead, use search terms such as ‘PFAS course’ + ‘supply chain’/ ‘supplier’/ ‘manufacturing’/- ‘training’ to find the relevant courses.

Evaluate and update guidelines and processes

The Danish Consumer Council Tænk and other consumer organisations in the EU, as well as the Danish Environmental Protection Agency, regularly publish product tests revealing new findings of PFAS. Fortunately, the development of alternatives to PFAS is also progressing rapidly. It is therefore important that you keep up to date with new options in product areas where PFAS were previously unavoidable, and regularly assess whether there is a need to update your guidelines and requirements.

The following may provide input for the evaluation:

- **Attend conferences and subscribe to newsletters:** You would benefit from attending relevant conferences and networking events on developments in EU chemicals legislation, best practices and new solutions, which are offered by many industry and interest groups as well as consultants in the environmental and chemicals sectors. Many of them also publish newsletters on environmental issues, where news about PFAS will typically be featured. Finally, it is advisable to subscribe to [the Danish Environmental Protection Agency's newsletter](#) and indicate that you wish to receive news about PFAS.
- **Re-evaluate the prioritised product groups:** If you have chosen to focus on selected procurement areas and product groups, you should regularly review your procurement areas and assess whether it is time to prioritise new product groups that you wish to investigate further (see Chapter 2).
- **Check for new products without intentionally added PFAS:** An easy way to keep up to date with new alternatives on the market that do not contain intentionally added PFAS is to regularly check whether there are new products that have obtained one of the recognised eco-labels/certifications, and to search the [ChemSec Marketplace](#) portal (see Chapter 3).
- **Incorporate feedback from buyers and suppliers:** When updating your guidelines and requirements based on new legal requirements, new priority product groups and/or new alternatives without intentionally added PFAS, you should also consider the feedback you have received from your procurement organisation and from your suppliers. This may include barriers to implementing the requirements, as well as suggestions for improving requirement specifications and processes for follow-up and control.

Case: Chemical management at BESTSELLER

Since 2019, BESTSELLER has required all its suppliers to ensure that all delivered products are free from PFAS. The company has a comprehensive chemical management system to ensure compliance with this requirement.

The system is run by a centrally located chemical team, which ensures that compliance officers in each of the company's nine brand houses are kept informed of new or stricter chemical requirements. Any changes to the requirements and ongoing monitoring of compliance by BESTSELLER's suppliers are handled by chemical teams at purchasing offices in BESTSELLER's sourcing countries and are therefore carried out independently of the specific knowledge of individual buyers.

The key elements of the system are:

- **Restricted Substances List:** PFAS is included in [BESTSELLER's Restricted Substances List \(RSL\)](#), which sets out restrictions and limit values for chemical substances in all clothing, footwear and accessories, as well as in all components, i.e. including zips, buttons, rivets and labels. The restriction on PFAS in the RSL is formulated as a limit value based on a total fluorine test, which will be tightened to 50 ppm by 2025. The RSL is updated once a year and more frequently if new legislation is introduced or if deficiencies are found in it.
- **Mandatory training:** All new suppliers must undergo an approval process that includes mandatory training at local offices on BESTSELLER's chemical requirements and the RSL. The training typically lasts around four hours, and in some countries concludes with an exam to ensure that suppliers have understood the requirements. The training is repeated annually when an updated RSL is issued.
- **Supplier rating:** All suppliers are assigned a rating from "excellent" to "critical" based on an assessment of their error rate in chemical testing, as well as their compliance set-up, participation in training, management support, etc. Suppliers rated as "poor" and "critical" must improve within a few months if they wish to remain suppliers to BESTSELLER.
- **Fixed testing programme:** The company has a comprehensive, fixed testing programme in which products from upcoming shipments are selected each month for testing to ensure compliance with the RSL. Products deemed to pose the greatest risk of non-compliance with the RSL are prioritised. For example, a jacket would typically be selected for testing rather than a T-shirt. The proportion of a supplier's products selected for testing depends on the supplier's rating. The better the rating, the fewer products need to be tested. Suppliers with a 'poor' and 'critical' rating must test all products. New suppliers must do the same until BESTSELLER has sufficient data to assign a supplier rating. Suppliers must use a specific test request form when sending products for testing, on which they must always state whether the products have undergone a water-repellent treatment. They may only use approved testing laboratories with which BESTSELLER has agreements. All components of a product must be tested separately. The laboratories follow fixed testing protocols for the various product categories, which are adapted to the materials used and the associated risk of the presence of material-specific chemicals.
- **Focus tests:** In addition to the standard tests, which are paid for by the suppliers, BESTSELLER has a testing programme where the company pays for testing of products and materials that, for example, give cause for concern. To gain an overview of any hidden use of PFAS for purposes other than water repellency, such as 'handfeel' or softness, BESTSELLER conducted a comprehensive test for total fluorine in over 1,000 materials in 2024. The test showed that PFAS was not an issue.
- **Tracing PFAS contamination:** It is the suppliers' responsibility to ensure that all subcontractors in the supply chain are aware of and comply with the RSL. If a chemical test reveals PFAS levels exceeding the limit of 50 ppm, the supplier is obliged to trace the source of the contamination and implement measures to prevent it from happening again. BESTSELLER and the supplier receive the test report simultaneously from the laboratory to rule out falsification of the report's results. BESTSELLER may offer to assist the supplier with the investigation or choose to draw on the laboratory's expertise to identify potential sources of contamination.
- **Collection and evaluation of test data:** BESTSELLER systematically collects data from all tests to evaluate where, how and on which materials failures may occur. The evaluation is used to adapt the testing programme and minimise the risk of failures.

Appendix A – Overview of PFAS use, product examples and risks

Textile and leather products

PFAS use: Textiles and leather may be produced or impregnated with PFAS to achieve water and sweat repellency, dirt and stain resistance, and durability under harsh conditions. Outdoor and workwear often have PFAS-based treatments to make them waterproof, flame-retardant and chemical-resistant. One indicator is the DWR (Durable Water Repellent) label, as DWR-treated textiles are traditionally based on fluorinated substances. However, PFAS-free DWR treatments are also available. Several labelling schemes and industry initiatives are working to promote alternatives without intentionally added PFAS, but there are still many products on the market with PFAS-based treatments.

Even textiles marketed as “PFAS-free” may contain PFAS. For example, a product may be treated with a coating that does not intentionally contain PFAS, but still have a waterproof, breathable PTFE (polytetrafluoroethylene) membrane inside. GORE-TEX® membranes have historically been PTFE-based (a PFAS polymer), but the manufacturer has recently developed PFAS-free membranes in some products. This means that you cannot automatically determine the PFAS content based on the brand name. Furthermore, components such as zips, mesh, drawstrings and fabric surface treatments (e.g. to provide a smoother surface or stretch) may contain PFAS without this being stated in the declaration.

Examples of textile and leather products containing PFAS:

- **Outdoor clothing:** Rainwear, shell jackets/trousers, skiwear, thermal clothing, coveralls, gloves, etc.
- **Footwear:** Water-repellent shoes and boots (including safety footwear).
- **Equipment:** Tents, tarpaulins, sailcloth, gazebos, pram covers, rucksacks, sleeping bags.
- **Home textiles:** Rugs, upholstery, tablecloths, curtains, shower curtains – particularly those that are stain-resistant.
- **Workwear and uniforms:** Fire-retardant or dirt-repellent workwear, safety clothing, uniforms.
- **Impregnating agents :** Sprays/products to make furniture, clothing and shoes water-repellent.

Risks and regulation: One can be exposed to PFAS and PFAS residues in textiles via the skin, whilst impregnation sprays can release PFAS into the respiratory tract whilst being applied. There is a focus on regulating PFAS in textiles, particularly in the EU, where the PFAS restriction proposal covers textile products. On 1 July 2025, a ban came into force in Denmark on PFAS in clothing, footwear and certain impregnation agents for consumers. The ban has a 12-month transition period, and therefore it will no longer be legal to import and sell these products after 1 July 2026, with the exception of existing stock, which may be sold until 1 January 2027.

[----- Link to overview -----](#)

Cookware

PFAS use: In cookware, PFAS are primarily used as non-stick coatings. The classic example is Teflon™ (PTFE) on frying pans and saucepans. PTFE is a fluoroplastic, which is itself a PFAS. There is increased awareness of PFAS in cookware, and several manufacturers are already marketing alternatives, e.g. ceramic coatings for frying pans. However, there are some product groups that are still primarily produced with PFAS coatings.

A pan with a Teflon/PTFE coating often has a matt dark grey surface, whereas a frying pan without deliberately added PFAS (e.g. polished stainless steel or ceramic coating) has a glossier finish. This can be used as a rule of thumb. Previously, PTFE coatings contained small amounts of PFOA, which is now banned (see below). There are [examples](#) (in Danish) of pans advertised as 'PFOA-free' but which are still made of PTFE and therefore still contain PFAS.

