Restriction proposal on undecafluorohexanoic acid (PFHxA), its salts and related substances[1]

Summary

The Background Document details a proposal to restrict the manufacture, use and placing on the market of undecafluorohexanoic acid (PFHxA), its salts and related substances. Due to their unique properties (e.g. providing oil, dirt and water repellence), PFHxA, its salts and related substances are used in a wide variety of sectors in large quantities in the EU. The main uses identified are in paper and cardboard (food contact materials), textiles and fire-fighting foams. However, many other uses are covered by the scope of this restriction proposal (e.g. semiconductors, medical devices, cosmetics, intermediate uses, etc.). ECHA has compiled an indicative list of substances covered by the scope of this restriction proposal. The indicative list is provided as annex to this information note.

The Dossier Submitter concluded that the use of (PFHxA), its salts and related substances results in a risk to environment and human health and that the emissions need to be minimised. Given that PFHxA salts and related substances transform/degrade into PFHxA, they would also need to be restricted. The Dossier Submitter proposes that PFHxA has a combination of hazardous properties: PFHxA has a very high persistence which leads to an increasing pollution stock in the environment if the emissions are not controlled. The substance is also mobile and has surface active properties such that the use of the substance causes contamination of ground water, surface waters and the marine environment on a wide geographical scale. Furthermore, its removal from e.g. contaminated drinking water and soil is currently not economically feasible. Exposure of humans takes place mainly via drinking water and food, including infants via breast milk. Due to the very long-term and increasing exposure, long-term risks to human health and environment cannot be quantified with certainty.

The Dossier Submitter considered the proposed restriction to be proportionate to the risk: emissions to the environment are irreversible and alternatives are available and affordable for many uses. Where the Dossier Submitter considered that this is not the case, derogations from the restriction have been proposed.

SEAC DRAFT OPINION CONSULTATION

The consultation on the SEAC draft opinion for this proposed restriction will start on 07/07/2021 and end on 07/09/2021.

Interested parties can comment on the restriction report using the relevant web form on the ECHA website.

When submitting information, please keep in mind that:

- It is necessary to provide **supporting evidence** to justify the information submitted in the consultation, otherwise SEAC may not be able to independently evaluate the information submitted.

[1] This information note has been prepared based on the Background Document submitted by Germany, as well as the RAC final opinion and the SEAC draft opinion.

- In order for SEAC to evaluate whether a derogation could be supported, **detailed and substantiated information** on the following elements is needed:
  - The **tonnage used and function** of PFHxA, its salts and related substances in the specific use/ sector;
  - **Alternatives** that have been assessed, including information on the search for alternatives, and why they are considered not technically or economically feasible;
  - If alternatives are currently available, but more time than the 36-month general transition period currently proposed by SEAC (from entry into force of the restriction) is considered necessary for substitution, a detailed justification of the substitution timeline;
  - The **socio-economic impacts** in case a derogation is not proposed. This includes the financial impact to companies manufacturing the products in question, but also to companies manufacturing alternatives, as well as the potential impact on society if these products are not available any longer or do not provide the same level of performance, following the restriction.
- Information arriving after the closing date or via other channels than the web form will not be taken into account by SEAC.
- It is your responsibility to remove **confidential information** from the comments and attachments submitted with non-confidential status.
- As far as possible, justifications based on non-confidential information are preferred to those based on confidential information. Should the submission of confidential information be considered to be fundamental to justify a derogation, then a non-confidential form of the confidential information (i.e. generic use descriptions, a tonnage or concentration range or aggregated data from multiple sources to prevent back-calculation) should also be submitted in addition to the confidential information. This is to allow for the most transparent discussion of the justification for a derogation in the SEAC opinion.

Further information can be found in the consultation guidance available at: https://echa.europa.eu/documents/10162/13641/restriction_consultation_guidance_en.pdf

When responding to the consultation, stakeholders should ensure that they are referring to the SEAC draft opinion and the most recent version of the Background Document and its annexes that are published alongside the consultation.

How to submit a comment in the consultation on the proposed restriction

When you are ready to make your comments, click on the appropriate link on the ECHA website. Please be aware that it is not possible to save your submission and come back to it, so you should already have your comments prepared in an attachment or saved in some other format in advance.

