

PFAS in Soil Monitoring and Resilience Directive (SMRD)

Testing to support new EU soil monitoring law

In November 2025, the EU Parliament and Council published the Soil Monitoring and Resilience Directive (SMRD; (EU) 2025/2360), a landmark regulation establishing a comprehensive soil monitoring framework. The directive aims to ensure all soils across the Union remain healthy by 2050, addressing contamination, degradation, and resilience to restore ecosystem services and mitigate climate and biodiversity crises. PFAS (per- and polyfluorinated substances) are included as a group of contaminants that is given special attention.

Background

Over 60% of European soils are currently estimated to be unhealthy, leading to significant economic losses and reduced agricultural productivity. According to the directive Member States will assess soil health, define best practices, and implement regeneration measures based on collected data. SMRD also mandates the identification and remediation of approx. 2.8 million potentially contaminated sites in the union.

The directive (also called soil monitoring law) must be implemented in each Member State within three years, with activities conducted in six-year monitoring cycles. Each country is required to establish a framework for monitoring soil health, soil sealing, and soil removal. Soil health is to be assessed using a set of soil descriptors, while sealing and removal are evaluated through a series of indicators. The descriptors reflect various aspects of soil degradation, including loss of organic carbon, salinization, acidification, compaction, contamination, nutrient depletion, biodiversity loss, and erosion. It is important to note that soil contamination is distinct from contaminated sites. The management of contaminated sites is addressed in a separate chapter of the directive. In this regard baseline reports according to the Industrial emissions directive (IED; 2010/75/EU) can potentially qualify as investigation of contaminated land.

Concerning the selection of pollutants to monitor, this is partly delegated to the Member States for evaluation and decision-making. However, three groups are explicitly mentioned: heavy metals, PFAS, and pesticides including their metabolites (Annex I, Parts B and C). An indicative list of additional contaminants will be published by the Commission 18 months after SMRD enters into force. The design of the monitoring programme is largely left to the discretion of the Member States.

PFAS Monitoring in Soil

In addition to heavy metals, PFAS is the only contaminant group for which individual substances are listed as soil descriptors. Two lists are proposed, with the more comprehensive one comprising 43 PFAS substances. This PFAS43 list was compiled by the EU Horizon project Aragorn on behalf of the Commission. Eurofins Denmark and Örebro University are participants in the project, and confirmatory testing of contaminated soils has been conducted at the Eurofins European PFAS Competence Centre in Sweden. The selection of PFAS is based on environmental relevance, analytical feasibility, and alignment with EU regulations for other matrices. For instance, the PFAS20 from the Drinking Water Directive (DWD) is included.

PFAS43 - Precursors

The PFAS43 range encompasses a range of common precursors that may degrade into the EU EFSA PFAS4 (PFOS, PFOA, PFHxS, PFNA). Among these are six different PreFOS compounds that can transform into PFOS (e.g., PFOSA, MeFOSA, EtFOSA). PreFOS substances have been used directly or as intermediates in products such as surface-treated paper, waterproof textiles, polishing agents, and insecticides. The corresponding six PFHxS homologues are also included. PFHxS, initially used as a PFOS



substitute, is now regulated as a persistent organic pollutant (POP), similar to PFOS. The Stockholm Convention risk assessment identifies similar applications for PFHxS and PFOS, including electronics and metal plating. Additionally, PFOS and particularly PFHxS-based precursors are found in significant quantities in electrochemical fluorination (ECF) based fire-fighting foams (AFFF), where PFOS is typically the dominant compound. For PFOA precursors, two compounds—8:2 FTS and 7:3 FTCA—are considered potential contributors. 8:2 FTS has also been used as a PFOS substitute, with similar applications in textiles and paper (e.g. food contact materials). Furthermore, 6:2 and 8:2 FTS can serve as backbone moieties in larger fluorotelomer (FT) substances, such as 6:2 FTAB found in AFFF and other products (inks, polishes, coatings), and may act as intermediates. 7:3 FTCA can be a degradation product of several 8:2-based FT chemicals and potentially side-chain co-polymers, with PFOA as a major end-product. Similarly, 5:3 FTCA leads to shorter-chain end-products. PFBS is another short-chain replacement chemical. Its amide derivatives have been used in buffered acid etching solutions for silicon-oxide substrates. The amide FBSA is frequently detected in fish. PFBS precursors are also present in ECF-based foams and Scotchgard products. The smaller PFAS range, PFAS21, proposed in the directive includes the DWD PFAS20 plus 6:2 FTS, thereby incorporating only one precursor substance. This set aligns with PFAS21 in the Swedish drinking water regulation.