Examples of kitchenware containing PFAS:

- **Frying pans and saucepans:** Non-stick coating on the inside.
- **Electrical appliances:** waffle irons, toast/panini grills, air fryer baskets, rice cookers – often with non-stick surfaces.
- **Ovens and hobs:** Some baking trays and oven interiors have PTFE-based “easy-to-clean” coatings (though rarely). In addition, the electronics in ovens, hobs, fridges and kitchen appliances in general will contain PFAS.
- **Food-related equipment:** For example, vacuum sealers may contain PFAS in any Teflon-coated seals.

Risks and regulation: Since 2020, Denmark has banned PFAS in paper/cardboard food packaging, but PFAS (e.g. PTFE coatings) on cookware are still permitted and widespread. Globally, PFOA is banned as an auxiliary substance in the production of PTFE coatings (Stockholm Convention, 2020), partly because PFOA can migrate from the coating onto food when heated. Furthermore, there is a suspicion that if a PTFE coating is overheated (typically >260°C), it may break down into various short-chain PFAS, the toxicity of which is unknown.

[----- Link to overview -----](#)

Fire-fighting foam

PFAS use: Fire-fighting foam has for decades been based on PFAS due to their unique ability to smother fires in flammable liquids. PFAS-containing surfactants in the foam lower the surface tension, allowing the foam to spread rapidly and cover burning liquids with a dense film that prevents the supply of oxygen. This is highly effective for severe oil and petrol fires (Class B). Consequently, PFAS-containing foam has been the standard at airports, in the military, at petrochemical plants and in certain fire services.

Examples of fire extinguishing agents containing PFAS:

- **AFFF (Aqueous Film Forming Foam):** Standard fire foam for liquid fires.
- **AR-AFFF (alcohol-resistant foam):** For alcohols and polar liquids.
- **FFFP (fluoroprotein foam):** Combines proteins and PFAS.

- **Dry fire extinguishing powders:** Some types contain PFAS as an additive.

Risks and regulation: PFAS can contaminate soil, groundwater and the food chain around training grounds and incident sites, which can be transferred directly to humans. The use of PFAS-containing fire-fighting foam is [being phased out rapidly worldwide](#) (in Danish). Denmark has banned the use of PFAS-containing fire-fighting foam for training exercises, but it remains possible to use remaining stocks in the event of actual fires in specific circumstances. This exemption is expected to be phased out with the upcoming EU ban, meaning there will be a total ban on PFAS in firefighting foam for both training exercises and actual fires.

[----- Link to overview -----](#)

Construction products

PFAS use: PFAS are found in many building materials and components due to their combination of useful properties: extreme durability, UV resistance, heat and chemical resistance, as well as water, oil and dirt repellency. This makes them attractive for everything from surface treatments to additives in the building material itself, as PFAS can improve the product's performance and lifespan, for example by preventing paint from cracking, grout from discolouring, or concrete from cracking.

Examples of construction products containing PFAS:

- **Paint and varnish:** Dirt-repellent, weather-resistant.
- **Impregnation:** Stone, tiles, masonry, wood, cladding panels, roofing membranes.
- **Sealants:** Fluorine additives in sealants.
- **Insulation and foam:** Polyurethane containing PFAS.
- **Concrete additives:** PFAS-containing surfactants in lightweight concrete/floor levelling compounds.
- **Thread sealants:** PTFE tape, pipe thread pastes.
- **Roofing materials:** Fluoropolymer-coated roofing membranes/roofing felt.
- **Floor finishes:** Wax and polish for vinyl and stone floors.

Risks and regulation: PFAS in buildings may, over time, be released into the indoor environment, and dust in homes may originate from surfaces and materials containing PFAS. Long-term low-dose exposure of residents is a concern, as is leaching into soil and sewage, and the handling of waste during renovation or demolition. The EU's proposed restrictions on PFAS cover building materials.

[----- Link to overview -----](#)

Electronics

PFAS use: The electronics industry uses PFAS in many components due to their unique combination of properties: they are excellent electrical insulators, heat- and chemical-resistant, and can make surfaces water- and oil-repellent. Examples include printed circuit boards, where a thin layer of PFAS-based coating protects against moisture and dust, or cables, where PFAS plastics (e.g. PTFE, PVDF) are used as insulation that withstands high

temperatures and does not burn easily. PFAS are also used as dielectric fluids in certain capacitors and as coolants in high-performance computers.

In semiconductor production (microchips), PFAS are essential in manufacturing processes, for example in photolithography, where fluorinated substances ensure precise patterns by reducing surface tension and reflection during etching. Furthermore, PVDF (polyvinylidene fluoride) acts as a binder in lithium-ion batteries (electrode matrix), whilst anions such as TFSI are used as electrolytes for ion transport, making electric vehicle batteries a new focus area for the phase-out of PFAS.

Examples of electronic products containing PFAS:

- **Cables and wires:** Insulation and sheathing, particularly in cables that must be flame-retardant (LAN cables, coaxial cables).
- **Printed circuit boards (PCBs):** Solder masks and conformal coatings protect the circuit.
- **Semiconductors:** Photolithography chemicals (photoresists, etchants) contain PFAS; and equipment such as wafer holders may be PTFE-coated.
- **Screens and displays:** Anti-reflective and anti-fingerprint coatings on glass may contain fluoropolymers.
- **Sensors and connectors:** Some sensors use PFAS oil (e.g. PFPE) as a pressure-sensitive fluid; connectors may be coated for water repellency.
- **Cooling:** High-end computers, data centres and radar systems use PFAS-based coolants (e.g. 3M Fluorinert™ perfluorocarbon fluids) for direct electronics cooling.
- **Batteries:** PVDF and TFSI in battery cells.

Risks and regulation: During normal use, electronics release only very small amounts of PFAS, as the majority is encapsulated. Greater risks arise during production, when workers are exposed to PFAS-containing chemicals; during the dismantling and shredding of electronics, where PFAS can be released into the environment; and in the event of accidents, where overheating or fire in electronic equipment can release PFAS-containing fumes. The EU's proposed PFAS restrictions cover electronics.

[----- Link to overview -----](#)

Industrial machinery and equipment

PFAS use: In heavy industry, chemical plants and the energy sector, PFAS are used to ensure that equipment can withstand extreme conditions. This includes, for example, high temperatures, high pressure, corrosive chemicals, fuel, etc. PFAS are typically found in seals, gaskets and lubricants. For example, perfluoroelastomer O-rings (known by trade names such as Kalrez®, Viton, etc.) are indispensable in certain chemical processing plants, as they are not degraded by aggressive chemicals and heat. Similarly, PFAS-containing hydraulic fluids and oils are used in aviation and industry, as they remain stable under extreme stress.

Examples of industrial machinery and equipment containing PFAS:

- **Seals and gaskets:** PFAS rubber (e.g. FKM and FFKM) in O-rings, valve seals and flange gaskets, for example in the oil and gas industry and pharmaceutical production. These ensure no leaks even at +200 °C and in acids/alkalis.
- **Hoses and valves:** PTFE lining in hose tubes transports solvents and acids without reacting.
- **Machine lubricants:** Special high-temperature greases often contain PTFE or other fluoropolymers, as they reduce friction even at high temperatures and do not evaporate.
- **Pumps and compressors:** PFAS-based oils/fluids (e.g. PFPE oils) are used as compressor oil and coolant in, for example, vacuum pumps.
- **Fuel cells and energy:** PFAS membranes (Nafion™) are used in fuel cells and electrolysis plants due to their unique conductivity for certain ions and their stability.
- **Hydraulics and fluid systems:** PFAS-based hydraulic fluids are used in aircraft because they are highly flame-resistant and temperature-stable.
- **Surfactant processes:** PFAS-containing surfactants are added to some drilling fluids to improve recovery (foam stabilisation during oil/gas fracturing).

Risks and regulation: Although PFAS are typically contained within closed systems, risks arise when these systems are maintained or leak. Workers may be exposed by handling PFAS-containing oils or by subjecting equipment with fluorinated coatings to heat, for example during welding, which can release toxic gases. In addition, end-of-life parts (gaskets, oils) can contaminate waste streams. The EU's proposed PFAS restrictions cover industrial machinery and equipment.

[----- Link to overview -----](#)

Personal care products

PFAS use: In cosmetics and personal care products, PFAS are added primarily to provide water-repellent, long-lasting and smooth application properties. Fluorinated substances are most commonly found in cosmetics such as foundation, powder, concealer, eyeshadow, mascara, lipstick, etc., where they help the product to spread evenly, prevent smudging and ensure longer-lasting wear. PFAS may also be present in skin creams to make them water-repellent yet breathable, in sunscreens (as an excipient), in shaving products and dental floss, as PTFE dental floss glides more easily.