The web form contains five main parts:

- Introduction: containing some general information on the restriction and a link to this note and the consultation guidance.
- Section 1: personal information.

- Section 2: organisational information.
- Section 3: non-confidential comments on the SEAC draft opinion - both general comments and information on specific issues (see below). Your responses can be entered directly into the form or through section 4 as an attachment. However, please do not submit the same comments via both means. General comments can be on any aspect of the SEAC draft opinion.
- Section 4: Non-confidential attachments can be added here.
- Section 5: Confidential attachments can be added here. Confidential information will only be available to the ECHA Secretariat, the Committees and Member State Competent Authorities. However, if ECHA receives an Access to Documents request, we may come back to you for justifications why the information is confidential. You can also add this information already in the relevant part of the webform.

Once you have finished your submission press the submit button and your comments will be submitted. You will receive a submission number via e-mail and you should refer to this in any communication with ECHA on this issue. It is not possible for you to retrieve your submission so you may want to take a screen shot, or printed copy for your future reference.

Specific information requests

1. Reporting requirements

In line with the proposal by the Dossier Submitter, SEAC currently suggests reporting requirements for the proposed uses to be derogated in PPEs, high visibility clothing, medical devices and their impregnation agents, epilames in watches, filtration and separation media, and fire-fighting foams (for class B fires in tanks >400m^2 and their bunded areas). For more details, please refer to paragraphs 9 and 11 of the conditions of the restriction as proposed by SEAC in the SEAC draft opinion.

SEAC would like to receive feedback from stakeholders concerning the availability of information as required in paragraphs 9 and 11 to the actors indicated. In particular, if any issues in collecting this information is expected, a detailed explanation (including examples) should be provided.

2. Concentration limits for PFHxA, its salts and related substances in fluoropolymers[2]

Based on the information provided during the consultation on the Annex XV report, the Background Document reports that fluoropolymers may contain PFHxA, its salts or PFHxA-related substances, as residues above the proposed specific concentration limits. To avoid the expected high societal costs of a restriction on the placing on the market of affected fluoropolymers, the Dossier Submitter proposed the following concentration limits for PFHxA and its salts or PFHxA-related substances in fluoropolymers:

- 2000 ppb for the sum of PFHxA and its salts in **fluoropolymers**;

[2] With the term fluoropolymers we refer to polymers where fluorine atoms are directly bound to the backbone (i.e. not to side chains). Fluoropolymers sometimes contain PFHxA, its salts or related substances as residuals from the manufacturing process but are not considered to be PFHxA-related substances themselves.

- 100 ppm for the sum of PFHxA related low molecular substances in fluoropolymers;

- 150 ppm for the sum of PFHxA and its salts in fluoropolymers used in the following usage groups: **engine parts in automotive, aerospace and shipping industry**;
- 2500 ppm for the sum of PFHxA related low molecular substances in fluoropolymers used in the following groups: engine parts in automotive, aerospace and shipping industry;

- 10 ppm for the sum of PFHxA and its salts in fluoropolymers used in **coating of electronic devices** until XX XX XXXX [7 years after entry into force];
- 500 ppm for the sum of PFHxA related substances in fluoropolymers used in coating of electronic devices until XX XX XXXX [7 years after entry into force].

SEAC currently notes in its draft opinion that higher concentration limits may be justified to allow for the continued use of fluoropolymers in a number of sectors. However, **SEAC considers that more information is needed to understand the impacts of different potential concentration limits in order to guide any decision on setting appropriate concentration limits** and requests specific and detailed information on:

a. the sector/application in which respondents use fluoropolymers containing PFHxA, its salts and related substances (even as impurities), and the quantity of fluoropolymers used;
b. the current concentration (*in ppm/ppb*) of PFHxA, its salts or related substances in fluoropolymers for specific applications/uses;
c. the concentration of PFHxA, its salts or related substances necessarily needed in the fluoropolymer to reach an appropriate performance level (if at all necessary) for specific applications/uses;
d. technical information on why it is not possible to use fluoropolymers that do not contain PFHxA, its salts or related substances in specific applications/ uses, including any technical information on why the performance level may not be satisfactory - does the presence of PFHxA, its salts or related substances in the fluoropolymer decisively affect the performance, or is it merely about the structure of the polymer itself (that would become different due to the presence of PFHxA, its salts or related substances during the manufacture of the fluoropolymer), or something else (please specify);
e. why it is not feasible to reduce the concentrations below the general proposed concentration limits of 25 ppb (PFHxA and its salts) or 1000 ppb (PFHxA related substances), noting also that information was submitted about an existing technology to remove PFAS from fluoropolymers[3];
f. existing technologies that allow the production of fluoropolymers without using PFAS (in particular, without using PFHxA, its salts or related substances) as processing aid;
g. the concentration of PFHxA, its salts or related substances in purified fluoropolymer grades;
h. the difference in price between fluoropolymers purified of PFHxA, its salts or related substances and non-purified grades, if that is considered a major impediment to transitioning to purified grades;

[3] Please see comment #2960 in the RCOM, part 1.

i. possible difficulties of complying with different concentration limits for different sectors where fluoropolymers are used, as suggested by the Dossier Submitter;
j. analysis to demonstrate and, if possible, quantify the negative impact of not proposing higher concentration limits (including corroborated information on the limit value that would help avoid the largest impacts).

3. Coating of electronic devices

During the consultation on the Annex XV report, stakeholders requested a derogation for different types of coating of electronic devices. Based on those submissions, it remains unclear to SEAC if a derogation would be justified to avoid disproportionate impacts and how a possible derogation could be phrased in order to ensure that it is targeted only to specific uses. More information is needed before a derogation for coating of electronic devices can be fully evaluated by SEAC.

For **side-chain fluorinated polymers**, SEAC invites stakeholders to submit the following:

a. further information on the exact type of use, function provided, related emissions and costs of a restriction (including why alternatives are not available/technically or economically feasible);
b. proposals as to how to word a possible derogation such that it covers the necessary uses and only those uses;
c. information on whether the wording used in the PFOA restriction[4] ("pulsed plasma nano-coating") would also be appropriate for these uses (along with the related costs and emissions);
d. information on the downsides of potentially including a derogation of pulsed plasma nano coatings (e.g. additional uses that have not been evaluated might be covered etc.);
e. information on the extent to which a derogation for plasma nano coatings would also cover uses in filtration applications, medical devices/ medical textiles and technical textiles.

For **fluoropolymers**: please also see question 1 on "Concentration limits for PFHxA, its salts and related substances in fluoropolymers".

4. Cladding for optical fibres

During the consultation on the Annex XV report, one stakeholder (comment #3002) reported that cladding in optical fibres would be impacted by the proposed restriction and requested a derogation. However, the information provided was insufficient to evaluate the request for a derogation. In order for further consider this derogation, SEAC requests detailed and specific information on:

a. the quantity of PFHxA related substances used in the EU per year for this use;

[4] Point 3e in the SEAC opinion on the PFOA restriction proposal: "Paragraphs 1 and 2 shall apply from (36 months after entry into force) with the exception of **pulsed plasma nano-coating produced using conditions that minimise emissions to the environment, for which the transition period is 6 years after entry into force"**.

b. how wide this use is in the EU (e.g. how many companies use PFHxA related substances for cladding in optical fibres);

c. the claim that higher data rate transmission media will be mandatory in the near future for safe driving or auto-pilot system:
   i. what is the timeframe in which this requirement is expected?
   ii. what data rate will be required and what can alternatives achieve in this regard?

d. alternatives that have been assessed, including information on the search for alternatives, and why they are considered not technically or economically feasible;

e. the performance level of optical fibres potentially already being manufactured by other actors (using alternative substances or processes) in the use specified in comment #3002 (see RCOM, part 2).

