


PFAS FOCUS

Chromatography Consumables For Testing & Analysing Forever Chemicals





PFAS persist and accumulate in soil, water, air, wildlife, our bodies.
PFAS has been found in human breast milk.
PFAS is found in the blood of 97% of the American population.
PFAS has been linked to fertility problems and changes in metabolism.
PFAS has been linked to an increased risk of obesity and some cancers.
Globally PFAS is found in rivers, lakes and every ocean on our planet.
PFAS has been detected on Mount Everest. There is no-where that PFAS is not present. It is in the soil, the air and water.
PFAS is manmade, it is damaging our environment on a daily basis.


MOST COMMONLY FOUND IN
Fast-food wrappers and containers
Water-resistant clothing
Stain resistant clothing
Oceans
plastic water bottles
Cleaning products
Human bodies
Microwave bags
pizza boxes
Paint
Non-stick cookware
Sweet wrappers
Drinking water
River sediment

PFAS USES


Fragrance


Flavours


Cosmetics


Textiles


Energy


Petrochemical


Environmental


Food


Pharmaceutical


Alcohol testing


Mining


Chemical


Forensics


Agricultural

Are all PFAS toxic to humans?

This is a question that remains to be answered. Research over many years will provide the data needed to analyse the impact PFAS has on the environment. Some PFAS, sometimes used in construction materials are not released into the air or water table when it rains but they are released when buildings are demolished and the debris is sent to landfill.

Should we be concerned?

Some PFAs are of a more immediate concern as they are released into the environment when they are used or when they come into contact with water. Small residual PFAS molecules wash off easily and are carried to the soil, air and water very quickly. Many short-chain PFAS dissolve in water. Gradually, over time, the PFAS sinks to the depths of oceans and rivers, settles in the sediment and becomes a concern as marine life feeds on plants and other animals that are in the sediment. Some PFAS such as PFOA act like detergents, they repel water and rise back to the surface, they are then released into the atmosphere as droplets. Some scientists believe that sprayfrom the oceans is the biggest source of atmospheric PFAS.

- PERFLUORO
- POLYFLUORO
- OR FLUORO

INDICATES THAT AN ITEM CONTAINS PFAS

PFAS, known as “forever chemicals” are found in everyday objects. Food Packaging, paints, cosmetics, wood lacquers, sealants , solar panels, fire fighting foams, artificial grass and many more seemingly innocent products.

Generally used to prevent corrosion and make products waterproof and stain-resistant they are present in our everyday life. Unfortunately they do not break down in our environment and as a consequence are “forever present”.

TESTING FOR PFAS?

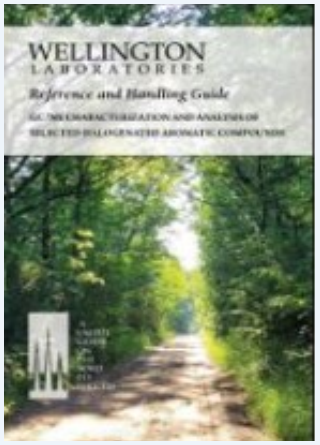
WELLINGTON LABORATORIES
Standards for Environmental Testing and Research

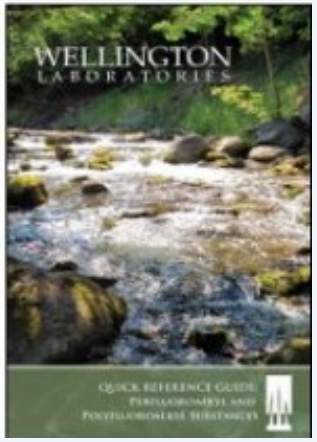
Wellington Laboratories has been committed to providing high quality reference standards and exceptional customer service since its inception in 1980.

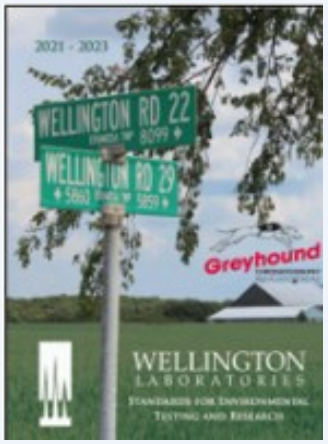
The primary source of Standards for EPA Methods 23, 513, 1613, 1668, 8280, 8290, European Method EN-1948 and World Health/EPA Standards, C13 and Native Dioxins, Furans, PCBs and Brominated Diphenyl Ethers, Brominated Dioxins and Furans, Methylated PCDDs and PCDFs, Fluorinated Compounds and more.

SCAN ME

Wellington's Quality Documents

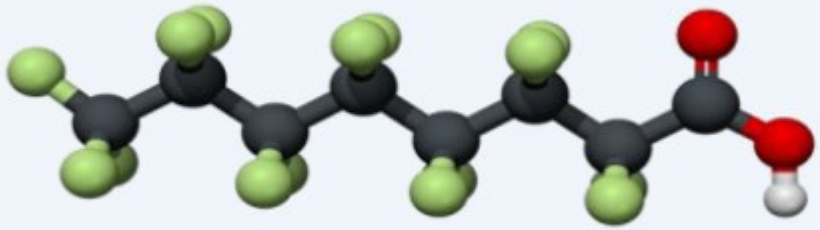






General Concepts of Organofluorine Chemistry for PFAS

Organofluorine Chemistry: A branch of organic chemistry involving organic molecules with a carbon-fluorine bond. Organofluorine molecules have many commercial uses. They include PFAS, such as PFOA, shown below:



EXAMPLE: 3D model of a PFOA (perfluorooctanoic acid) molecule, in its acid form. Source: Manuel Almagro Rivas (Own work using: Avogadro, Discovery Studio, GIMP) [CC BY-SA 4.0] (https://creativecommons.org/licenses/by□sa/4.0)], via Wikimedia Commons. https://commons.wikimedia.org/wiki/File:PFOA-3D.p

Gray spheres represent carbon atoms linked together in a chain; there are eight of them, so “octane” is used in the name. Green spheres represent fluorine atoms bonded to carbon atoms. Red spheres represent oxygen atoms. White sphere represents a hydrogen atom that dissolves away in water, which makes this an acid. Fluorine atoms are attached to all possible bonding sites, making this perfluorinated. If some of the fluorine atoms were replaced by other atoms (such as oxygen or hydrogen), it would be polyfluorinated.

General Concepts of Organofluorine Chemistry for PFAS

Isomer: A molecule with the same molecular formula as another molecule, but with a different chemical structure. Isomers contain the same number of atoms of each element, but have different arrangements of their atoms. See imagefor an example; linear and branched PFOS contain the same number of carbon, fluorine, oxygen, and sulfur atoms, but these atoms are arranged differently depending on whether it is a linear or branched isomer of PFOS.

Homologue Groups and Homologous Series: A group of organic compounds, usually listed in order of increasing size, that has a similar structure (and therefore also similar properties) and whose structures differ only by the number of carbon atoms in the chain. For example, all of the linear and branched isomers of PFOS would be in the C8 homologue group, while all of the linear and branched isomers of perfluorohexane sulfonic acid (PFHxS) would be in the C6 homologue group.

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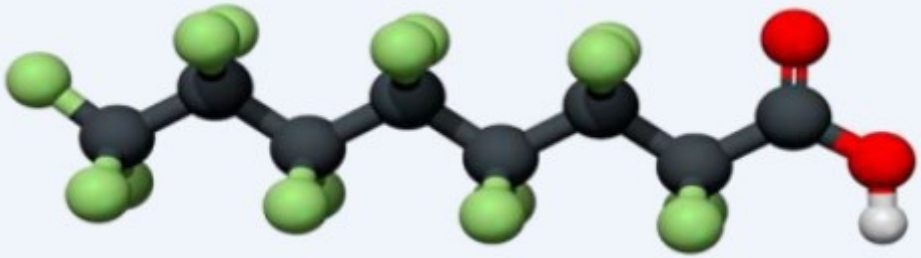
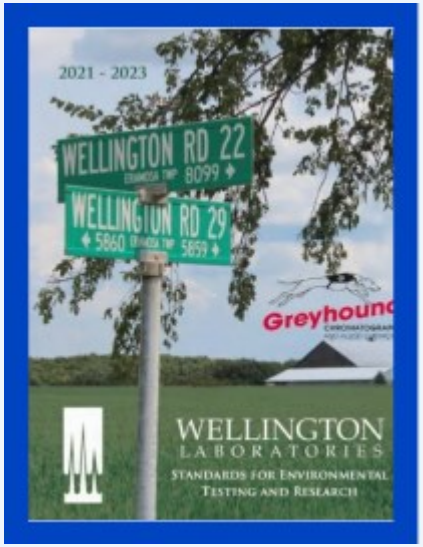


Per- and Polyfluoroalkyl Substances (PFAS) are an emerging class of environmental contaminants. Their unique properties create a host of analytical challenges that require the use of native and mass-labelled standards for the generation of accurate data.

The most notable PFAS include PFOS(perfluorooctanesulfonate) and PFOA (perfluorooctanoic acid) and Wellington Laboratories currently offers multiple mass-labelled standards for these compounds to meet your analytical needs. In fact, Wellington offers a large selection of native and mass-labelled per- and poly-fluorinated compounds, **including:**

- Perfluoroalkylcarboxylic Acids (PFCAs)
- Perfluoroalkylsulfonates (PFASs)
- Perfluorooctanesulfonamides (FOSAs)
- Perfluorooctanesulfonamidoethanols (FOSEs)
- Perfluorooctanesulfonamidoacetic acids (FOSAAs)
- Telomer Alcohols (FTOHs)
- Telomer Acids (FTAs)
- Telomer Sulfonates (FTSs)
- Perfluoroalkylphosphonic acids (PFAPAs)
- Perfluoroalkylphosphinic acids (PFPi's)

WELLINGTON LABORATORIES
Standards for Environmental Testing and Research



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Wellington started to synthesize perfluorinated compounds in 2004 and, since then, Wellington Laboratories have regularly added new native and mass-labelled standards to their inventory.