For cosmetic products, there is a requirement for full declaration of intentionally added substances, and it will therefore be possible to identify whether the cosmetic product contains PFAS. On the list of ingredients, look for names such as “PTFE”, “perfluoro”, “polyfluoro”, “fluorosilane”, etc. There may be cases where PFAS do not appear on the list, but only if they are present unintentionally, e.g. as contamination from manufacturing equipment.

Examples of personal care products containing PFAS:

- **Make-up:** Foundation, BB/CC creams, powder, concealer, waterproof mascara and eyeliner, lipsticks and lip gloss, certain nail varnishes and hair styling products (for shine and longevity).

- **Skin and hair products:** Long-lasting moisturisers and lotions, sun cream/spray, hair dye, shaving gel and aftershave.
- **Dental care:** Dental floss (PTFE-based 'glide' floss).
- **Others:** Make-up for children (e.g. face paint may contain PFAS to make it easy to wash off).

Risks and regulation: PFAS in cosmetics are applied directly to the skin, where they can be absorbed and contribute to the body's overall PFAS exposure. Some PFAS are relatively large molecules and are absorbed minimally, whilst others (such as methyl perfluorobutyl ether, PFHxA, etc.) – smaller molecules – can penetrate the skin or be ingested, for example from lipstick, which one typically “eats” some of. When cosmetics containing PFAS are washed off, these substances can end up in wastewater and the environment. Although the most problematic substances, such as PFOA and PFHxA, are now regulated in the EU, other PFAS are still available on the market. The EU's proposed restrictions on PFAS cover personal care products.

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Laboratory, medical and scientific equipment

PFAS use: Medical and laboratory equipment contains PFAS because it often needs to withstand sterilisation, be biocompatible and possess inertness (i.e. not react with samples or with the body). PFAS properties such as heat stability, chemical inertness and non-stick properties are utilised, for example, in surgical instruments with non-stick coatings and in implants, where a thin PTFE film can prevent inflammation. Certain diagnostic agents are also perfluorinated compounds. PFAS may be present in components and materials where it is not immediately visible or declared.

Examples of laboratory, medical and scientific equipment containing PFAS:

- **Implants:** Certain heart valves, stents and artificial blood vessels are made of PTFE (GORE-TEX® is also used in medical implants). PFAS coatings on implants can improve biocompatibility so that the body 'accepts' them more readily.
- **Wound care:** Some advanced dressings have a fluorine-based coating to repel external fluids whilst maintaining breathability.
- **Instruments:** Scalpels, forceps and needles may have a PTFE coating to reduce friction and make cleaning easier (non-stick).
- **Diagnostics:** PFAS are used as a component in certain MRI and ultrasound contrast agents, and perfluorocarbon fluids have been developed as blood substitutes for emergency transfusions (due to their high oxygen-carrying capacity).
- **Laboratory equipment:** PTFE-coated magnetic stirrers (the small white 'rods' in chemical flasks), PTFE tubing in laboratory pumps, sealing rings in centrifuges, etc. contain PFAS to withstand reagents and high temperatures. Furthermore, precision instruments such as chromatography equipment are often fitted with small PFAS components (gaskets, valves) to prevent leakage or reaction with samples.

- **Syringes and filters:** Disposable syringes may have a lubricating PFAS coating on the plunger, and alcohol filters and pipette tips may be treated to prevent liquid adhesion (to avoid sample residues).

Risks and regulation: A focus on patient safety and precision requirements may make PFAS more difficult to substitute. However, the risk with PFAS is that they may release small amounts to the patient (e.g. particles released from a PTFE implant), or cause contamination in laboratory samples if the equipment contains PFAS. Furthermore, end-of-life medical equipment containing PFAS can contaminate waste streams. A lack of alternatives means that regulation will be slower to come into effect, but research is being conducted into equipment without intentionally added PFAS, e.g. new types of dialysis membranes and fluorine-free nano-coatings. The EU's proposed PFAS restrictions cover laboratory, medical and scientific equipment.

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Adhesives, lubricants and sealants

PFAS use: Many glue products (adhesives), speciality lubricants and sealants contain PFAS as an additive. In adhesives, PFAS-containing surfactants are added in small quantities (usually <1%) to ensure the adhesive flows evenly and that wetting properties are optimal. This counteracts, among other things, foaming and ensures that the adhesive covers the entire surface before curing. In lubricants, PFAS is used to provide low friction (PTFE powder as a solid lubricant in, for example, dry lubricant sprays) and to resist degradation at high temperatures. In sealants (joint sealant, thread tape, etc.), PFAS provides water- and chemical-repellent properties and high durability. PFAS can be included in many product types without being clearly stated in the declaration.

Examples of adhesives, lubricants and sealants containing PFAS:

- **Adhesives and glues:** Industrial adhesives for materials such as wood, paper and plastic may contain fluorinated substances as surfactants. Examples include certain spray adhesives, floor adhesives, contact adhesives and epoxy adhesives. Pressure-sensitive adhesive systems (e.g. adhesives on labels and tape) may also contain PFAS to prevent them from sticking to production equipment.
- **Lubricants:** Lubricants, e.g. dry lubricant sprays for hinges and bicycle chains (bicycle oil), often contain PTFE powder (Teflon spray). Some engine oils and special-purpose greases contain fluorinated additives to withstand extreme loads (e.g. weapon lubrication, racing engines, high-temperature grease).
- **Sealants:** Pipe sealing tape (PTFE tape) is a polymeric PFAS. Thread sealants may contain powdered PTFE. Construction sealants may contain fluorine additives for mould and dirt repellency. Oil- and petrol-resistant gasket compounds (e.g. for car engines) may contain fluoropolymers to withstand contact with fuel.

Risks and regulation: These products are often used in open environments; for example, a dry lubricant is sprayed directly onto a chain, where excess spray may land on the ground. Spray adhesives may off-gas solvents and potentially PFAS, as these can be aerosolised and inhaled. Upon curing, PFAS are often bound within the matrix, but when disposing of, for example, adhesive residues, PFAS may be washed out. Food contact is a particular concern, as PFAS-containing adhesives may be used in packaging, and lubricants containing PFAS may

contaminate food-producing machinery. The EU's proposed restrictions on PFAS cover adhesives, lubricants and sealants.

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Refrigerants (refrigeration and air conditioning)

PFAS use: Many traditional refrigerants in fridges, freezers, air conditioning and heat pumps are fluorinated hydrocarbons, e.g. HFO gases such as HFO-1234yf or HFC gases such as R-134a, R-125, R-32 and others. These substances (F-gases) chemically belong to the PFAS family because they contain at least one fully fluorinated carbon. They were introduced as a replacement for ozone-depleting CFCs in the 1990s but proved to be potent greenhouse gases, which led to the development of HFOs, which are neither ozone-depleting nor have a high global warming potential.

Examples of refrigeration and air conditioning systems containing PFAS:

- **Passenger cars:** Many car manufacturers use the HFO refrigerant R-1234yf in air conditioning systems. This applies especially to electric cars, where the cooling system is also crucial for thermal management of the battery.
- **Lorries, buses and agricultural machinery:** Refrigerants such as R-134a and R-1234yf are used in HVAC systems in heavier vehicles to ensure driver comfort and safety.
- **Refrigerated transport:** Specialised refrigerated containers and trailers used for transporting food and medicines rely on F-gases such as R-134a and R-452A to maintain a stable temperature during transport.
- **Domestic heat pumps and air conditioning:** Refrigerants such as R-32 and various HFC/HFO blends are widely used in systems for private homes.
- **Industrial heat pumps and cooling systems (chillers):** Large-scale installations, such as in district heating systems or for industrial process cooling, use a wide range of PFAS refrigerants, including R-134a, R-407C and R-450. Some installations, e.g. in the chemical industry, require cooling down to -50 °C or lower, where there are currently few viable alternatives to F-gases.

Risks and regulation: During normal operation, refrigerants are contained, but leaks are not uncommon. Leaks release PFAS-based HFCs or HFOs directly into the atmosphere, where they contribute to global warming and, over time, break down into persistent fluorinated substances. When refrigeration systems are scrapped, there is a risk that the gas will not be recovered correctly. International agreements such as the Kigali Agreement and EU regulations (such as the F-Gas Regulation) are working to phase out and replace HFCs and other PFAS-based refrigerants with alternatives that have a lower environmental and climate impact. The EU's proposed restrictions on PFAS includes refrigerants.

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Toys

PFAS use: In toys, PFAS are not used intentionally, but they may be present in surface treatments and materials to make them water-, dirt- or stain-repellent. Soft toy textiles in particular (doll's clothes, stuffed animals, doll's prams, etc.) may be impregnated to resist stains, and these impregnations have traditionally contained PFAS. Outdoor toys such as

foam play mats, paddling pools and certain types of balls may also contain fluoropolymers to provide a smooth or weather-resistant surface.

