

Identifying PFAS Use & Understanding Reporting Requirements

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TURA Continuing Education Conference

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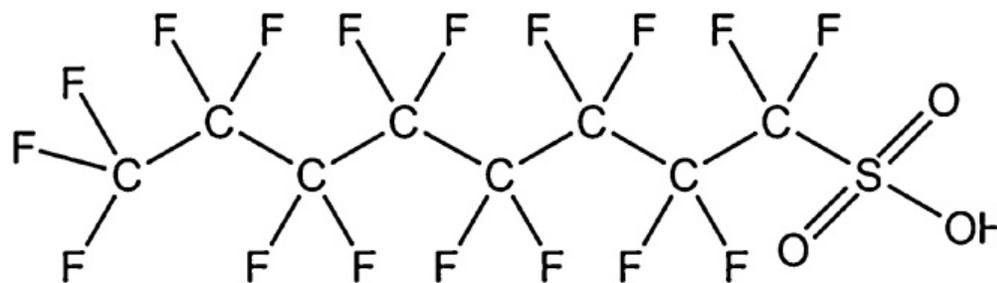
Overview

- Background on PFAS
- Regulatory context
 - TRI and TURA reporting
- Uses of PFAS
- Resources
- Breakout exercise

What are PFAS?

- Per- and polyfluorinated alkyl substances
- Fluorinated carbon chain
- Large class of chemicals - 4,700 identified by OECD

Example – PFOS:



Health and Environmental Effects

- **Highly persistent and mobile in the environment**
 - Do not break down under normal environmental conditions
- **Bioaccumulative**
 - In animals or plants
- **Health effects include:**
 - Effects on endocrine system, including liver and thyroid
 - Immunotoxicity (with implications for vaccines)
 - Metabolic effects
 - Developmental effects
 - Neurotoxicity

Regulatory Context

- On-going revelations about health and environmental impacts
- Water supply contamination
- State, federal and international bodies working to respond
 - Federal – EPA, e.g., TRI program
 - Massachusetts – TURA program, DEP (wastewater, drinking water, residuals)

Reporting PFAS under TURA

172 TRI/TURA PFAS	TURA Certain PFAS NOL
<ul style="list-style-type: none">• Tracked starting: 1/1/2021• Reportable to MassDEP: 7/1/2022• Reportable: <u>individually</u>• Reporting threshold: 100 lbs. (de minimis exemption applies)• <i>Note: TRI is still listing additional PFAS</i>	<ul style="list-style-type: none">• Tracked starting: 1/1/2022• Reportable to MassDEP: 7/1/2023• Reportable: as a <u>category</u>• Reporting thresholds: 25,000 lbs. (manufactured or processed); 10,000 lbs. (otherwise used)

<https://www.mass.gov/news/pfas-tracking-and-reporting-updates>

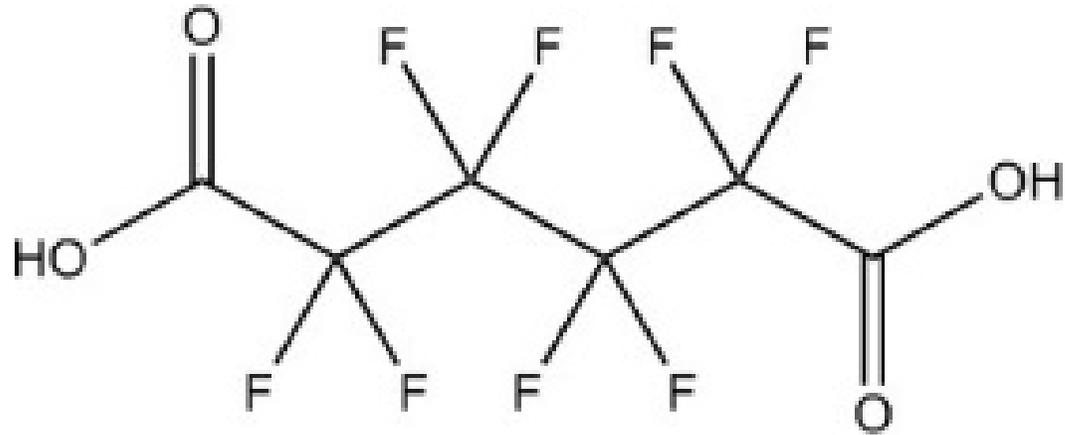
TURA Certain PFAS Not Otherwise Listed (NOL)

The TURA Administrative Council voted to add the category *Certain Per- and Poly-Fluoroalkyl Substances Not Otherwise Listed (PFAS NOL)*, to the TURA list of Toxic or Hazardous Substances (TURA List). The category is defined as:

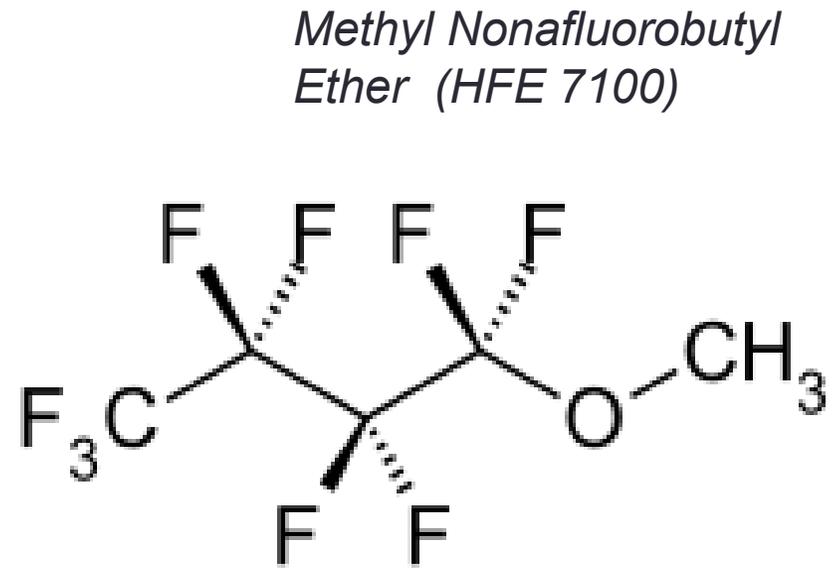
Certain PFAS NOL includes those PFAS that contain a perfluoroalkyl moiety with three or more carbons (e.g., $-C_nF_{2n}-$, $n \geq 3$; or $CF_3-C_nF_{2n}-$, $n \geq 2$) or a perfluoroalkylether moiety with two or more carbons (e.g., $-C_nF_{2n}OC_mF_{2m}-$ or $-C_nF_{2n}OC_mF_m-$, n and $m \geq 1$), wherein for the example structures shown, the dash (–) is not a bond to a hydrogen and may represent a straight or branched structure, that are not otherwise listed.

The clarification of 'PFAS NOL' to 'Certain PFAS NOL' reflects that the listed category contains only the certain PFAS considered by the Science Advisory Board and Administrative Council rather than all PFAS NOL.

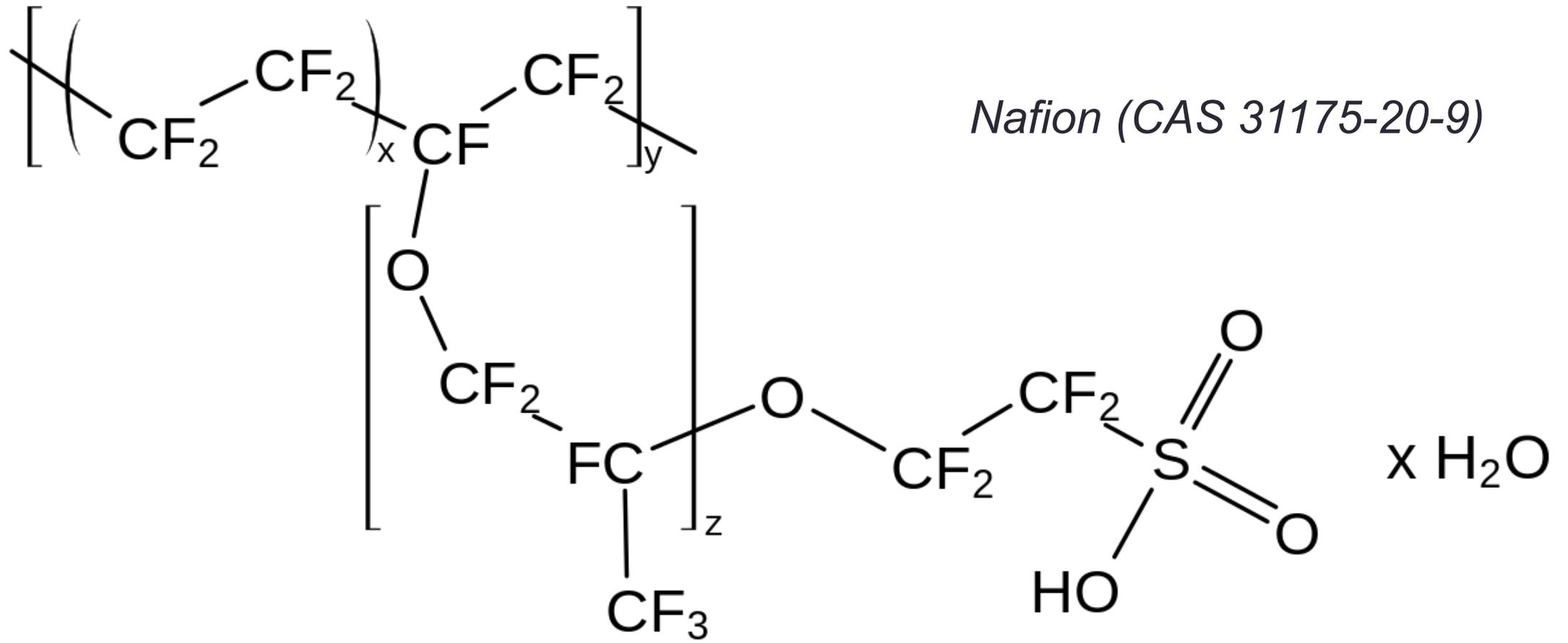
Examples of PFAS Included in the TURA Definition