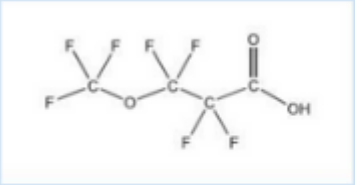
- PFC-C-CVS Calibration set and support solutions
- Perfluoroalkanesulfonates (PFAS)
- Perfluoroalkylcarboxylic acids (PFCAs)
- Perfluorooctanesulfonamides (FOSEs)
- Perflurooctanesulfonamidoethanols (FOSAAs)
- Fluorinated Telomer Alcohols (FTOHs)
- Fluorinated Telomer Acids (FTAs)
- Unsaturated Fluorinated Telomer Acids (FTUAs)
- Perfluoroalkylphosphonic Acids (PFAPAs)
- Perfluoroalkylphosphinic Acids (X:XPFPi)
- Polyfluorinated Phosphate Esters (PAPs and SAmPAPs)
- Fluorinated Telomer Acrylates and Acetates

WELLINGTON LABORATORIES
Standards for Environmental Testing and Research

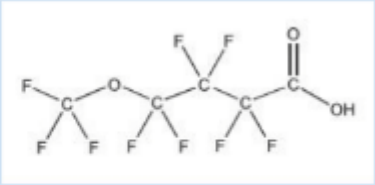
PFCs are still emerging environmental contaminants and each of the groups of compounds listed above pose unique analytical challenges, In addition, the individual isomers, such as the branded PFOA and PFOS isomers, are being found to have different toxicokinetic and ecokinetic properties. Wellington Laboratories' inventory of PFCs will continue to grow.

Testing for PFAS in Everyday Products

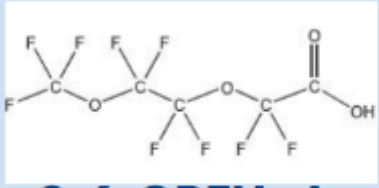
In response to the ever increasing demand for new Reference Standards to test for the presence of PFAS in everyday products Wellington Laboratories has increased its product line to include four new perfluoroether and perfluoropolyether-carboxylic acids (PF40PeA, PF50HxA, 3,6-0PFHpA and P5MeODIOXOAc), a perfluoroethersulfonate (PFEESA), perfluorodecanesulfonamide (FDSA-1) and N-methylperfluorobutanesulfonamide (N-MeFBSA-M).



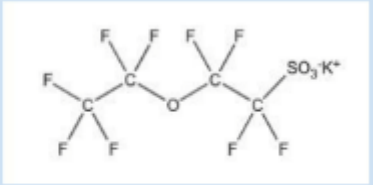
PF4OPeA



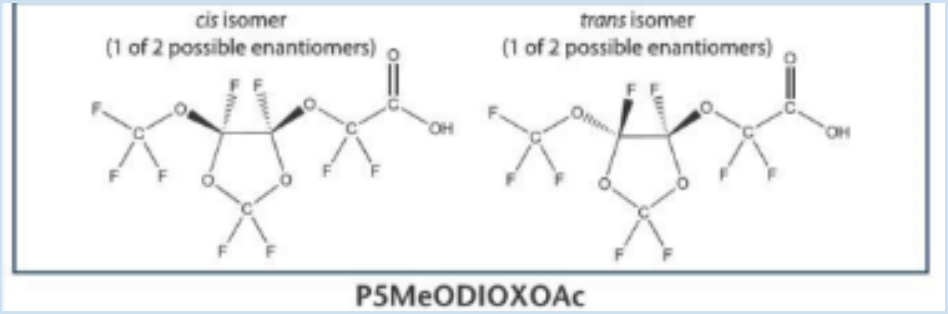
PF5OHxA



3,6-OPFHpA



PFEESA



P5MeODIOXOAc

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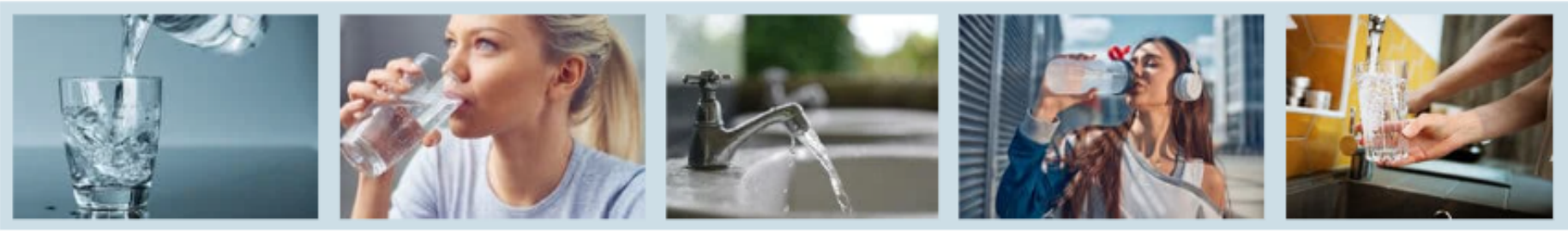
WELLINGTON REPORTER NOV 29TH 2019

PFAS and Other Toxic Forever Chemicals in Drinking Water

For over 30 years the European Union have worked tirelessly to protect the integrity of our drinking water. EU officials have recently reached a provisional agreement to update the Union's 1998 Drinking Water Directive to tighten up the permissible limits allowed for both PFAS and several other drinking water contaminants, including bisphenol-A, microplastics, lead and chromium.



European drinking water standards currently far exceed the standards set in the United States but this is a changing picture as state by state new instances of contaminants are emerging. Currently, the U.S. Environmental Protection Agency has only issued a non-enforceable health advisory of 70 ppt for PFOA, formerly used by DuPont to make Teflon, and PFOS, formerly an ingredient in 3M’s Scotchgard. Those compounds are no longer manufactured in the U.S., but they and other PFAS contaminate the drinking water for an estimated 110 million Americans.