Examples of toys containing PFAS:

- **Doll's clothes and soft toys:** If the fabric is 'stain-resistant' or water-repellent (feels slightly greasy/water beading), it may contain PFAS.
- **Paints/art supplies:** Certain finger paints and colouring books may contain fluorinated substances to make the paper water-repellent, preventing the paper from disintegrating from the wet paint.
- **"Magic sand" and slime:** Some types of play sand/slime may contain PFAS-containing surfactants to give a specific texture (suspected in some analyses).
- **Foam and plastic toys:** EVA foam floor tiles, children's gym mats, or pool noodles *may* contain PFAS as foam stabilisers or flame retardants, but again, it is difficult to know without testing. Inflatable toys (beach balls, etc.) may have a PFAS-based coating on the inside to make them airtight, but PVC itself is usually PFAS-free.

Risks and regulation: There is growing concern about children's exposure, as children are particularly sensitive and often put things in their mouths, which increases the exposure. There are yet no specific PFAS limits in toy legislation, but the EU is considering this in connection with the revision of the Toy Safety Directive. Toys are also included in the EU's proposed restrictions on PFAS.

Cleaning products

PFAS use: Fluorinated surfactants are used in certain cleaning products to enhance their effectiveness. By adding a small amount of surfactant, the surface tension of water can be reduced significantly, thereby enabling the cleaning product to wet the surface more effectively, penetrate small crevices and dissolve grease. A typical formulation might be an alkaline cleaning liquid containing approximately 0.01% anionic PFAS-containing surfactant. PFAS may be present in cleaning products without being declared.

Examples of cleaning products containing PFAS:

- **Industrial cleaning agents:** Metal scouring agents, strong degreasers and acidic/alkaline cleaners for industrial use may contain PFAS to ensure even coverage on greasy/oily surfaces.
- **Floor care:** Some floor waxes and polishes may contain perfluorocarboxylic acids as dirt-repellents.
- **Car care:** Car shampoo, wax and 'rain-repellent' products for windows may contain fluorinated substances. For example, 'Rain-X' in its original form was based on fluoropolymer (although newer formulations may have changed).
- **Electronics cleaning:** Specialised sprays for cleaning circuit boards or contacts (e.g. the 3M Novec™ line) consist almost entirely of fluorinated solvents, as these are designed to evaporate quickly without leaving residues.

- **Glass cleaner and anti-fog:** To avoid streaks on mirrors/windows and prevent fogging, certain products have used fluorinated substances. 'Compressed air' spray cans for cleaning keyboards often contain HFC-134a gas (a PFAS).
- **Household:** Common household products such as carpet/fabric cleaners in spray cans may contain PFAS.

Risks and regulation: Cleaning staff may be exposed via skin contact and inhalation. When PFAS-containing cleaning products are rinsed away, they end up in the aquatic environment. In indoor environments, PFAS from cleaning products can become part of house dust. Children and pets are particularly vulnerable, as they are close to the floor and often in contact with treated surfaces. The EU's proposed restrictions on PFAS cover cleaning products, and several manufacturers have already reformulated their products.

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Office supplies

PFAS use: Certain paper products and office supplies are treated to make them durable or stain resistant. For example, carbonless paper (self-copying paper) has historically used PFOS-based substances in its microcapsules.

Examples of office supplies containing PFAS:

- **Paper and notebooks:** Water-repellent notebooks (e.g. for field use), waterproof cards or envelopes may contain PFAS. Certain whiteboards, flipchart paper or laminates may also contain PFAS.
- **Office furniture:** Fabric upholstery on office chairs and partition screens may be stain-resistant and treated with PFAS. Similarly, certain mouse pads or desk mats may have an anti-stain coating.
- **Adhesive products:** Some labels and tape may contain fluorine in the adhesive to facilitate release from the roll.
- **Cleaning sprays:** 'Compressed air' products for cleaning keyboards/electronics are often made from HFC gas (1,1,1,2-tetrafluoroethane, R-134a), which is classified as a PFAS.
- **Ink and toner:** Ink and toner may contain PFAS-containing surfactants to improve printing properties, for example by reducing ink puddling on the printer nozzle.

Risks and regulation: There is a relatively low risk to user health, as one rarely comes into close contact with these chemicals in large quantities, but the environmental impact can be significant, as office waste can lead to large volumes of waste. Paper containing PFAS could, for example, contaminate recycled paper pulp or compost. Aerosol cans containing HFCs contribute to both the greenhouse effect and the spread of PFAS. The EU's proposed restrictions on PFAS cover office supplies.

Food packaging

PFAS use: PFAS have previously been used as a coating, particularly in paper and paperboard-based food packaging, to make it grease- and water-repellent, but since 2020

Denmark has had a ban on PFAS in disposable tableware and packaging made of paper and paperboard. However, this ban does not apply to non-paper and non-paperboard-based food packaging.

Examples of food packaging containing PFAS:

- **Fast food and takeaway packaging:** Burger wrappers, chip trays, sandwich paper, pizza boxes.
- **Baking and food paper:** Baking paper and muffin cups, bagel wraps, etc.
- **Microwave popcorn bags:** The inside of the bag has previously been treated with PFAS.
- **Paper plates and disposable tableware:** Some “compostable” paper plates have been surface-treated with PFAS.

Risks and regulation: The main risk lies in fatty foods and their packaging, as there is a higher likelihood of PFAS content and because fatty foods help to leach PFAS from the packaging into the food. When the packaging is thrown away or composted, PFAS are also released into the environment. Recycled paper can also become contaminated, which is why PFAS are now being found in, for example, recycled cardboard food boxes. Denmark was the first country to ban the entire PFAS group in cardboard/paper food packaging. However, there is an exception if the packaging has a functional barrier that prevents the migration of PFAS into the food. Consequently, the product may potentially contain PFAS despite the legislation.

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Non-food packaging

PFAS use: Non-food packaging may contain PFAS to achieve specific properties. Typically, fluorinated substances are used as barrier coatings (e.g. fluorinated varnishes on cardboard or plastic) to make the packaging impermeable to liquids, fats and chemicals. In addition, PFAS-based additives are used in anti-static coatings, e.g. on packaging for electronic components, to prevent the build-up of static electricity, as well as in dirt- and dust-repellent coatings on surfaces, so that the packaging does not attract dirt or stains.

Examples of non-food packaging containing PFAS:

- **Plastic containers for chemicals:** HDPE (high-density polyethylene) drums/barrels with a PFAS-coated interior to create a chemical and diffusion barrier.
- **Antistatic bags and wrappings:** For electronics, with a PFAS-coated surface to dissipate static electricity.
- **Water- and oil-repellent cardboard packaging:** Cardboard boxes/bags for tools and machine parts, as the PFAS coating prevents the penetration of grease, oil or water.
- **Cosmetics and personal care product packaging:** Pump bottles, spray cans, and cream tubes containing PFAS components to ensure smooth glide (low friction) and prevent oil- or chemical-containing products from reacting with the packaging (extending shelf life).

- **Industrial packaging solutions:** Shrink film, tarpaulins, lining materials treated with PFAS to withstand harsh weather, chemical splashes, high heat or long-term storage.

Risks and regulation: Risks associated with PFAS include migration and contamination of the contents, occupational and user exposure, contamination in the recycling system, and environmental impact during disposal. There is a global trend towards phasing out PFAS in packaging, and the EU's proposed PFAS restrictions cover packaging with only a few essential exceptions.

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Appendix B – Letter template for supplier dialogue

Dear [supplier],

At [company name], we strive to be at the forefront of upcoming EU legal requirements to restrict the use of PFAS, which is expected to be adopted in 2027. Therefore, we ask you to inform us whether [the product] contains PFAS.

Some PFAS are already banned or restricted in the EU, including [PFOS](#), [PFOA](#), [PFHxS](#) and [C9-C14 PFCA](#), but all other PFAS are within the scope of being banned under the new EU restriction proposal.

PFAS (Per- and polyfluoroalkyl substances) are defined as all chemical substances that contain at least one perfluorinated methyl group ($-CF_3$) or one polyfluorinated methylene group ($-CF_2-$).

[Insert here: Industry-specific text, e.g. from the table below and/or specific examples of PFAS materials and products from Chapter 3]

If you do not know whether [the product] contains PFAS, please ask your suppliers if they use PFAS in the manufacture of the product.

See the PFAS restriction proposal here: <https://echa.europa.eu/da/restrictions-under-consideration/-/substance-rev/72301/term>

Please reply in writing by [dd.mm.yyyy].