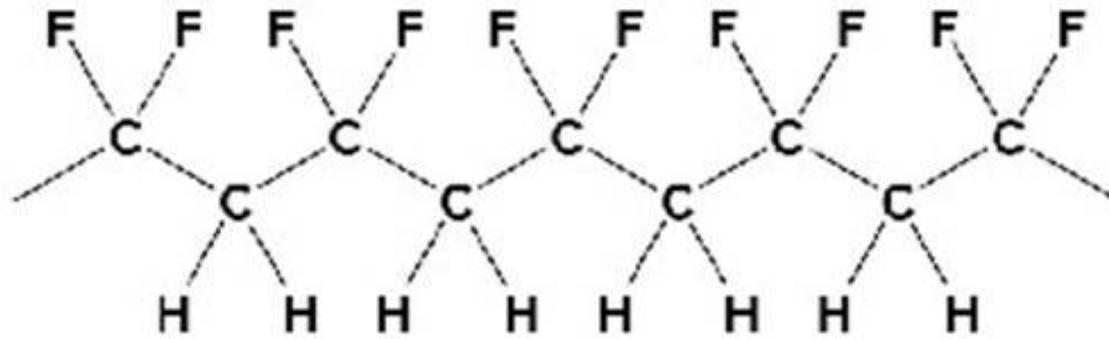
(CAS 336-08-3) -
Octafluoroadipic acid,
Perfluoroadipic acid



Examples of PFAS Included in the TURA Definition

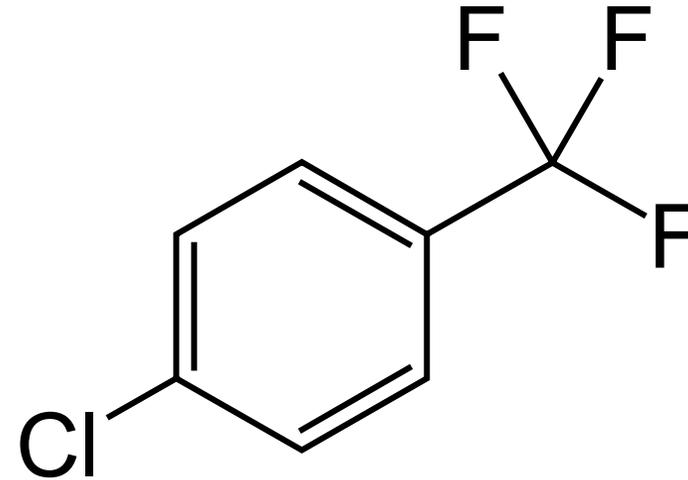


Examples of PFAS Not Included in the TURA Definition



PVDF (Polyvinylidene difluoride)

PCBTF (Parachlorobenzotrifluoride)



How Are PFAS Reported?

Guidance for Reporting Per- and Poly-Fluoroalkyl Substances (PFAS) under the Toxics Use Reduction Act (TURA), including Individually Listed PFAS and the Certain PFAS Not Otherwise Listed (NOL) Category

❑ 4 tables –

- Table 1 - lists PFAS that are individually reportable under TURA & TRI at the 100 lb threshold, after TURA adopted the TRI NDAA listings.
- Table 2 - lists PFAS that were already individually reportable under TURA. Continue to report them at typical reporting thresholds (25,000/10,000 lb/yr).
- Table 3 - lists PFAS that are reportable under the TURA C1-C4 Halogenated Hydrocarbons category. 5 of these substances are ALSO reportable under the new Certain PFAS NOL TURA category.
- Table 4 - lists PFAS that are reportable under the Certain PFAS NOL category only.