NEW PRODUCTS PFAS TESTING STANDARDS

Native & Mass-Labelled PFAS Solution/Mixtures

Compatible with U.S. EPA Draft Method 1633

Wellington Laboratories is pleased to support U.S. EPA Draft Method 1633 for the analysis of PFAS in aqueous, solid, biosolid and tissue samples by releasing compatible prime stock solutions. To offer the greatest degree of flexibility with other applications, a series of native (PFAC-MXF, PFAC-MXG, PFAC-MXH, PFAC-MXI and PFAC-MXJ) and mass-labelled (MPFAC-HIF-ES and MPFAC-HIF-IS) stock solutions have been prepared. These mixtures can be diluted and/or combined to achieve the spiking and calibration solutions recommended by the method.

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https://www.epa.gov/newsreleases/epa-announces-first-validated-laboratory-method-test-pfas-wastewater-surface-water

WELLINGTON REPORTER 8 OCTOBER 2021

Native Certified Reference Standards for L-PFUdS & L-PFTrDS

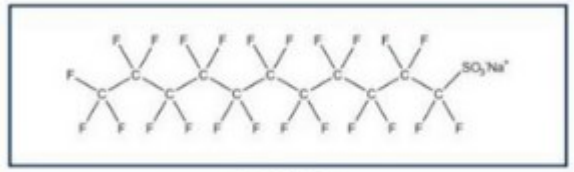
In early 2020 the European Parliament and the Council of the European Union released new requirements for the analysis of per- and polyfluoroalkyl substances (PFAS) in water intended for human consumption (5813/20). Unfortunately this amendment to Council Directive 98/83/EC included perfluoroalkanesulfonates that were not commercially available. In response to this, Wellington Laboratories synthesized, purified, characterised and prepared accurate Certified Reference Standards of the required substances: sodium perfluoro-1-undecanesulfonate (L□PFUdS) and sodium perfluoro-1-tridecanesulfonate (L-PFTrDS).

Wellington Laboratories have also prepared a native solution/mixture (EU-5813-NSS) that contains all of the PFAS listed in the drinking water directive (5813/20) for your convenience. This solution/mixture can be used in conjunction with two of Wellington's existing mass-labelled PFAS mixtures to easily prepare a calibration set for quantitation:

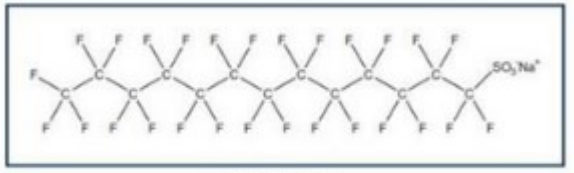
Suggested Extraction Standard Mixture: MPFAC-C-ES

Suggested Injection Standard mixture: MPFAC-C-IS

PFAS STANDARDS



L-PFUdS



L-PFTrDS

WELLINGTON
Reporter
PRODUCT UPDATES FROM WELLINGTON LABORATORIES

Native & Mass-Labelled PFAS Mixtures Compatible with:

U.S. EPA Draft Method 1633
Native PFAS Certified Reference Standards
ISO 21675:2019 Solution/Mixtures
Native PFAS Solution/Mixtures
Aqueous Film-Forming Foam PFAS
New PFAS Reference Standard Solutions
New PFAS Solution/Mixture PFAC30PAR
Aqueous Film-Forming Foam PFAS

New additions to our product list

Alternative Method 16130 Calibration set (16130CVS)
Mass - labelled PCDD Window defining mixture (MD5CCWDS)
35 Individual Native OCP Standards
24 Individual Mass - Labelled OCP Standards
PCN Calibration set (PCN-CVS-A) and support solutions
27 Individual native PCN Standards
4 individual Mass-Labelled PCN Standards
and more...

WELLINGTON Reporter

PRODUCT UPDATES FROM WELLINGTON LABORATORIES

Wellington Reporters 2012 Combined Documents

Wellington Reporters 2013 Combined Documents

Wellington Reporters 2014 Combined Documents

Wellington Reporters 2015 Combined Documents

Wellington Reporters 2016 Combined Documents

Wellington Reporters 2017 Combined Documents

Wellington Reporters 2018 Combined Documents

Wellington Reporters 2019 Combined Documents

Wellington Reporters 2020 Combined Documents

Wellington Reporters 2021 Combined Documents

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Solutions for PFAS analysis

More than 4730 compounds belong to the group of PFAS(which stands for per- and polyfluoroalkyl substances), which have been produced since the 1940s. Since these compounds do not originate in nature, global pollution is the result of human activities. PFAS are 'forever chemicals', chemicals that are very persistent in the environment and in the human body. For reliable PFAS analysis, we have developed products that are ideally suited for sample preparation, sample integrity and determination of these harmful substances by HPLC.

The special phase for sample preparation - CHROMABOND® PFAS

CHROMABOND® PFAS is a polymer-based combination phase which contains a weak anion exchange functionality. The combination of different SPE phases makes it possible to use various interactions (dipole-dipole, ionic, hydrophobic, H-Bond)

SPE product solutions - CHROMABOND HR-X and HR-XAW
According to DIN 38407-42, EPA 537.1 and 533 guidelines, MACHEREY-NAGEL also offers further SPE products solutions for the enrichment or PFAS:

- CHROMABOND® HR-X: hydrophobic PS / DVB copolymer
- CHROMABOND® HR-XAW: weak mixed mode anion exchanger (WAX) PS / DVB copolymer
-

These allow outstanding recovery rates and high reproducibility.