Kind regards,

[xxxxx]

Procurement Department	Suggested text
Textile and leather products	PFAS are often used in textile and leather products to achieve water- and dirt-repellent properties or breathable, waterproof membranes (e.g. PTFE). Typical products containing PFAS include outerwear (rain and ski wear), workwear, footwear, outdoor equipment (tents, rucksacks), upholstery fabrics and carpets.
Cookware	In cookware, PFAS are primarily used for non-stick surfaces, particularly Teflon/PTFE coatings. Products include frying pans, saucepans, waffle irons, toasters, air fryers, ovens, hobs and kitchen worktops.
Fire-fighting foam	PFAS are found particularly in foam-forming films (AFFF) for fire-fighting, where they reduce surface tension and improve fire extinguishing, e.g. in fire training foam, foam for liquid fires and foam extinguishers.
Building materials	PFAS are used in building materials to provide weather, water and dirt resistance, as well as increased durability against UV, heat and chemicals. Typical products include roofing materials, sealants, paints, varnishes, adhesives, floor polishes, insulation and plumbing tape.
Electronics	In electronics, PFAS are used for insulation, fire retardancy, conductivity and chemical/thermal stability. For example, in cables, wires, printed circuit boards, semiconductors, electronic components and coolants.
Industrial equipment	PFAS ensure high chemical and heat resistance, lubricity and sealing functions in harsh environments, and are therefore used in, for example, pumps, valves, gaskets, O-rings, chemical hoses and turbine lubricants.
Personal care products	PFAS are added to provide water and oil repellency, long shelf life and a smooth texture, and can therefore be found in, for example, make-up, skin cream, sun cream, hair products, dental floss and shaving foam.
Laboratory and medical equipment	PFAS are used for non-stick surfaces, sterilisation and biocompatibility, for example in implants, surgical instruments, catheters, medical tubing and laboratory containers.
Adhesives and lubricants	PFAS reduce surface tension, provide low friction and chemical resistance, and are used in, for example, adhesives, thread-sealing tape and speciality greases.
Refrigerants	PFAS-based gases are used for cooling and freezing applications, e.g. in refrigerators, air conditioning, heat pumps and refrigerated lorries.
Toys	PFAS may be used in dirt- and water-repellent surface treatments or softening coatings in, for example, textile parts on toys, foam pads and water-repellent toys.
Cleaning products	PFAS are added to industrial cleaning products to improve cleaning performance by reducing surface tension, and may be found in, for example, carpet cleaners, car wax, glass cleaners, floor polishes and degreasers.
Office supplies	PFAS are used to make paper, ink and toner water- and oil-repellent and in friction-reducing sprays, for example in carbonless copy paper, notepads, ink, compressed air and upholstery fabric.
Food packaging	PFAS are banned in food packaging in Denmark but may still be present in packaging that is not in direct contact with the food. Furthermore, food packaging from other countries may contain PFAS.
Non-food packaging	PFAS are used as fluorinated barrier coatings and for dirt-repellent coatings in packaging for electronics, tools, cosmetics, chemicals and industrial equipment.

Appendix C – Proposed requirements for procurement

This appendix contains proposals for specific requirements regarding PFAS that can be used in procurement contracts, and which actively seek to stay ahead of upcoming legislation. It is important to note that these requirements are only meaningful as long as there is no ban on the use of PFAS, and it is therefore important to keep up to date with the status of the EU's proposed restrictions on PFAS.

Definitions and explanations used

Category	Type	Purpose
Requirements	“Fixed requirements” that tenderers must meet and price (must be included in the tender).	Typically used where alternatives without intentionally added PFAS are common and functional. These requirements aim to prohibit the intentional addition of PFAS.
Evaluation criteria	Competition parameters (sub- and partial criteria) which tenders may (but are not required to) meet. Compliance is included in the evaluation of tenders.	Applied where alternatives are limited, under development, or where PFAS are used for critical functions. The focus here is on transparency, minimisation and/or a planned phase-out.
Contract terms	“Fixed requirements” which tenderers must fulfil progressively during the contract period.	If Evaluation Criteria or Contract Terms are applied, the contract must include penalty clauses that enable the supplier's obligations to be enforced. To the extent that contract terms are applied which allow for the replacement of products during the contract period, the contractual framework for such replacement must be described.
Documentation	Supports Requirements, Evaluation Criteria, Contract Terms	Specifies how the supplier must demonstrate compliance with Requirements, Evaluation Criteria or Contract Terms.

Important: All requirement formulations are suggestions and should always be adapted to the specific procurement situation and the product's intended use.

The requirements are divided by procurement areas and consider whether there are commonly available alternatives on the market without intentionally added PFAS. Please also note the following:

- **Definition of PFAS:** All references to PFAS cover (unless otherwise specifically stated) the broad definition from the OECD (2021): “Fluorinated substances containing at least one fully fluorinated methyl (-CF₃) or methylene (-CF₂-) carbon atom (without

H/Cl/Br/I attached)". It is recommended that the definition used be specified in the agreement.

- **Limit values:** The limit values mentioned (e.g. 50 ppm total organic fluorine (TOF)) are examples and should be set specifically based on the specific context, limitations of testing methods and industry standards. Lower values (e.g. 20 ppm) may be considered to minimise the risk of unintentional contamination.
- **Unintentional contamination:** Although deliberate addition is prohibited, traces of PFAS may occur due to contamination in the production process (see box below). It is therefore important to engage in dialogue with the supplier regarding their processes to minimise this.
- **Dynamic market:** Alternatives are constantly being developed, and requirements should therefore be reviewed regularly to reflect technological developments. Innovation clauses (see Chapter 4) may be useful.

PFAS in products without deliberate addition

Even if a product is not manufactured with the deliberate use of PFAS, it may still contain PFAS as a result of unintentional contamination in the value chain or background contamination in natural resources. This can occur in two ways:

1. Unintentional process contamination (can often be prevented)

Example: A subcontractor switches from a PFAS-containing impregnation to a product without intentionally added PFAS in a treatment tank, but does not clean the tank thoroughly between changes. Consequently, PFAS residues remain in the equipment and are transferred to products that would otherwise be PFAS-free. This form of unintentional contamination can typically be avoided or minimised through clear dialogue and requirements for systematic cleaning and inspection at the relevant stages of the supplier's supply chain.

2. Background contamination (difficult or impossible to avoid)

Products may contain PFAS from their natural raw materials (e.g. wood, cotton) if these grow in a PFAS-contaminated environment, or because the raw materials have been washed in PFAS-contaminated water. This is known as background contamination from bioaccumulation and can be difficult or impossible for companies to eliminate. Background contamination is therefore primarily limited through assessment of the origin of raw materials and, if necessary, requirements for additional purification of resources (e.g. water).

Note that analytical methods cannot distinguish between PFAS that have been intentionally added, occur as background contamination, or result from unintentional contamination. Therefore, even products without intentionally added PFAS may contain measurable traces when tested. You should therefore focus both on avoiding active addition and on reducing the risks of unintentional occurrence.

The following very rough rule of thumb can be used to provide an overview of what different concentrations may indicate:

- Over 100 ppm (mg F/kg) is often an indication of intentionally added PFAS or significant process contamination
- Between 1–100 ppm (mg F/kg) may indicate process contamination, and in rare cases, intentionally added PFAS
- Less than 1 ppm (mg F/kg) may indicate background contamination or mild process contamination

1. Textile and leather products *(Alternatives are widely available for DWR, and increasingly for membranes. Certifications are widespread.)*

- **Requirements (general):**

- "The product (including all components such as fabric, thread, zips, buttons) must not contain intentionally added PFAS, or PFAS in concentrations greater than 50 ppm. The ban covers any water-, dirt- or oil-repellent treatments (e.g. DWR) and any waterproof/breathable membranes (e.g. PTFE-based)."
- **Documentation (select one or more relevant options):**
 - a) Valid certificate for STANDARD 100 by OEKO-TEX (relevant product class), the EU Flower (for textile impregnation), the Nordic Swan Ecolabel or equivalent recognised third-party certification. Please note that certain certifications only cover specific product components or processes.
 - b) Test report from an accredited laboratory for Total Organic Fluorine (TOF) analysis (<50 ppm) on representative material samples.
 - c) Supplier declaration confirming the absence of intentionally added PFAS, supplemented with information (e.g. trade name, CAS number if possible) on the alternative technology used for any water/stain repellency or membrane.

- **Evaluation criterion (for high-performance/specialised products where alternatives are not commonly available):**

- "The contracting authority wishes, as far as possible, to purchase products that do not contain PFAS. The tenderer must therefore provide a detailed account in the tender of any use of PFAS in the product (type, function, component). When evaluating the tenders, the contracting authority will make an overall assessment of the tender's compliance with the contracting authority's wish to avoid PFAS as far as possible, whereby the contracting authority will apply the following approach in the evaluation: (A) Documented absence of PFAS in the products is preferred (i.e. evaluated most favourably). (B) The use of the least harmful PFAS alternatives (e.g. short-chain vs. long-chain, non-polymeric vs. polymeric, if relevant) and finally (C) an ambitious, credible phase-out plan with an associated timeframe and milestones will be evaluated positively (but less positively than (A) and (B) respectively)."
- **Documentation:** Detailed material declaration, test reports (TOF, possibly specific PFAS), phase-out plan – depending on what the tender covers.