How Are PFAS Reported?

Notes on the Guidance tables -

- ❑ Tables 2-4 were generated from PFAS that are known to be in commerce, primarily from the Toxic Substances Control Act (TSCA). Thus, these lists are NOT exhaustive. Approximately 1/3 of the PFAS in commerce, as noted by the TSCA Chemical Data Reporting (CDR), are claimed as Confidential Business Information (CBI) and thus will require the supplier to disclose whether the substance meets the definition.
- ❑ For fluorinated substances where a chemical structure is not available, they should be assumed to be part of the category until more specific information is available.

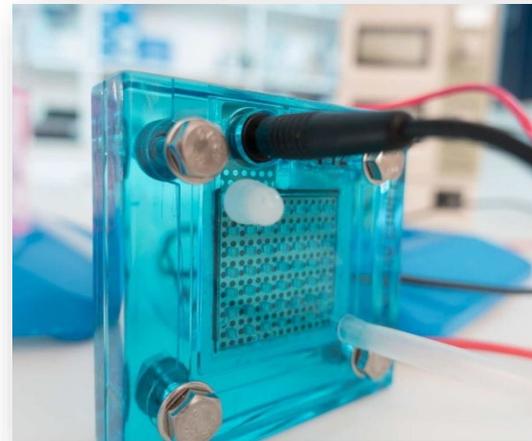
Reporting Exemptions & PFAS

- Article exemption
- Otherwise Use exemptions –
 - as a structural component of the facility (doesn't apply to process-related components)
 - in routine janitorial or facility grounds maintenance
 - personal uses by employees or other persons
 - use of products for maintaining motor vehicles operated by the facility
 - contained in intake water (used for processing or non-contact cooling) or in intake air (used either as compressed air or for combustion)
- De minimis exemption –
 - OSHA carcinogens – 0.1% (e.g., Perfluorooctanoic acid (PFOA) (335-67-1))
 - All others – 1.0%

Industrial Uses

- Polymers and Resins

- Fluoropolymers, and as feedstock and processing aids in their manufacture (e.g., PTFE, PVDF, FEP) and products (e.g., insulation and jacketing of wire & cable)
- Side-chain fluoropolymers
- Non-fluorinated resin processing aids
- Fluorination of HDPE containers
- Additives in coatings
- Membranes (e.g., Nafion)



Example: Teflon (Polytetrafluoroethylene)

- PTFE is included in the Certain PFAS NOL Category.
- Reportable - PTFE pellets being processed (such as in extrusion processes) and PTFE coating emulsions.
- Teflon articles, such as Teflon tape or spacers, would likely meet the article exemption.
- TFE, the monomer used in the manufacture of PTFE, is not included in the Certain PFAS NOL category. But it is individually listed on TURA.

Industrial Uses

- Metal finishing
 - Surfactants - Fume/mist suppressants
 - Bath additive in nickel, copper and tin plating
- Solvents - HFE's (hydrofluoroethers)
 - e.g., HFE 7100 and HFE 7500
- Solvents, blowing agents, refrigerants - HFO's, HFC's
- Surfactants, lubricants, coatings in many industries



Example: Hex Chrome Fume/Mist Suppressants

- Function – low surface tension
 - Limits release of Cr^{+6} from metal finishing baths
- Essential? For all or some applications?
 - Performance criteria vary somewhat with application
- Alternatives
 - Non-hex chrome metal finishing
 - Closed systems
 - Drop in alternatives
 - C6 fluorinated surfactants (same chemical class)
 - Non-fluorinated surfactants
- Need for continued R&D for Cr^{+6} metal finishing alternatives and non-fluorinated fume suppressants



Aqueous Film-Forming Foam (AFFF)

- Primarily used by airports, military and fire depts – *also industrial fire suppression systems*
- Internationally, many airports have shifted to fluorine-free foams (F3)
- Many foam manufacturers now offer both options
 - Alternatives are cost competitive
- MassDEP working with CT DEEP to test several F3 foams



Obstacles for Companies

Lack of company awareness

PFAS not listed on SDS
Confidential Business Information (CBI)
Tainted incoming feedstock

Regrettable substitution

'Shorter-chain' is still a 'forever chemical'

Fear of liability

Other PFAS sources = misplaced liability

Lack of regulation

What to look for

Check SDS (see examples)