CHROMABOND® PFAS provides several advantages:

- Solutions for various PFAS substances classes
- >28 PFAS can be enriched
- sorbent retention mechanisms according to DIN 38407-42
- EPA 537.1 and 533 guidelines
- High capacity
- high recovery rates

PFAS in food using QuEChERS extraction and clean-up method

QuEChERS ("Quick, Easy, Cheap, Effective, Rugged and safe") sample preparation products from MACHEREY-NAGEL ensure a time efficient and simple extraction of PFAS from food and subsequent solid phase extraction for further sample clean-up according to procedure C-010.01 developed by the US Food and Drug Administration (FDA) for the measurement of 16 PFAS in food.

dSPE columns, CHROMABOND QuEChERS Mix XIII, 15ml centrifuge tubes, CHROMABOND QuEChERS mix XX, 2ml centrifuge tubes

Good to know

There are CHROMABOND QuEChERS mixes available that are especially suitable for sample preparation of PFAS in:

- Dairy products
- Bread
- Lettuce
- Fish

MACHEREY-NAGEL

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Plastic vials and fluorine-free closures for PFAS analysis

When you are doing PFAS analysis, it is crucial to select the right vials and closures for the application. Adsorption effects of glass as well as possible contaminations od the sample by particles from the septa, especially from the PTFE lamination, may put your analysis results at risk.

MACHEREY-NAGEL offers polypropylene screw neck vials N 9 and snap ring vials N 11 as well as appropriate closures with a silicone/polymide septum that - in contrast to PTFE laminated liners - is fluorine free.

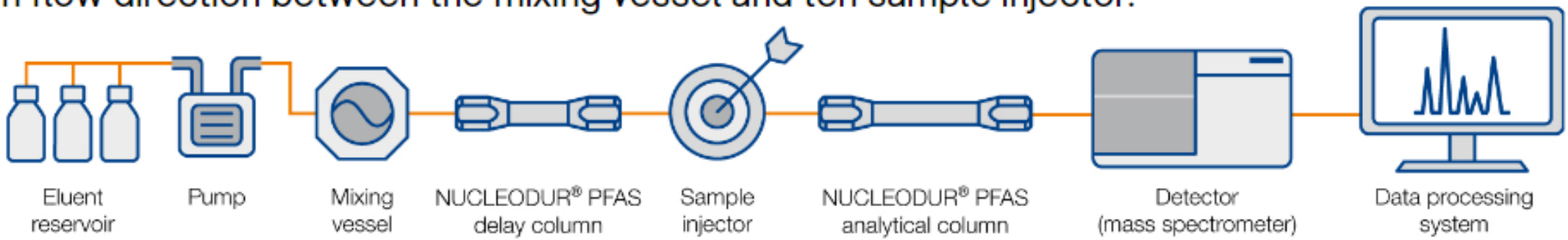
Get more details

If you want to learn more, read the detailed PFAS test report showing the performance of different MN vials and fluorine-free closures in PFAS analysis.

Solutions for PFAS analyis
The special HPLC columns: NUCLEODUR® PFAS and NUCLEODUR® PFAS delay

NUCLEODUR® PFAS HPLC columns are a perfect choice for analysing PFAS substances. These columns show a high batch-to-batch reproducibility, are specially batch tested for PFAS analyses and are very well suited for LC-MS due to a low bleeding characteristics.

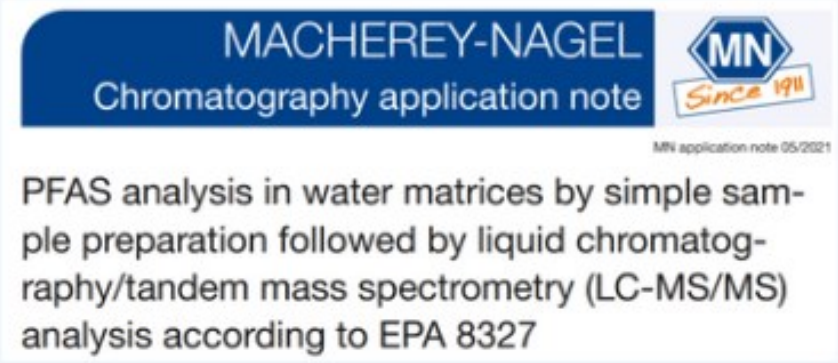
The NUCLEODUR® PFAS Delay column provides high retention for PFAS compounds and are used to retain PFAS contaminants from the HPLC system, which could other-wise falsify the sample to be analysed. For this purpose, the NUCELODUR® PFAS Delay column is connected in flow direction between the mixing vessel and teh sample injector.

