

What You Should Know About your PFAS Laboratory

MWEA Lab Practices Seminar

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What are Perfluorocarbons (PFCs)?

PFCs are compounds used to make everyday products more resistant to:

- Stains
- Grease
- Water

Perfluorocarbons (PFCs)

PFCs are used in common everyday objects:

- Non-stick cookware
- Stain-resistant sofas and carpets
- Waterproof clothes/mattresses
- Found in some food packages
- Fire-resistant materials (like children's pajamas)

Perfluorocarbons (PFCs)

In industries, PFCs are utilized in

- Aerospace
- Automotive
- Building and construction
- Electronics

Perfluorocarbons (PFCs)

PFCs break down very slowly in the environment.

- Nationally, the current monitored compounds are:
 - Perfluorooctanoic acid (PFOA)
 - Perfluorooctane sulfonate (PFOS)

Combined total for health advisory Limits 70 ppt

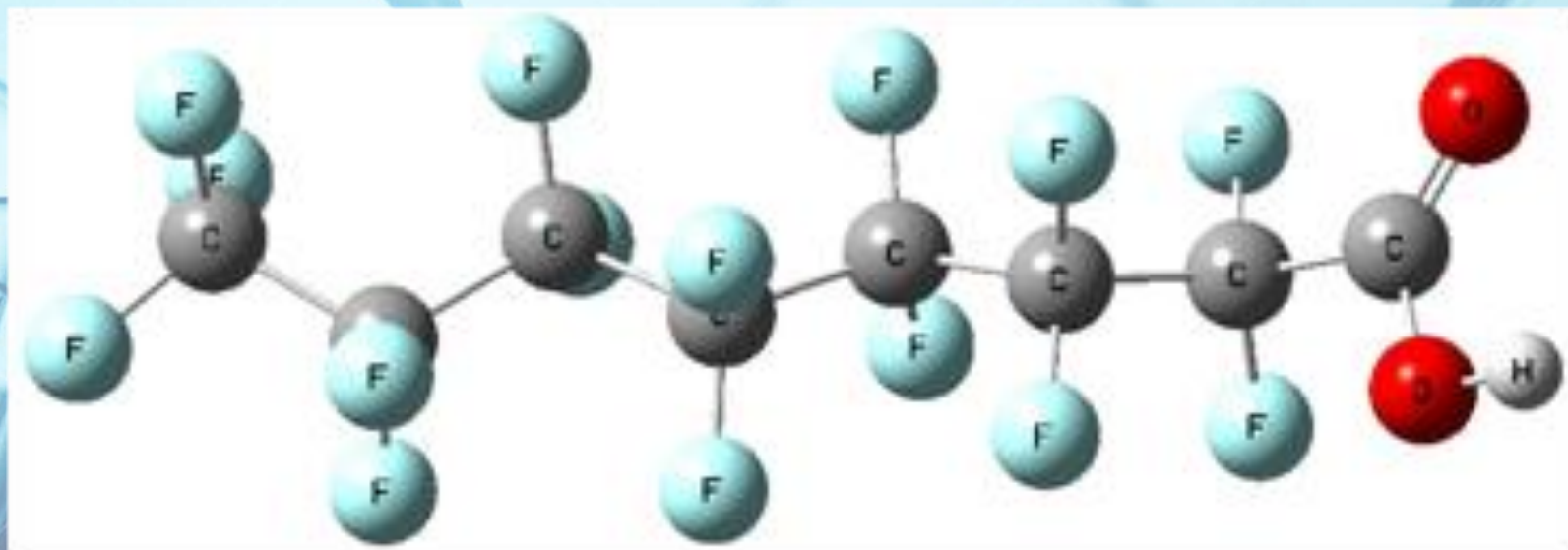
- State of Michigan guidance for Drinking Water compounds are:
 - Perfluorooctanoic acid (PFOA @ 9 ppt)
 - Perfluorooctane sulfonate (PFOS @ 8 ppt)
 - Perfluorononanoic Acid (PFNA @ 9 ppt)
 - Perfluorohexane Sulfonic Acid (PFHxS @ 84 ppt)
 - Perfluorobutane Sulfonic Acid (PFBS @ 1000 ppt)

Perfluorocarbons (PFCs)

PFOA and PFOS are byproducts of other commercial products, and are released into the environment when other products are made, used, or discarded.

Perfluorocarbons (PFCs)

PFCs example structure (PFOA):



Perfluorocarbons (PFCs)

- Method 537: as published, is only for Drinking Water samples.
- ASTM Method D7979: WW/GW matrices w/isotopic dilutions
- ASTM Method D7968: solid matrices w/ isotopic dilutions.
- Method 537 Modified: utilizes same extraction procedures with modifications. DoD allows the use of modifications to the drinking water method, as long as the DoD QC requirements are met.

Method QC Comparisons

Method	EPA 537	D7979	D7968
Analytes	14 + 3 SSD+3 IS	21 + 9 SSD	21 + 9 SSD
Matrix	Drinking Water	WW/GW/Sludge	Soil/Solid
QC Criteria MS/MSD	70 - 130%	70 - 130%	70 - 130%
QC Criteria RPD	≤ 30%	≤ 30%	≤ 30%

EPA 537 Rev.1.1 Drinking Water

- Drinking water method is a confirmed method for drinking water matrices only.
- This method does not allow for variances or modifications.
- Does not consider matrix effects outside of drinking water.
- Does not allow for other PFC compounds

ASTM 7979 w/isotopic dilutions

- ASTM procedures are documented protocols that take into effect the matrix issues and PFC behaviors.
- Sample is diluted directly in the container sampled.
- The sample has less contact with possible source of contamination.
- The PFCs in the sample are less likely to be lost in transfer of the sample

ASTM 7979 w/isotopic dilutions

- Samples are directly injected into LC/MS/MS
- Compound lists are flexible and new PFCs/branched compounds can be studied/tested.
- Longer holding times (28 days) vs. EPA 537 14-day extraction holding time (28 days to analyze).

EPA 537 Modified

- Selectivity of solid phase potentially eliminates interferences.
- Larger sample volume concentrated down, can lead to lower detection limits.
- PFCs can be lost when moving from one container to another.
- Modifications to 537 are varied between laboratories.

EPA 537 Modified

- DoD requires passing QC for modified method, but does not give guidance to the modifications.
- Data can be variable and inconsistent between laboratories, because the modifications are proprietary information for every lab and are unknown.

When choosing a PFCs Laboratory

- Experience doing analyses, volume of work completed
- Accreditations for different methods
- Analytical scientist experience with Liquid Chromatography as well as Mass Spectroscopy

PFCs Accreditations

- EPA Drinking Water (NELAC)
- ISO 170925 (Environmental)
- DoD (537 and 537M)

Currently, State of Michigan does not have drinking water accreditation for PFCs.



THANK YOU!