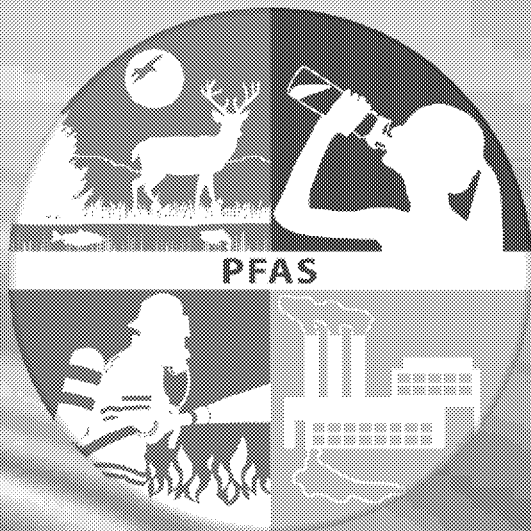




**ITRC: Per- and  
Substances**

[WWW.ITRCWEB.ORG](http://WWW.ITRCWEB.ORG)



# Polyfluoroalkyl (PFAS) Team

*Advancing Environmental Solutions*





# Interstate Technology & Regulatory Council (ITRC)

- Public-private coalition working to reduce barriers to the use of innovative environmental technologies.
- Produces documents and training that broaden and deepen technical knowledge and expedite quality regulatory decision-making while protecting human health and the environment.
- More at [www.itrcweb.org](http://www.itrcweb.org)

## ITRC PFAS Team

- Purpose: produce concise technical resources for project managers – regulators, consultants, responsible parties, and stakeholders
- Why: State and federal environmental regulators and others need easily accessible information to aid them in evaluating risks and selecting appropriate response actions at PFAS release sites

## ITRC PFAS Team

- ITRC has assembled a team of over 330 PFAS experts from all sectors:
  - ◆ Academics – 12
  - ◆ Stakeholders – 3
  - ◆ Federal (DOD, DOE, EPA, Other) – 45
  - ◆ State and local – 72
  - ◆ Industry and consulting – 190
  - ◆ International – 8

# ITRC PFAS Team: Products

- ◆ Factsheets
  - History and Use (Nov. 2017)
  - Naming Conventions and Physical and Chemical Properties (Nov. 2017)
  - Regulations, Guidance, and Advisories (Nov. 2017)
  - Fate and Transport (Feb. 2018)
  - Site Characterization, Sampling Techniques, and Lab Analytical Methods (Feb. 2018)
  - Remediation Technologies (Feb. 2018)
  - AFFF (to be published mid-2018)
- ◆ Web-based, updated information tables
- ◆ Technical/Regulatory Document (to be published 2019)
- ◆ Internet Based Training (to go live in late 2019)

# ITRC PFAS Team: Factsheets



## Regulations, Guidance, and Advisories for Per- and Polyfluoroalkyl Substances (PFAS)

### 1 Introduction

Per- and polyfluoroalkyl substances (PFAS) include combinations of elements consisting of fluorine (F), C, H, and/or other elements. PFAS are used in a wide variety of consumer products, including food packaging, stain repellents, and firefighting foams. PFAS are used in a wide variety of consumer products, including food packaging, stain repellents, and firefighting foams. PFAS are used in a wide variety of consumer products, including food packaging, stain repellents, and firefighting foams.

ITRC has developed a number of all-hazards advisories for the widest range of emerging technologies regarding PFAS. The complete list of all-hazards advisories is available at [www.itrcweb.org/pfas](https://www.itrcweb.org/pfas).

### 2 Regulation of PFAS

The science and regulatory landscape for PFAS is rapidly evolving. ITRC has developed a number of all-hazards advisories for the widest range of emerging technologies regarding PFAS. The complete list of all-hazards advisories is available at [www.itrcweb.org/pfas](https://www.itrcweb.org/pfas).

Human health protection is the primary focus of the PFAS regulatory, guidance, and advisory documents developed to date. The focus for PFAS and PFCA use vary across programs, such as drinking water, food packaging, and firefighting foams, and approaches used for risk assessment and exposure. The choice of analytical measurements, including the frequency and percentage of exposure, also varies by program. See Table 3-1.