Eurofins Testing & Analysis

Eurofins has extensive experience in PFAS soil testing, including the compounds discussed above. We now offer a PFAS43 package for soil analysis in accordance with the SMRD directive (see table) with a standard delivery time (TAT) of 5 working days. Reporting limits (LOQ) range from 0.03–1 µg/kg DM with 21 substances at 0.03 µg/kg DM incl PFAS4. A PFAS21 package is also available with the same TAT. Moreover, we have a PFAS35 package covering PFAS21 plus PreFOS in PFAS43 as well as additional PreFOS, PFCAs and FTS compounds. For all packages, 100 g of soil is required. Sample containers can be ordered free of charge via our homepage. Visit the search engine at our homepage for more details about the packages such as LOQs, measurement uncertainty and express options.

PFAS packages – Soil SMRD	Code
<i>PFAS 43 in soil</i>	PLWCY
<i>PFAS 35 in soil</i>	PLWN0
<i>PFAS 21 in soil</i>	PLWDJ

PFAS43 – SMRD Annex I, Part C

<i>Perfluorinated butane acid (PFBA)</i>
<i>Perfluorinated pentane acid (PFPeA)</i>
<i>Perfluorinated hexane acid (PFHxA)</i>
<i>Perfluorinated heptane acid (PFHpA)</i>
Perfluorinated octane acid (PFOA)
Perfluorinated nonane acid (PFNA)
<i>Perfluorinated decane acid (PFDA)</i>
<i>Perfluorinated undecane acid (PFUnA/PFUdA)</i>
<i>Perfluorinated dodecane acid (PFDoA)</i>
<i>Perfluorinated tridecane acid (PFTrA)</i>
<i>Perfluorinated tetradecane acid (PFTeA)</i>
<i>Perfluorinated butane sulfonic acid (PFBS)</i>
<i>Perfluorinated pentane sulfonic acid (PFPeS)</i>
Perfluorinated hexane sulfonic acid (PFHxS)
<i>Perfluorinated heptane sulfonic acid (PFHpS)</i>
Perfluorinated octane sulfonic acid (PFOS)
<i>Perfluorinated nonane sulfonic acid (PFNS)</i>
<i>Perfluorinated decane sulfonic acid (PFDS)</i>
<i>Perfluorinated undecane sulfonic acid (PFUnDS)</i>
<i>Perfluorinated dodecane sulfonic acid (PFDoS)</i>
<i>Perfluorinated tridecane sulfonic acid (PFTrDS)</i>
<i>Perfluorinated octane sulfonamide (PFOSA)</i>
<i>N-ethylperfluorooctanesulfonamide (EtFOA)</i>
<i>N-methylperfluorooctanesulfonamide (MeFOA)</i>
<i>N-ethylperfluorooctanesulfonamido acetic acid (EtFOSAA)</i>
<i>N-methylperfluorooctanesulfonamido acetic acid (MeFOSAA)</i>
<i>Perfluorooctane sulfonamido acetic acid (FOSAA)</i>
<i>Perfluorinated hexane sulfonamide (FHxSA)</i>
<i>N-ethylperfluorohexane sulfonamide (EtFHxSA)</i>
<i>N-methylperfluorohexane sulfonamide (MeFHxSA)</i>
<i>N-ethylperfluorohexane sulfonamido acetic acid (EtFHxSAA)</i>
<i>N-methylperfluorohexane sulfonamido acetic acid (MeFHxSAA)</i>
<i>Perfluorohexane sulfonamido acetic acid (FHxSAA)</i>
<i>Perfluorinated butane sulfonamide (FBSA)</i>
<i>N-ethylperfluorobutane sulfonamide (EtFBSA)</i>
<i>N-methylperfluorobutane sulfonamide (MeFBSA)</i>
<i>N-ethylperfluorobutane sulfonamido acetic acid (EtFBSAA)</i>
<i>N-methylperfluorobutane sulfonamido acetic acid (MeFBSAA)</i>
<i>Perfluorobutane sulfonamido acetic acid (FBSAA)</i>
<i>6:2 Fluorotelomer sulfonic acid (6:2 FTS)</i>
<i>8:2 Fluorotelomer sulfonic acid (8:2 FTS)</i>
<i>5:3 Fluorotelomer carboxylic acid (5:3 FTCA)</i>
<i>7:3 Fluorotelomer carboxylic acid (7:3 FTCA)</i>
<small>EFSA PFAS4 in bold PFAS21 in bold and italic</small>

Orders

Sample containers can be ordered on our website free of charge. Further information on the packages can be found in our online catalogue: <https://analyskatalog.eurofins.se/>. *If high levels are suspected, state this on the delivery note*

We reserve the right to make changes and/or correct errors