Keywords to look for terms such as 'fluoro', 'PFxx', 'fluorinated', 'HF is a decomposition product'

De minimis = 1% for all PFAS except PFOA (<0.1%). Applications where PFAS are likely to be present less than 1% include surfactants, processing aids

Testing is not required, but is an option

NuGenTec Fluosolv FX-AP Solvent

Fire = 1
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

HEALTH 2 Health = 2
 FIRE 1 Fire = 1
 REACTIVITY 0 Reactivity = 0

· **Hazard(s) not otherwise classified (HNOC):** None known

3 Composition/Information on Ingredients

· **Chemical characterization:** Mixtures

· **Description:** Solvent mixture

· **Dangerous Components:**

CAS: 156-60-5 RTECS: KV 9400000	trans-dichloroethylene ⚠ Flam. Liq. 2, H225; ⚠ Acute Tox. 4, H332; Aquatic Chronic 3, H412	Proprietary%
	Proprietary ⚠ Acute Tox. 4, H302; Flam. Liq. 4, H227	12%
CAS: 163702-07-6	Methyl nonafluorobutyl ether Aquatic Chronic 3, H412	Proprietary%
CAS: 163702-08-7	Methyl nonafluoroisobutyl ether Aquatic Chronic 3, H412	Proprietary%
CAS: 67-63-0 RTECS: NT 8050000	Isopropyl alcohol ⚠ Flam. Liq. 2, H225; ⚠ Eye Irrit. 2, H319; STOT SE 3, H336	Proprietary%

4 First-Aid Measures

· **Description of first aid measures:**

· **General information:** Take affected persons out into the fresh air.

· **After inhalation:**

Supply fresh air. If required, provide artificial respiration. Consult doctor if symptoms persist.

· **After skin contact:** Generally the product does not irritate the skin.

· **After eye contact:** Rinse opened eye for several minutes under running water.

· **Information for doctor:**

· **Most important symptoms and effects, both acute and delayed:** Breathing difficulty

Fluosolv CAS Solvent

P403+P233 Store in a well-ventilated place. Keep container tightly closed.
 P405 Store locked up.
 P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- **Classification system:**
- **NFPA ratings (scale 0 - 4)**



- **HMIS-ratings (scale 0 - 4)**



- **Hazard(s) not otherwise classified (HNOC):** None known

3 Composition/Information on Ingredients

- **Chemical characterization:** Mixtures
- **Description:** Mixture of substances listed below with non-hazardous additions.

· **Dangerous Components:**

Proprietary Fluorinated Fluid Blend	>60%
⚠ Acute Tox. 4, H332; Aquatic Chronic 3, H412	
Proprietary Solvent	<40%
⚠ Flam. Liq. 2, H225, ⚠ Eye Irrit. 2A, H319, STOT SE 3, H335-H336	

· **Additional information:**

The exact percentages of the ingredients of this mixture are considered to be proprietary and are withheld in accordance with the provisions of paragraph (i) of §1910.1200 of 29 CFR 1910.1200 Trade Secrets.

4 First-Aid Measures

- **Description of first aid measures:**
- **After inhalation:**
 Supply fresh air. If required, provide artificial respiration. Consult doctor if symptoms persist.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.

3M Novec 7100

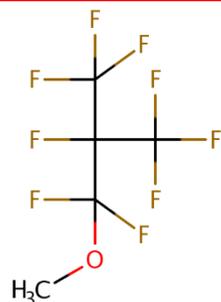
3M™ Novec™ 7100 Engineered Fluid 07/09/21



Safety Data Sheet

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
Methyl nonafluoroisobutyl ether	163702-08-7	55 - 90
Methyl nonafluorobutyl ether	163702-07-6	10 - 45



methyl nonafluoroisobutyl ether 163702-08-7
 From [EPA Comptox dashboard](#)

3M™ Novec™ 7100 Engineered Fluid

Introduction

3M™ Novec™ 7100 Engineered Fluid, methoxy-nonafluorobutane (C₄F₉OCH₃), is a clear, colorless and low-odor fluid intended to replace ozone-depleting substances (ODSs) and compounds with high global warming potential (GWP) in many applications. Its physical properties are compared with several other ODS replacement fluid candidates in Table 1.

This proprietary fluid has zero ozone depletion potential and other favorable environmental properties (see Table 2). It has one of the best toxicological profiles of CFC replacement materials, with a time-weighted average exposure guideline of 750 ppm (eight hour average).