2. Cookware (*Good alternatives without intentionally added PFAS (e.g. ceramic, steel, cast iron) are widely available.*)

- **Requirements:**

- "The product's surface that comes into contact with food (e.g. non-stick coating) must not contain intentionally added PFAS, including Teflon/PTFE (polytetrafluoroethylene)."
- **Documentation:** Supplier's declaration specifying the type of non-stick coating (e.g. ceramic, silicone-based, stainless steel, cast iron) and confirming that the product's surface is free from intentionally added PFAS.

3. Fire-fighting foam (*Fluorine-free (F3) alternatives are available and are increasingly becoming the standard, particularly for training and general Class B fires. The use of PFAS in fire-fighting foam is now specifically regulated in REACH, Annex XVII, entry 82, by Regulation (EU) 2025/1988.*)

- **Requirements (particularly for training foam and new purchases for most purposes):**

- "The product must not contain intentionally added PFAS in the fire-fighting foam. Only fluorine-free fire-fighting foams (F3 foams) may be supplied, such that the ready-to-use foam solution contains less than 1 mg/L for the sum of all PFAS, cf. REACH Annex XVII, entry 82."
- Existing and specific applications (only where PFAS remain lawful under Annex XVII, entry 82 – e.g. certain Seveso sites, offshore installations, military vessels and selected civilian ships):
If PFAS-containing foam continues to be used, the supplier must:
 - document that the use is covered by a valid transitional provision in REACH Annex XVII, entry 82, and specify the relevant expiry date
 - ensure that the foam is used only for Class B fires
 - draw up and maintain a PFAS management plan for use, collection, treatment/'adequate treatment' and phase-out to fluorine-free foams in accordance with the transitional deadlines.
- **Documentation:**
 - a) Supplier's declaration that the foam is fluorine-free (F3) and that the total PFAS content in the ready-to-use solution is < 1 mg/L, cf. REACH Annex XVII, entry 82, as well as any test report (TOF/TF).
 - b) For PFAS-containing foam during lawful transition periods: a copy of the PFAS management plan and documentation confirming that the specific application is covered by a transitional provision in Annex XVII, entry 82.

4. Building materials (*Alternatives are available for many standard products (paint, sealant), but PFAS may be hidden in speciality products or as additives.*)

- **Requirements (for standard products such as interior paint, standard sealants, standard plumbing tape alternatives):**

- "The product [specify type, e.g. interior wall paint, sanitary sealant] must not contain intentionally added PFAS."

- **Documentation:**
 - a) Valid Nordic Swan Ecolabel certificate or equivalent recognised third-party certification.
 - b) Supplier declaration confirming the absence of intentionally added PFAS, possibly supplemented with information on the chemistry used (e.g. “silicone-based without fluorine additives”). For plumbing tape: Require an alternative to PTFE tape (e.g. hemp and packing grease) where possible.
- **Evaluation criterion (for high-performance facade paint/coating, special sealants, impregnation, roof membranes, PTFE tape):**
 - “The contracting authority wishes, as far as possible, to purchase products/materials that do not contain PFAS. The tenderer must therefore declare in the tender all PFAS intentionally added to the product (type, concentration, function). When evaluating the tenders, the contracting authority will make an overall assessment of the tender’s compliance with the contracting authority’s wish to avoid PFAS as far as possible, applying the following approach: (A) Documented absence of PFAS in the products is preferred (i.e. receives the highest evaluation). (B) The use of the least harmful PFAS alternatives (e.g. short-chain vs. long-chain, non-polymeric vs. polymeric, if relevant) and finally (C) an ambitious, credible phase-out plan with associated timelines and milestones will be evaluated positively (but less positively than (A) and (B) respectively).”
 - **Contract terms:** “If PFAS are used, the supplier must report annually on the status of the development and implementation of alternatives without intentionally added PFAS for the application in question.”
 - **Documentation:** Detailed product data sheet/safety data sheet (subject to the limitations of the SDS), supplier’s declaration with specific PFAS information, possibly TOF testing, substitution/phase-out plan – depending on the scope of the tender/contract.

5. Electronics *(PFAS are often critical for functionality (semiconductors, batteries, insulation), and for many core applications there are very limited alternatives.)*

- **Requirements (focus on areas with known alternatives):**
 - “Enclosures, external cables and power supply cables must not contain intentionally added PFAS as flame retardants or insulation material, unless the tenderer can demonstrate to the contracting authority that no alternatives meet the specific requirements for flame-retardant properties set for the specific application.”
 - **Documentation:** Supplier’s declaration confirming the absence of intentionally added PFAS in the parts mentioned, possibly with reference to TCO Certified.
- **Evaluation criterion (general):**
 - “The contracting authority wishes, as far as possible, to purchase products/materials that do not contain PFAS. The tenderer must therefore provide in the tender a declaration regarding known, intentionally added PFAS in the product’s main components (e.g. printed circuit boards, semiconductors, batteries, internal cables, cooling systems) based on information from subcontractors. The declaration must specify the type of PFAS (if known) and its function. When evaluating the tenders, the contracting authority will make an overall assessment of the tender’s compliance with the contracting authority’s

wish to avoid PFAS as far as possible, applying the following approach: The lowest possible use of PFAS in the products is preferred (i.e. receives the highest score). The next best option is an ambitious and credible plan for PFAS reduction and substitution during the contract period."

- **Contract terms:** "The supplier must update the PFAS declaration for the supplied product models annually and report on progress in the substitution work in accordance with the submitted plan."
- **Documentation:** PFAS declaration (may be at a general component level), phase-out/substitution plan, possibly a TCO Certified certificate (which includes requirements for PFAS reporting and reduction).

6. Industrial equipment (Pumps, valves, hoses, lubricants) *(PFAS, particularly PTFE, FKM, FFKM, PFPE, are used for critical functions in demanding environments. Alternatives are available for less demanding applications.)*

- **Requirements (for standard/less demanding applications):**

- "Components such as O-rings, gaskets and hoses for use at moderate temperatures (< [e.g. 150°C]) and with non-aggressive chemicals [specify types if applicable] must not contain intentionally added PFAS (e.g. FKM, FFKM, PTFE). Standard lubricants for general use must not contain intentionally added PFAS (e.g. PTFE powder)."
- **Documentation:** Material specifications confirming the use of alternative materials (e.g. EPDM, NBR, silicone). Supplier's declaration for lubricants confirming the absence of intentionally added PFAS.

- **Evaluation criterion (for demanding applications):**

- "The contracting authority wishes, as far as possible, to purchase products/materials that do not contain PFAS. The tenderer must therefore provide in the tender a declaration of known, intentionally added PFAS in the products (type, concentration, function, specific component) based on information from subcontractors. The declaration must specify the PFAS type (if known) and function. When evaluating the tenders, the contracting authority will make an overall assessment of the tender's compliance with the contracting authority's wish to avoid PFAS to the greatest extent possible, applying the following approach: The lowest possible use of PFAS in the products is preferred (i.e. receives the highest evaluation). The next best option is an ambitious and credible plan for PFAS reduction and substitution during the contract period."
- **Contract terms:** "The supplier must continuously investigate and report annually on the possibility of substituting PFAS-containing components with alternatives without intentionally added PFAS, once these become technically and commercially available."
- **Documentation:** Detailed material declaration focusing on wear parts (gaskets, seals, hoses, lubricants) and technical justification for the use of PFAS.

7. Personal care products *(Alternatives are widely available. Direct skin contact increases the emphasis on the precautionary principle.)*

- **Requirements:**

- "The product must not contain intentionally added PFAS. Ingredients containing 'fluoro', 'perfluoro' or 'PTFE' as well as other PFAS-related names in the INCI name must not be used."
- **Documentation:**
 - a) Valid certificate for the Nordic Swan Ecolabel, EU Flower, Ecocert, COSMOS or equivalent recognised third-party certification.
 - b) Test report from an accredited laboratory for Total Organic Fluorine (TOF) analysis (<50 ppm) on representative material samples.
 - c) Full list of ingredients for the product (there is a legal requirement that cosmetic products must have a full INCI list available to the consumer), supplemented where applicable by a supplier's declaration confirming the absence of intentionally added PFAS.
 - d) For dental floss: Confirmation that it is not PTFE-based.

8. Laboratory and medical equipment *(PFAS are often used for critical functions (inertness, biocompatibility, non-stick properties, sterilisability). Alternatives are very limited and subject to strict regulatory approval.)*

- **Requirements:**

- "The tenderer must declare all intentionally added PFAS in the product or its components. The declaration must include the PFAS type (if known), the specific component, and the function of the PFAS. For medical devices (particularly implants and devices for invasive use), the use of PFAS must be justified by essential requirements for function, safety and biocompatibility, where no approved and equivalent alternatives without intentionally added PFAS exist."