In addition to release and exposure, health-based assessment, guidance, and advisory documents are also needed to address the company's primary release-out and mitigation of PFAS. For example, the ITRC's guidance on PFAS release-out and mitigation of PFAS. For example, the ITRC's guidance on PFAS release-out and mitigation of PFAS.

### 3 Regulatory Programs

Advisory for PFAS is derived from a number of federal, state, and local regulations, including the Superfund Amendments and Reauthorization Act (SARA), the Resource Conservation and Recovery Act (RCRA), and the Clean Air Act (CAA).

#### 3.1 Federal PFAS Regulations

##### 3.1.1 Toxic Substances Control Act (TSCA)

The TSCA authorizes the EPA to require reporting, monitoring, and testing of chemicals and chemical processes that may pose a risk to human health or the environment. Section 5 of TSCA allows the EPA to issue Significant New Use Rules (SNURs) to limit the use of a chemical when it is newly identified, or a significant new use of an existing chemical is identified, before the chemical is marketed in the United States.

## Naming Conventions and Physical and Chemical Properties of Per- and Polyfluoroalkyl Substances (PFAS) continued

### Fluorotelomer Degradation Pathway Overview

Example for P-2 Fluorotelomer Homologues

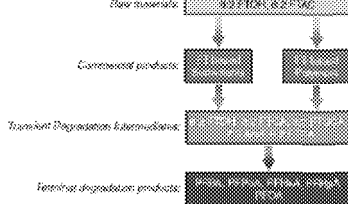


Figure 3-4. Fluorotelomer degradation pathway overview (Example for P-2 fluorotelomer homologues)

### ECF Degradation Pathway Overview

Example for perfluorocyclic ether homologues

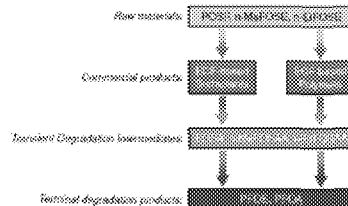


Figure 3-5. ECF degradation pathway overview (Example for perfluorocyclic ether homologues)

#### 2.1.2.1 Fluorotelomer Substances

Fluorotelomer substances are polyfluoroalkyl substances produced by the telomerization process. As shown in Figure 2-4, the degradation of polyfluoroalkyl substances is a sequential series of PFCA to the ultimate form of PFAS. For example, the degradation of a P-2 fluorotelomer surfactant involves the sequential degradation of the surfactant to a perfluorinated alcohol, then to a perfluorinated aldehyde, and finally to a perfluorinated carboxylic acid.

## History and Use of Per- and Polyfluoroalkyl Substances (PFAS) continued

### 4.2 Class B Fluorine-Containing Firefighting Foams

Class B fluorine-containing firefighting foams, including foams for extinguishing flammable liquids fire include aqueous film forming foams (AFFF), fluoropolymer foams (FPF), and fluorinated foams (FF). These foams have been found to be effective for the extinguishment, containment, and fireproofing of flammable liquids. However, these foams have been found to be effective for the extinguishment, containment, and fireproofing of flammable liquids. However, these foams have been found to be effective for the extinguishment, containment, and fireproofing of flammable liquids.

Fluorinated foams are a complex mixture of both known and unidentified PFAS of differing molecular structures present in varying proportions. These foams are used for a wide range of applications, including firefighting, industrial cleaning, and agricultural uses. The use of these foams has been found to be effective for the extinguishment, containment, and fireproofing of flammable liquids.

Fluorinated foams are a complex mixture of both known and unidentified PFAS of differing molecular structures present in varying proportions. These foams are used for a wide range of applications, including firefighting, industrial cleaning, and agricultural uses.

- The volume released of foam can be used for storage, transfer, or equipment protection.
- The foam can be used for fire suppression, fire prevention, and fireproofing.
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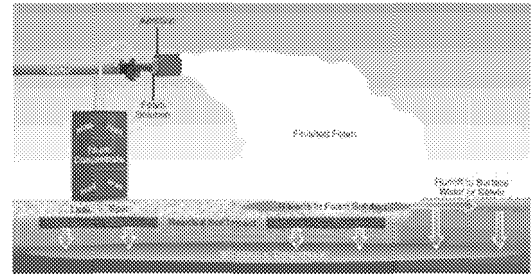


Figure 4-4. Release of firefighting foam