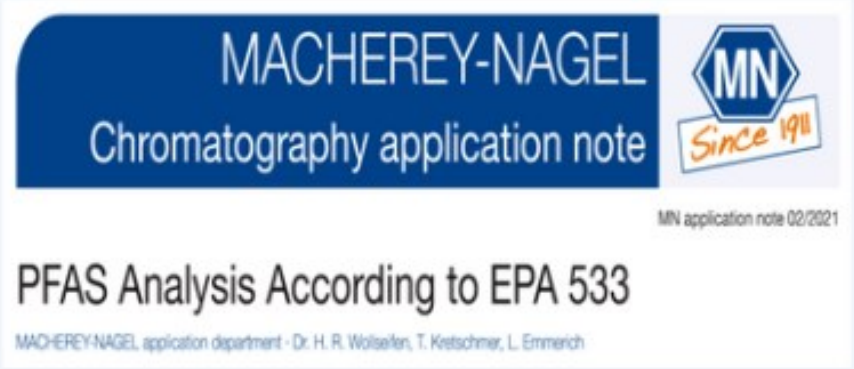


Product selection according to ISO 21675:2019, DIN 38047 -42, EPA 537.1, 533, 8327 and FDA C-010.01 guidelines

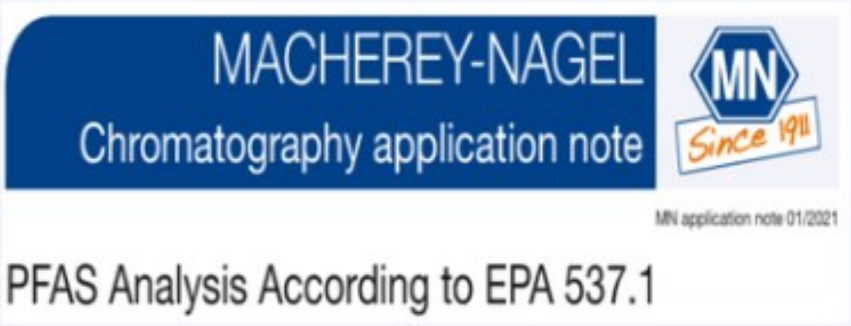
Method → / Product type ↓	ISO 21675:2019 and DIN 38407-42	EPA 537.1	EPA 533	EPA 8327	FDA C-010.01
SPE columns	CHROMABOND® HR-XAW (REF 7307-42)	CHROMABOND® HR-X (REF 730931P45)	CHROMABOND® HR-XAW (REF 730745)		CHROMABOND® PFAS (REF 730283)
dSPE centrifuge tubes	CHROMABOND® PFAS (REF 730283)	CHROMABOND® HR-X (REF 730939)	CHROMABOND® HR-XAW (REF 730745) CHROMABOND® PFAS (REF 730283)	Direct injection	SCHROMABOND® QuEChERS Mix XII (REF 730648) CHROMABOND® QuEChERS Mix L (REF 7300008) CHROMABOND® QuEChERS Mix xx (ref 730670.2)

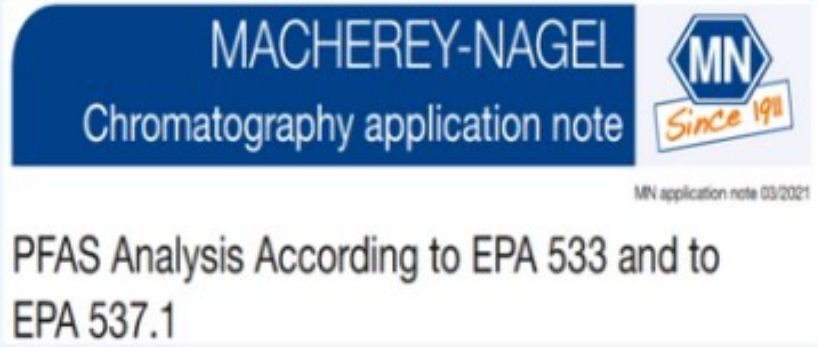
Delay column	EC 50/2 NUCLEODUR® PFAS Delay, 5 µm (REF 760673.20)
HPLC column	EC 50/2 NUCLEODUR® PFAS, 3 µm (REF 760663.20)
	EC 100/2 NUCLEODUR® PFAS, 3 µm (REF 760666.20)
Vials and caps	0.3 mL N 9 screw neck vial, PP transparent (REF 702009)
	0.7 mL N 9 screw neck vial, PP transparent (REF 702010)
	1.5 mL N 9 screw neck vial, PP transparent (REF 702500)
	0.3 mL N 9 screw neck vial, PP amber (REF 702172)
	0.3 mL N 11 snap ring/crimp neck vial, PP transparent (REF 702809)
	0.7 mL N 11 snap ring/crimp neck vial, PP transparent (REF 702174)
	0.3 mL N 11 snap ring/crimp neck vial, PP amber (REF 702173)
	N 9 screw closure, PP, blue, silicone white / polymide orange (REF 702402)
	N 11 snap ring closure, PE (soft), light blue, silicone white / polimide orange (REF 702403)

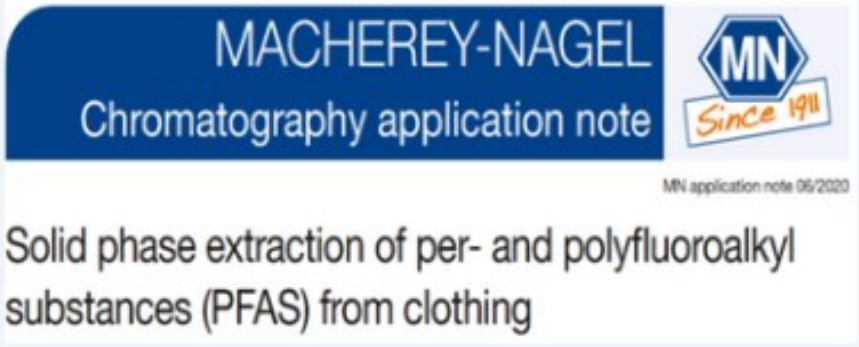

MACHEREY-NAGEL
Chromatography application note
MN application note 05/2021
PFAS analysis in water matrices by simple sample preparation followed by liquid chromatography/tandem mass spectrometry (LC-MS/MS) analysis according to EPA 8327