- **Evaluation criterion:**

- "The contracting authority wishes, as far as possible, to purchase products/materials that do not contain PFAS. The tenderer must therefore provide a declaration in the tender regarding known, intentionally added PFAS in the products (type, concentration, function, specific component) based on information from subcontractors. The declaration must specify the PFAS type (if known) and function. When evaluating the tenders, the contracting authority will make an overall assessment of the tender's compliance with the contracting authority's wish to avoid PFAS to the greatest extent possible, applying the following approach: The lowest possible use of PFAS in the products is preferred (i.e. receives the highest evaluation). The next best option is an ambitious and credible plan for PFAS reduction and substitution during the contract period."
- **Contract terms:** "The supplier must actively monitor the development of alternatives without intentionally added PFAS within the relevant product area. Additionally, they must inform the contracting authority annually of potential substitution options that meet all necessary regulatory and functional requirements."

- **Documentation:** Detailed material declaration from the manufacturer and technical justification for the use of PFAS (particularly for medical devices). Supplier's declaration confirming the absence of intentionally added PFAS, where possible in laboratory equipment.

9. Adhesives and lubricants *(Alternatives are available for many standard applications.)*

- **Requirements (for standard products):**
 - "General adhesives (e.g. wood glue, paper glue, standard contact adhesive) and general lubricants (e.g. multi-purpose oil, standard grease) must not contain intentionally added PFAS (neither as an additive nor as a main component, e.g. PTFE or PFPE)."
 - **Documentation:** Supplier's declaration confirming the absence of intentionally added PFAS. A product safety data sheet (SDS) for the product may be attached, but is not sufficient on its own, as PFAS may be added in quantities not required to be disclosed in the SDS. Alternatively, a test report from TOF measurement (<50 ppm).
- **Evaluation criterion (for speciality products such as PTFE spray, PTFE tape, high-temperature grease):**
 - "The contracting authority wishes, as far as possible, to purchase products/materials that do not contain PFAS. The tenderer must therefore include in the tender a declaration of any known, intentionally added PFAS in the products (type, concentration, function, specific component) based on information from subcontractors. The declaration must specify the type of PFAS (if known) and its function. When evaluating the tenders, the contracting authority will make an overall assessment of the tender's compliance with the contracting authority's wish to avoid PFAS as far as possible, applying the following approach: The lowest possible use of PFAS in the products is preferred (i.e. receives the highest evaluation). The next best option is an ambitious and credible plan for PFAS reduction and substitution during the contract period."
 - **Contract terms:** "The supplier must continuously offer and provide information on alternatives without intentionally added PFAS (e.g. graphite-/MoS₂-based dry lubrication, bio-based oils), if alternatives exist for the application in question."
 - **Documentation:** Safety Data Sheet (SDS) with full material declaration, supplier's declaration with PFAS specification and justification for the use, as well as information on available alternatives without intentionally added PFAS.

10. Refrigerants (in new equipment) *(Natural and low-GWP alternatives are standard in most new equipment.)*

- **Requirements (for new refrigeration, air conditioning and heat pump equipment):**
 - "The equipment must use a refrigerant that is not a PFAS and has a Global Warming Potential (GWP) of less than 150 (or a lower specified limit). This excludes the use of several HFCs, HFOs and PFCs. Natural refrigerants such as propane (R-290), isobutane (R-600a), CO₂ (R-744) or ammonia (R-717) are preferred." (Note: Some HFOs have a low GWP but are still PFAS – the requirement may be adjusted to permit only *non-fluorinated* low-GWP refrigerants).

- **Documentation:** Nameplate or technical data sheet for the equipment, clearly stating the refrigerant type (e.g. R-290) and GWP value.

11. Toys *(PFAS are typically not necessary for function and should be avoided due to children's vulnerability.)*

- **Requirements:**

- "The toy (including all materials, textiles and surface treatments) must not contain intentionally added PFAS."
- **Documentation:**
 - a) Valid certificate for the Nordic Swan Ecolabel, the EU Ecolabel, OEKO-TEX Standard 100 for textile components, or equivalent recognised third-party certification.
 - b) Test report from an accredited laboratory for Total Organic Fluorine (TOF) analysis (<50 ppm) on representative material samples.
 - c) Supplier declaration confirming the absence of intentionally added PFAS.

12. Cleaning products *(Alternatives and eco-labelled products are widely available.)*

- **Requirements:**

- "The cleaning product must not contain intentionally added PFAS (surfactants or other fluorinated ingredients). Aerosol products (e.g. 'compressed air' for cleaning) must not contain PFAS-based propellants."
- **Documentation:**
 - a) Valid certificate for the Nordic Swan Ecolabel, EU Ecolabel, Green Seal, Safer Choice or equivalent recognised third-party certification.
 - b) Supplier declaration confirming the absence of intentionally added PFAS and HFC propellants, supported by a full list of ingredients. There is a legal requirement for the company to make a full INCI list available.

13. Office supplies and furniture *(Alternatives and eco-labelled products are widely available.)*

- **Requirements:**

- "Standard office supplies (paper, envelopes, notepads, ink, toner) must not contain intentionally added PFAS. Aerosol sprays ('compressed air') must not contain PFAS-based propellants. For office furniture with textile upholstery, please refer to the requirements under section 1 (Textile and leather products)."
- **Documentation:**
 - a) For paper: Valid certificate for the Nordic Swan Ecolabel, the EU Flower, the Blue Angel or equivalent recognised third-party certification.
 - b) For textiles: See section 1.
 - c) Supplier's declaration confirming the absence of intentionally added PFAS.

- **Evaluation criterion (for speciality paper, e.g. waterproof):**

- "The contracting authority wishes to avoid intentionally added PFAS in the products to the greatest extent possible. If speciality paper with water- and stain-repellent properties is offered, the tenderer must therefore declare whether PFAS has been used. When evaluating the tenders, the contracting authority will place

emphasis on the extent to which the tender documents the absence of intentionally added PFAS in the products offered.”

- **Documentation:** Supplier’s declaration specifying the technology used.

14. Food packaging (paper/cardboard) *(PFAS in paper/cardboard intended for food contact is prohibited in Denmark. Focus on compliance, particularly for imports.)*

- **Requirements:**

- "The packaging must comply with the requirements of Executive Order No. 681 of 25 May 2020 on the prohibition of PFAS in food contact materials made of paper and cardboard."
- **Documentation:**
 - a) Supplier’s declaration (“Declaration of Compliance”) explicitly confirming compliance with the Danish Executive Order.
 - b) Supplementary/in case of doubt: Test report from an accredited laboratory for Total Fluorine (TF) or Total Organic Fluorine (TOF) (< 20 µg F/g TOF, as an indicator of the absence of intentional addition).

15. Non-food packaging *(Alternatives and eco-labelled products are available.)*

- **Requirements (general and for plastics):**

- "The packaging must not contain intentionally added PFAS. Plastic packaging (e.g. cans, bottles) must not be surface treated with fluorine (e.g. plasma fluorination)."
- **Documentation:**
 - a) Valid Cradle to Cradle certificate, or equivalent recognised third-party certification.
 - b) Supplier declaration confirming the absence of intentionally added PFAS. For plastics: Explicit confirmation that fluorination has not been used.

- **Evaluation criterion (where specific barrier/antistatic properties are required):**

- "If the packaging requires special barrier or antistatic properties, the supplier must declare any use of PFAS (type, function) and the use must be justified. The contracting authority wishes to avoid intentionally added PFAS as far as possible (e.g. by using multilayer plastic with an EVOH barrier, non-fluorinated antistatic additives). When evaluating the tenders, the contracting authority will place emphasis on the extent to which the tender/the products offered contain intentionally added PFAS."
- **Contract terms:** The supplier must investigate and propose alternatives without intentionally added PFAS during the contract period.
- **Documentation:** Material specifications, technical justification for the use of PFAS and information on alternatives.