The high boiling point and low surface tension of Novec 7100 fluid make it ideal for use in vapor degreasing applications as a neat (pure), azeotropic component or co-solvent parts cleaner. In addition, its chemical and thermal stability, non-flammability and low toxicity make it useful for many other industrial and specialty solvent applications (see below).

Applications

- Cleaning and rinsing agent
 - Heavy-duty cleaning (co-solvent) – heavy oils, greases, fluxes
 - Medium-duty cleaning (azeotrope)– oils, greases, waxes
 - Light-duty cleaning (neat)– particulates, fluorolubes, light oils, fluoropolymers
- Lubricant carrier
 - Fluorocarbons
 - Hydrocarbons
 - Silicones
- Specialty solvents, dispersion media, reaction media
- Spray contact cleaner
- CFC, HCFC, HFC and PFC replacement
- Dielectric test media
- Heat transfer
 - See “3M™ Novec™ 7100 Engineered Fluid for Heat Transfer” Application Information

Material Description

Ingredients	3M™ Novec™ 7100 Engineered Fluid
Methoxy-nonafluorobutane ¹	99.5% minimum
Non-volatile residue (NVR)	2.0 ppm maximum
Appearance	Clear, colorless

¹Novec 7100 fluid (C₄F₉OCH₃) consists of two inseparable isomers with essentially identical properties. These are (CF₃)₂CFCH₂OCH₃ (CAS No. 163702-08-7) and CF₃CF₂CF₂OCH₃ (CAS No. 163702-07-6).

Identifying PFAS Use in Your Facility

Look for common uses of PFAS



- Common uses include textile coatings (e.g., water-repellency), surfactants, degreasing (e.g., solvents), metal finishing (e.g., fume suppressants), polymers and resins, and AFFF
- Check your SDSs for products likely to contain PFAS
- Note listings described as Confidential Business Information (CBI) or proprietary as items of concern – contact your supplier or [OTA](#) for help

Check available CAS numbers against reportable definition



- Review [draft TURA guidance](#) and use reportable definition to check CAS # against [existing databases](#)
- Paper and metal finishing industries, [contact OTA](#) to take survey
- If no CAS numbers are available for fluorinated compounds, contact your supplier or [OTA](#) for technical assistance

Send a notification letter to your chemical or product supplier



- Use [OTA's template](#) to notify your supplier
- Involve your purchasing department in this effort
- Keep records to demonstrate good faith effort