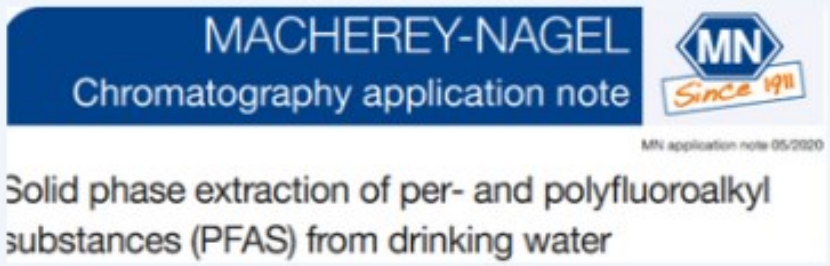

MACHEREY-NAGEL
Chromatography application note
MN application note 02/2021
PFAS Analysis According to EPA 533
MACHEREY-NAGEL application department · Dr. H. R. Wollseifen, T. Kretschmer, L. Emmerich

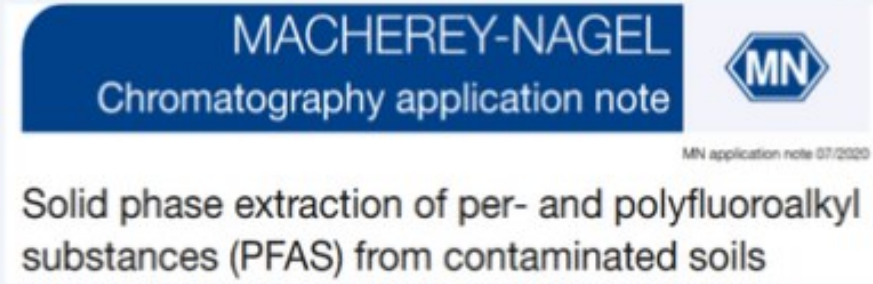

MACHEREY-NAGEL
Chromatography application note
MN application note 04/2021
PFAS Analysis According to ISO 21675:2019 and to DIN 38407-42

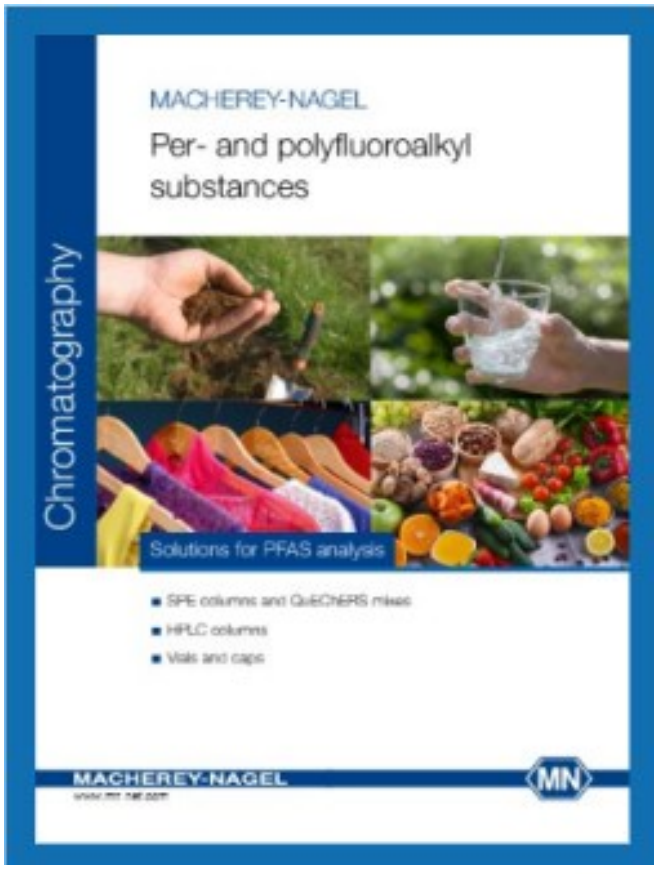

MACHEREY-NAGEL
Chromatography application note
MN application note 01/2021
PFAS Analysis According to EPA 537.1


MACHEREY-NAGEL
Chromatography application note
MN application note 03/2021
PFAS Analysis According to EPA 533 and to EPA 537.1


MACHEREY-NAGEL
Chromatography application note
MN application note 06/2020
Solid phase extraction of per- and polyfluoroalkyl substances (PFAS) from clothing


MACHEREY-NAGEL
Chromatography application note
MN application note 05/2020
Solid phase extraction of per- and polyfluoroalkyl substances (PFAS) from drinking water


MACHEREY-NAGEL
Chromatography application note
MN application note 07/2020
Solid phase extraction of per- and polyfluoroalkyl substances (PFAS) from contaminated soils



SCAN ME

PFAS

Greyhound Chromatography and Allied Chemicals

per- and polyfluoroalkyl substances

CONVENIENCE KITS FOR PERFLUOROALKYL AND POLYFLUOROALKYL (PFAS) TESTING

Q Range

Because Perfluoroalkyl and Polyfluoroalkyl substances do not decompose, they can accumulate over time in the environment and the human body. There is increasing evidence that exposure to PFAS can adversely affect human health. As a result, regulatory bodies are legislating that many materials should be tested to ensure that they do not contain traces of PFAS or that the traces are below permitted legal limits. Because PFAS are widely used in materials such as PTFE, that are commonly used in chemical analysis consumables, laboratories need new labware products to minimize background contamination from these chemicals.