5. Medical devices

During the consultation on the Annex XV report, stakeholders provided information on the use of PFHxA related substances in some medical devices (e.g. hearing aid devices, eye drops). SEAC is currently considering whether to support the derogation proposed by the Dossier Submitter for the use of PFHxA, its salts and related substances in medical devices as specified in Regulation 2017/745. To be able to support it in the final opinion, SEAC would like to receive more information on:

a. whether the definition of medical devices as specified in Regulation 2017/745 would also cover medical textiles (woven or non-woven);

b. if **medical textiles** are not covered by the proposed derogation for medical devices, please provide information on:
   i. the type(s) of product(s) not covered;
   ii. the quantity of PFHxA related substances used in the EU per year for this application and the related emissions;
   iii. alternatives that have been assessed, including information on the search for alternatives, and why they are considered not technically or economically feasible (including their difference in price, if economic feasibility is considered to be an issue);
   iv. the substitution timeline, in case alternatives are currently available, but more time than the 36-month general transition period currently proposed by SEAC (from entry into force of the restriction) is considered necessary for substitution;
   v. the extent to which the relevant applications would be covered by a derogation of plasma nano coatings similar to what was suggested by SEAC in the PFOA restriction case (see footnote 3);
   vi. socio-economic impacts resulting from a restriction of this use.

6. Antifog face shields

SEAC considers that the socio-economic impacts of a restriction for the use of PFHxA related substances on face shields used in medical settings may merit the same considerations as personal protective equipment, although they are not covered by Regulation (EU) 2016/425. However, in order to complete their evaluation of the impacts of a restriction for this use and be able to support a derogation in the final opinion, SEAC

requires additional information on:

a. the total quantity of PFHxA related substances used in the EU per year for this use;
b. how widespread this use is in the EU (e.g. how many companies use PFHxA related substances for treating antifog face shields and the function they provide);
c. alternatives that have been assessed, including information on the research for alternatives made, and why they are considered not technically or economically feasible (including their difference in price, if economic feasibility is considered to be an issue);
d. the substitution timeline, in case alternatives are currently available, but more time than the 36-month general transition period currently proposed by SEAC (from entry into force of the restriction) is considered necessary for substitution;
e. antifog face shields not containing PFHxA-related substances potentially already on the market, their performance level and the alternatives used.

7. Firefighting foam mixtures for class B fires, large tanks

The Dossier Submitter proposed a 12-year derogation with a reporting requirement for "concentrated fire-fighting foam mixtures for cases of class B fires in tanks with a surface area above 500 m^2". SEAC is currently supporting the Dossier Submitter's rationale for a derogation for this use but is considering suggesting that the minimum size of tanks to qualify for the derogation would be set at 400 m^2, and that the bunded areas of those tanks are also included in the derogation. However, SEAC would like to receive information on the **number of sites and the total surface area that would be covered by the derogation as phrased by SEAC** (tanks larger than 400 m^2 and bunded areas). In addition, information on the size of bunded areas (including an average size) and the possibility to fully contain the fire-fighting foams in case of an accident would be welcome.

8. Technical textiles: textiles used in engine bays

In the Background Document, and, in response to a comment received during the consultation on the Annex XV report[5], the Dossier Submitter proposed a permanent (i.e. without a time-limit) derogation for textiles used in engine bays in the automotive and aerospace industry. However, SEAC considers that the information available in the Background Document and provided during the consultation on the Annex XV report is insufficient to conclude on a derogation. Therefore, SEAC requests additional information on:

a. use quantities of PFHxA, its salts and related substances used and associated emissions to the environment from the manufacture, the service life and the end of life of vehicles;
b. clarification on the substances used, i.e. PFHxA-related (low-molecular) substances, side-chain fluorinated polymers, or fluoropolymers (see footnote 1) and their function;
c. a comprehensive overview of the end products (e.g. different types of vehicles) requiring this use;

[5] Please see comment #2996 in the consultation on the Annex XV report for information on the referred use (RCOM, part 2).

d. the number/proportion of the related end products (cars etc.) requiring this use;
e. alternatives (for the textile product or for the PFAS treatment) that have been assessed, including information on the search for alternatives, and why they are considered not technically or economically feasible (including their difference in price, if economic feasibility is considered to be an issue);
f. alternatives potentially already used by competitors, and their performance in general and in comparison with textiles containing PFHxA and/or related substances;
g. socio-economic impacts resulting from a restriction of this use;
h. proposed wording of a possible derogation, such that it would cover the intended use in terms of substances and end products;
i. the extent to which other possible derogations proposed , such as the one proposed by the Dossier Submitter for filtration and separation media, would also cover the use of technical textiles in engine bays.