Appendix D – Overview of tenders for capacity building on PFAS

The Danish Technological Institute	The Danish Technological Institute, a Danish consultancy firm, offers various courses and materials relating to PFAS. These include a report examining Danish companies' use of PFAS and how to avoid PFAS, as well as the Danish Environmental Protection Agency's PFAS partnerships with industry , which aim to accelerate the minimisation and phase-out of PFAS in companies.
Enhesa	Enhesa offers a wide range of free and accessible resources on PFAS, including webinars, articles and tools for capacity building. The webinar on supply chain management is particularly recommended, but you should also search for "PFAS" using the website's search function to find up-to-date guidance, checklists and analyses across various industries.
RISE	The Swedish research institute RISE disseminates knowledge through reports, webinars and case studies on PFAS, with a particular focus on textiles, food contact materials and consumer products. The material ranges from basic introductions to in-depth technical analyses and potential substitution solutions.
ECHA's PFAS restriction proposal	The European Chemicals Agency (ECHA) has drawn up a detailed proposal on the restriction of PFAS. The document, including Annex A and the Annex XV report, provides both a thorough overview of PFAS and the regulatory status, as well as a sector-specific review of the use of and alternatives to PFAS, and serves as a valuable reference for companies and organisations wishing to understand current and upcoming regulations.
Assent	Assent, a US consultancy firm specialising in sustainability and supplier collaboration, offers white papers , guides and webinars on PFAS – with a particular focus on engaging and educating industrial supply chains.
AFIRM	The AFIRM Group is an international platform aimed at the textile and clothing industry. AFIRM offers guidelines, manuals, lists of chemical requirements and tools for communicating with suppliers. Many resources are available in multiple languages and help companies comply with international requirements for PFAS and other chemicals.
OECD	The OECD collects and shares global knowledge on PFAS through its comprehensive reports, lists of existing and new PFAS substances, case studies, and best practices for risk assessment, regulation and substitution options. The OECD's website serves as an international reference and source of up-to-date statistics and policy developments.
ChemSec	The Swedish NGO ChemSec develops and maintains, among other things, the SIN list , which covers undesirable chemicals including PFAS, as well as the Marketplace . ChemSec offers practical tools, business guides and analyses that help organisations identify and substitute harmful PFAS substances in products and supply chains.
ZeroPM	ZeroPM is a European research project focused on preventing, detecting and phasing out PFAS and other persistent, mobile chemicals. The project brings together knowledge, practical case studies and tools for identifying and managing PFAS contamination. ZeroPM's website offers, among other things, guidance, policy briefs and examples of solutions and substitution.
ZeroF	ZeroF is an EU and SERI-funded project developing safe and sustainable alternatives to PFAS in food packaging and furniture textiles. The project focuses on new coating technologies that can replace PFAS substances throughout the value chain and regularly shares knowledge and results.
PFAS Central	PFAS Central brings together international news, scientific articles, educational materials and practical guides on PFAS. The service is run by the Green Science Policy Institute, USA, and is a useful reference resource for both professionals and non-specialists.
PRIO	The Swedish Chemicals Agency (KEMI) has developed a tool to help identify and replace hazardous substances. It contains a database of over 11,000 PFAS, where it is possible to check whether products contain PFAS by searching for CAS numbers. The tool also includes a step-by-step guide to phasing out problematic chemicals.

Appendix E – Overview of testing methods for PFAS

Documenting the absence or presence of PFAS in products requires laboratory testing, but it is crucial to choose the right test method for the purpose. There are three main approaches to analysing PFAS, and the choice has a significant impact on cost, the value of the documentation and limitations. As the analytical industry is rapidly developing new and updated methods, it is recommended that for product categories with contractual requirements, reference be made to (or compliance with) the latest of the relevant standards, and that the order be clear so that the supplier and laboratory are in agreement on the purpose and method.

Total Organic Fluorine (TOF)/Total Fluorine (TF)

Purpose: Rapid screening for the total amount of organic fluorine compounds in a material or product – a good indicator of whether PFAS are generally present.

Relevant standards: EN 14582:2016; DIN 38409-59; ASTM D7359-23. The most commonly used methods employ the CIC method.

Advantages:

- Relatively inexpensive analysis and well-suited to large-scale screening.
- Suitable for investigating whether PFAS are highly likely to be present in moderate or high concentrations – typically above 10–50 ppm (mg/kg).

Disadvantages:

- Cannot identify which type of PFAS is present.
- Cannot distinguish between regulated and unregulated PFAS.
- By default, TOF analyses are not sensitive enough to demonstrate compliance with limit values for the lowest permitted specific PFAS (e.g. PFOA, PFOS).

Note: Many suppliers associate PFAS testing with the much more expensive targeted tests and may be surprised by the lower price of TOF.

Extractable/Leachable Organic Fluorine (EOF)

Purpose: To measure how much PFAS can be extracted or released from a product upon contact with liquid – relevant for assessing potential environmental/user impact during use.

Relevant standards: EN 17681-1:2022; ISO 23702-1:2018.

Advantages:

- Provides a better assessment of what can actually be released from a product, e.g. during use, washing, or contact with water/food.

Disadvantages:

- Tests only those PFAS that are “extractable” – polymeric PFAS (e.g. PTFE/Teflon) are typically not detected as they do not dissolve.
- May require advanced and varied extraction conditions, making results difficult to compare without a clear method.

Targeted Analysis (LC-MS/MS)

Purpose: Precise measurement of one (or more) specific PFAS substances, often those subject to regulatory limits (e.g. PFOA, PFOS, PFHxS or C9–C14 PFCA). Typically operates via liquid chromatography coupled with mass spectrometry (LC-MS/MS).

Relevant standards: ISO 25101:2009; ISO 21675:2019 (water/analyses); EN 14668 (amendment to EN 17681) (foodstuffs and contact materials). Generally, there is no fixed standard for products, but many testing laboratories have their own in-house validated methods.

Advantages:

- Provides reliable documentation of compliance with specific limit values for regulated PFAS.
- High sensitivity (detection limits down to the ppt–ng/g level).

Disadvantages:

- “Blind” to all other PFAS substances not on the analysis’s target list – may therefore overlook large portions of the PFAS content.
- Significantly more expensive per test (particularly if many substances are to be analysed).

Brief summary: Which PFAS test should I choose?

- For broad screening: TOF/TF (detects all fluorine, but not which specific PFAS)
- To understand what may be released: Extractable fluorine (EOF)
- For compliance with legal requirements (e.g. PFOA): Targeted LC-MS/MS

Appendix F – List of abbreviations used

AFFF	Aqueous Film Forming Foam – fire-fighting foam containing PFAS-based surfactants for extinguishing oil fires, etc.
AR-AFFF	Alcohol Resistant – AFFF – fire-fighting foam that is resistant to alcohols/polar liquids, often contains PFAS.
CAS number	Chemical Abstracts Service number – a unique identification number for chemicals, used to look up substances in databases.
DWR	Durable Water Repellent – a surface treatment for water-repellent textiles, often based on PFAS.
ECHA	European Chemicals Agency – the European Chemicals Agency, responsible for chemicals regulation in the EU (including REACH and the PFAS proposal).
ETFE	Ethylene tetrafluoroethylene – a fluoropolymer used in construction and electrical insulation.
FEP	Fluoroethylene propylene – a fluoropolymer used, for example, in electrical cables and laboratory equipment.
FFKM	Perfluoroelastomer – a fluoropolymer used for seals and gaskets in demanding environments (e.g. Kalrez®).
FFFP	Film Forming Fluoroprotein Foam – firefighting foam containing proteins and PFAS surfactants.
FKM	Fluororubber – fluororubber elastomer for seals and gaskets, also known as Viton®.
GWP	Global Warming Potential – a measure of a substance's greenhouse effect relative to CO ₂ .
HFC	Hydrofluorocarbon – fluorinated hydrocarbons, used as refrigerants and classified as PFAS.
HFO	Hydrofluoroolefin – a newer type of climate-friendly, fluorinated refrigerant with a low GWP.
INCI	International Nomenclature of Cosmetic Ingredients – a system for naming cosmetic ingredients.
NDA	Non-Disclosure Agreement – confidentiality agreement, e.g. when exchanging sensitive information about chemicals.
OECD	Organisation for Economic Co-operation and Development – international organisation, including the chemical definition of PFAS.
PFAS	Per- and polyfluoroalkyl substances – a collective group of >10,000 fluorinated chemical substances with water-, grease- and dirt-repellent properties.
PFA	Perfluoroalkoxy – a fluoropolymer typically used for pipes and fittings.
PFC	Perfluorinated compounds – an older term for a subgroup of PFAS.
PCTFE	Polychlorotrifluoroethylene – a chlorine- and fluorine-containing polymer, typically used for packaging or components.
PFPE	Perfluoropolyether – a fluorine containing speciality lubricant for industrial applications.
POP	Persistent Organic Pollutants – environmental toxins that degrade very slowly, including certain PFAS.
PPM	Parts Per Million – unit of measurement for very low concentrations (1 ppm = 0.0001%). May also be expressed as mg/kg or µg/g, which are equivalent to ppm. Specifically, for TOF measurements, the unit µg F/g is used, which corresponds to ppm.
PTFE	Polytetrafluoroethylene – a fluoropolymer known as Teflon®, used for non-stick and technical applications.
PVDF	Polyvinylidene fluoride – a fluoropolymer used in batteries and surface treatments.
REACH	Registration, Evaluation and Authorisation of Chemicals – the EU's chemicals legislation and regulation.
RSL	Restricted Substances List – a list of substances required to be phased out of products.
SDS	Safety Data Sheet – technical document containing information on hazardous substances in products.
TOF	Total Organic Fluorine – measurement of total organically bound fluorine during PFAS screening.