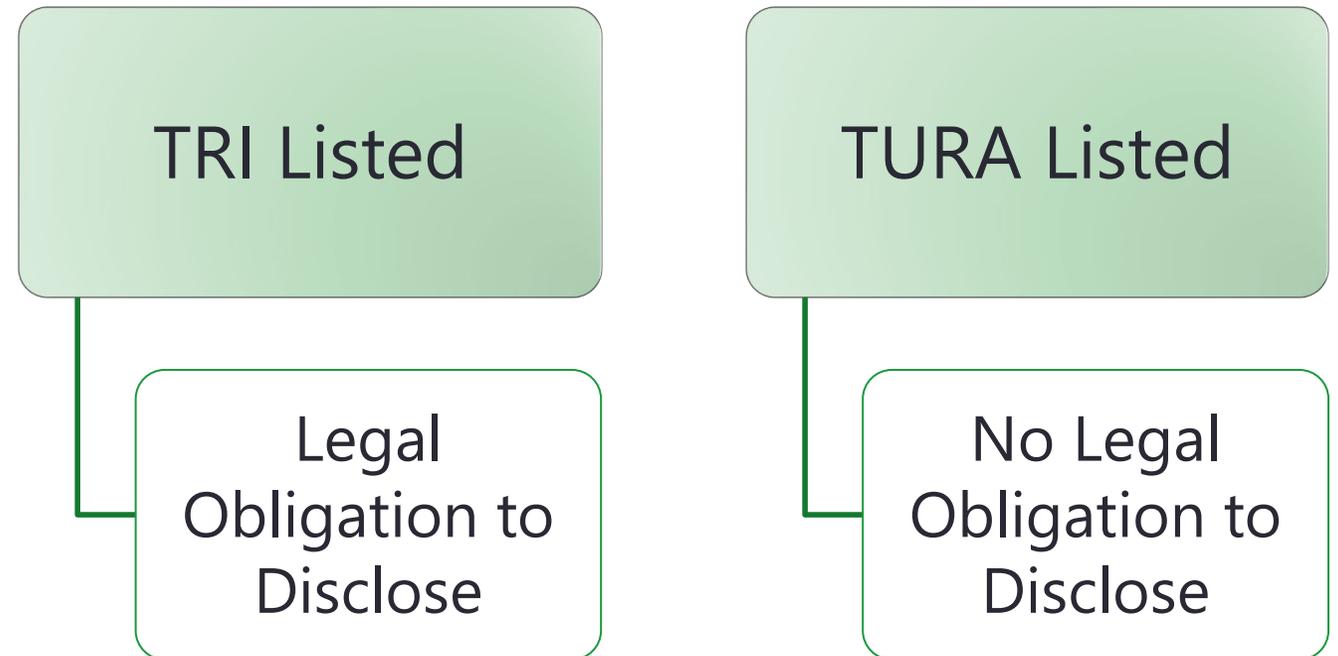
Contribute to developing product list



- The TURA program is developing a list of products confirmed to contain PFAS
- If your supplier notifies you of products containing PFAS, please share this information with OTA/TURI

PFAS Identification: Supplier Notification Letter

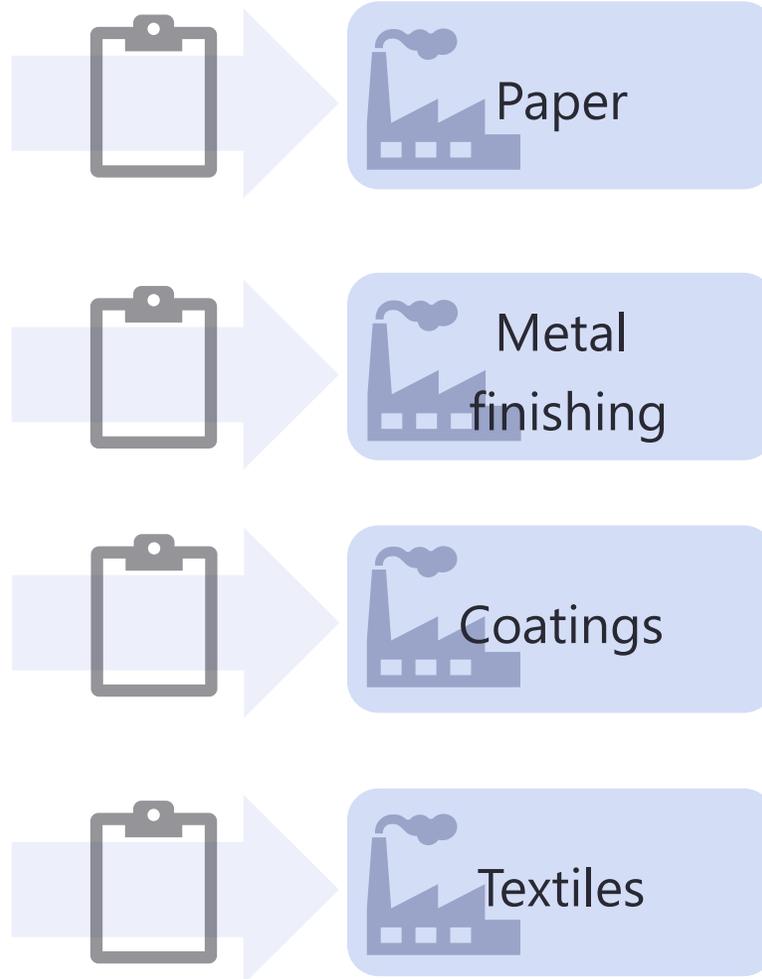
OTA has developed a **supplier notification letter** (template in handouts) that companies can use to request information from their suppliers about PFAS reportable under TRI and TURA.