VIEW THE FULL RANGE

GREYHOUND CHROMATOGRAPHY'S REACH IS GLOBAL

- Customers in over 100 countries worldwide
- International distributors working on behalf of Greyhound
- New product ranges frequently added to Greyhound's E-commerce website

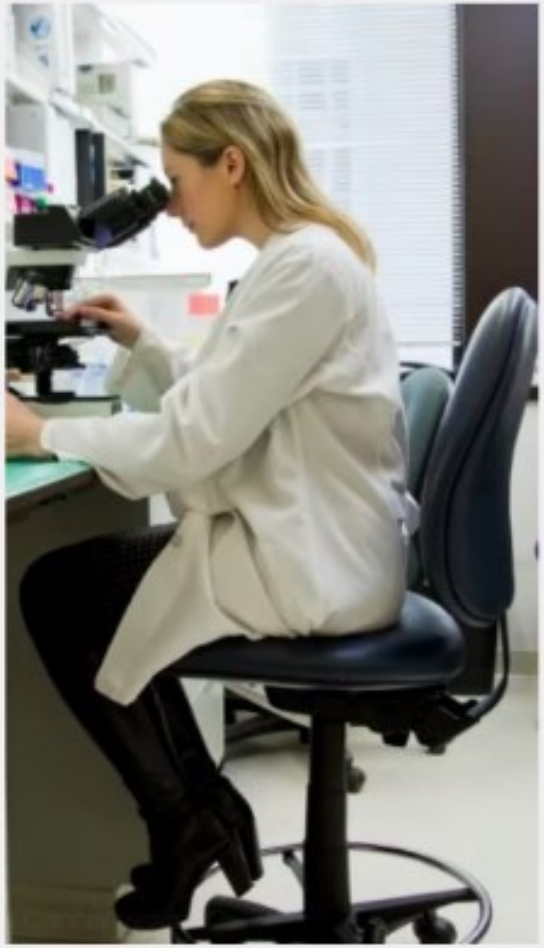
REPRESENTING THE WORLD'S LEADING SCIENTIFIC MANUFACTURERS

OUR PRODUCTS

Chemical Standards; Organic Reference Standards, Inorganic Reference Standards, Environmental Reference Standards, Botanical Reference Standards and Materials, Petrochemical Reference Standards, Food Testing Standards, Cosmetic & Fragrance Reference Standards and more...

Laboratory Water, Balances & Scales, Flash Cartridges, Pipettes, Derivitisation Reagents, Diluters and Dispensers, Membrane Filters, Solvents, SPE Cartridges, Solvent Safety Caps, Fittings, HPLC Accessories, HPLC Pumps, Syringes, Syringe Filters, Gas Purifiers, Filters and Traps, Well plates, Ferrules, Septa, Seals, Tubing, Vilas & Caps, Vial accessories, Inlet Liners, GC Columns, HPLC Columns, Research Chemicals, Gas regulators and all chromatography consumables.

Greyhound
CHROMATOGRAPHY
AND ALLIED CHEMICALS



WORKING WITH RESEARCH SCIENTISTS AND ANALYSTS ALL OVER THE WORLD

Greyhound
CHROMATOGRAPHY
AND ALLIED CHEMICALS

GETTING THE GOODS TO OUR CUSTOMERS

Greyhound will take care of all the paperwork, certification, dispatch and transport issues, so you can relax and look forward to receiving goods. By air, sea, road or rail, Greyhound products will arrive on time, every time.

Our IATA, ADR (Road) and IMDG (Sea) trained Logistics Department have many year's experience of shipping hazardous and non-hazardous materials around the world. Greyhound prides itself on using our extensive logistics knowledge to facilitate successful delivery of your goods, either to your door or an approved airport.

USEFUL LINKS

Greyhound Chromatography Website

About Us E-Book

Q-Range E-Book

Reference Standards E-Book

Greyhound Catalogue Downloads

Wellington Laboratories Website

Q-Range PFAS Analysis Screw Top Vials

PFAS Vial sampling kits

Wellington Laboratories PFAS Reference standards

Macherey-Nagel PFAS Products

PFAS Focus - PFAS in drinking water

Mixed native PFCAs and PFAs Solution

PFOS/PFOA Isomers

Aqueous Isomers

SIGN UP TO OUR NEWSLETTER

chemsec

ChemSec is an international non-profit organization that works to phase out harmful chemicals in favor of safe alternatives. In their work, ChemSec wants to create a strong link between researchers, decision makers and companies in the fight against harmful chemicals. By joining ChemSec's PFAS movement, companies commit to work towards getting all PFAS chemicals covered by EU's chemicals legislation, REACH, which lists the harmful chemicals banned from use in the EU, phased out from supply chains.

join

Like a number of other large companies, Greyhound Chromatography has joined the Swedish non-profit organization ChemSecs PFAS movement. The movement is working to have a number of harmful fluorinated compounds – known as "forever chemicals", since they don't degrade – phased out and banned.

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