Resources for Companies: PFAS Identification

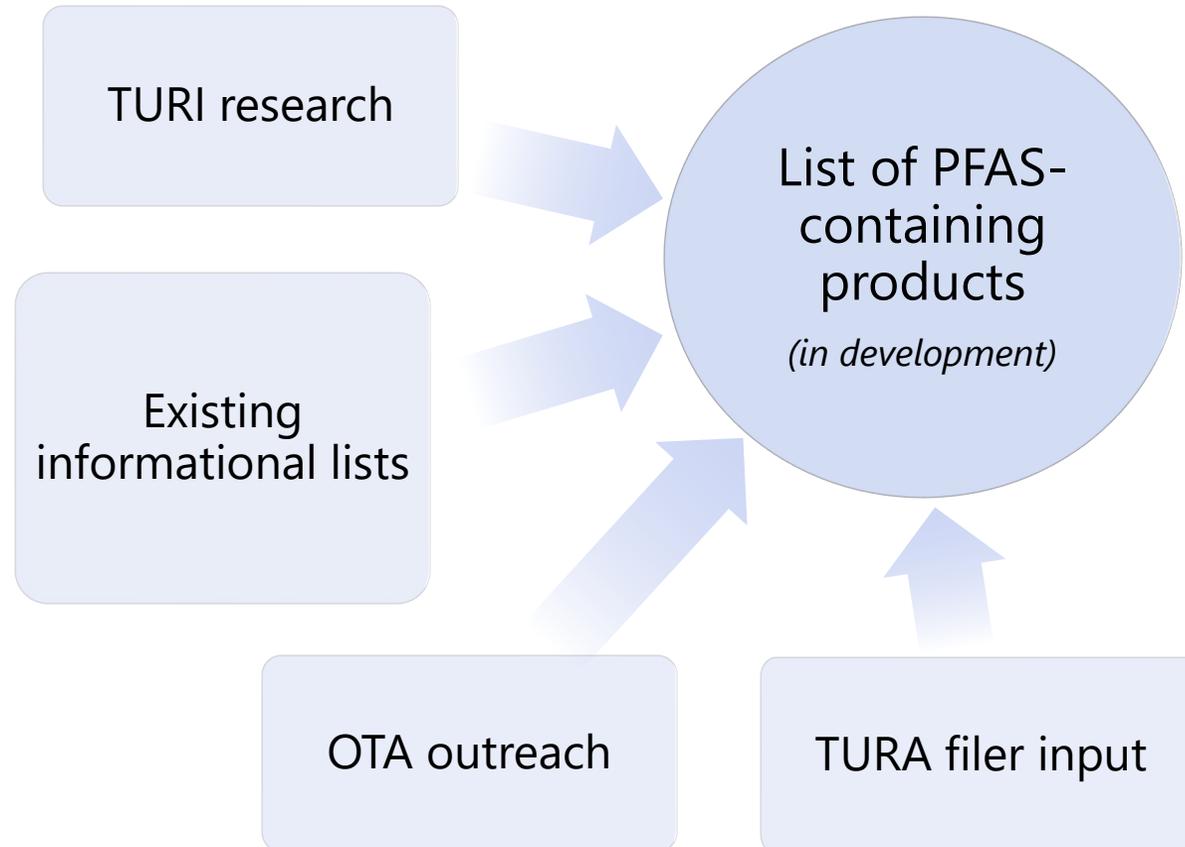
Assessments to
identify PFAS
sources

*(several in
development)*



- OTA technical staff flag likely sources of PFAS
 - Companies may share list of CAS numbers with OTA
- OTA and TURI pursue research on products of concern
- Companies may opt to share product information with OTA to populate a list of PFAS-containing products

Resources for Companies: PFAS Product List



- Once developed, product list made available to help companies avoid PFAS-containing products
- May highlight applications where safer alternatives still need to be identified

Resources

TURA resources –

- [Guidance document for reporting PFAS under TURA](#)
- OTA Resources
 - [Supplier notification letter template](#)
 - Paper and Metal finishing industry survey (see separate handout)
 - PFAS tracking and reporting deadlines (see separate handout)
- TURI Resources
 - Compilation of [resources](#) prepared by the TURA Program in Massachusetts, including suggestions for identifying PFAS in facilities and products
 - [Information on how to determine if your facility is using PFAS](#)
 - [PFAS Policy Analysis May 2021](#) - analyzes the implications of adding the category Per- and PolyFluoroalkyl Substances Not Otherwise Listed (PFAS NOL) to the TURA list.
- [MassDEP website](#) - Overview and information specific to Massachusetts

Resources

Other Resources -

- Information on industrial uses of PFAS -
 - Glüge et al. (2020) An overview of the uses of per- and polyfluoroalkyl substances [supplementary electronic information - 1](#). *Environmental Science Processes and Impacts*, 22. This document provides an overview the applications of PFAS in a variety of industry sectors and specific product categories.
 - Literature paper that describes the development of the above information - Glüge et al, [An overview of the uses of per- and polyfluoroalkyl substances](#). *Environmental Science Processes and Impacts*, 22, 2020.
- [OECD Portal on Per and Poly Fluorinated Chemicals](#) - includes a wide variety of PFAS resources, including a link to OECD's Global Database of PFAS.
- EPA Resources -
 - [Webinar slides](#) from April 16, 2020, on TRI Reporting and New Requirements for PFAS Chemicals
 - [EPA's PFAS webpage](#) includes EPA actions to address PFAS and tools and resources.
 - [Research on Per- and Polyfluoroalkyl Substances \(PFAS\)](#) - EPA is developing analytical methods to detect and quantify PFAS; current research and existing methods detailed here.

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Contact Us

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