9. Filtration and separation media

During the consultation on the Annex XV report, several stakeholders requested a derogation for filtration and separation media. The Dossier Submitted proposed a permanent (i.e. without a time limit) derogation for “filtration and separation media used in high performance air and liquid applications that require a combination of water- and oil-repellence”.

SEAC is currently considering whether to support this derogation, since enforcement of and compliance with this derogation may be difficult due to the current wording. More information could be submitted on:

a. Enforcement and compliance issues expected by industry stakeholders or enforcement authorities due to the current wording.
b. Applications that would not be covered by the proposed derogation with the current wording and, for these applications, information on:
    i. alternatives that have been assessed, including information on the research for alternatives made, and why they are considered not technically or economically feasible (including their difference in price, if economic feasibility is considered to be an issue);
    ii. the substitution timeline, in case alternatives are currently available, but more time than the 36-month general transition period currently proposed by SEAC (from entry into force of the restriction) is considered necessary for substitution.
c. The extent to which the relevant applications would be covered by a derogation of plasma nano coatings similar to that suggested by SEAC in the PFOA restriction case (see footnote 3).
d. The elements that a suitable wording for the derogation should contain.
e. Industrial or other national or international performance standards for filtration and separation media that can be met only with the current performance of combined water- and oil-repellence provided by PFHxA related substances. Evidence on the failure of alternatives to meet these standards should also be provided. Information on the performance standards will help SEAC to understand how to word any proposed derogation.

10. Photographic coatings applied to papers and inkjet photo media coatings

During the consultation on the Annex XV report, some stakeholders argued that the proposed derogation for photographic coatings on films should be extended to also cover photographic coatings applied to papers and inkjet photo media. SEAC currently does not support the derogation proposed by the Dossier Submitter for these uses and requests more information on:

a. the type of products suggested to be derogated;
b. the quantity of PFHxA related substances used in the EU per year (non-confidential ranges) for this application and their function;
c. emissions taking place in the manufacturing, use (potentially by consumers) and end-of-life stages;
d. alternatives that have been assessed, including information on the research for alternatives made, and why they are considered not technically or economically feasible (including their difference in price, if economic feasibility is considered to be an issue);
e. the timeframe needed to develop or implement suitable alternatives and the main impediments to develop a suitable alternative (if relevant);
f. the socio-economic impacts of not being able to use PFHxA related substances, including if/how a loss of performance would result in any concrete cost for society.

Annex – Indicative list of substances

This is an indicative and non-exhaustive list of substances that are within the scope of the restriction proposal on undecafluorohexanoic acid (PFHxA), its salts and related substances[6].

It should be noted that:

- The list has been updated from the third version (16 July 2020) of the indicative list of substances published on the ECHA website during the consultation on the Annex XV report[7]. The current version (07 July 2021) is in line with the final RAC opinion.
- Some of the substance names may appear more than once from EC/list number 6XX-XXX-X onwards.

Disclaimer: this list does not constitute a comprehensive record of all relevant numerical identifiers relevant for the proposed restriction. Please note that a substance identified by a numerical identifier or name other than those specified in this list may also still be covered by the proposed restriction. Similarly, a substance for which no numerical identifier is available may also be covered by this restriction proposal.

EC/list number	CAS number	Name
206-196-6	307-24-4	Undecafluorohexanoic acid
206-391-6	335-56-8	1-bromo-1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluorohexane
206-586-6	355-43-1	1,1,1,2,2,3,3,4,4,5,5,6,6-tridecafluoro-6-iodohexane
206-796-8	375-82-6	2,2,3,3,4,4,5,5,6,6,7,7,7-tridecafluoroheptan-1-ol
211-477-1	647-42-7	3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctan-1-ol
218-056-1	2043-57-4	1,1,1,2,2,3,3,4,4,5,5,6,6-tridecafluoro-8-iodooctane
218-407-9	2144-53-8	3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl methacrylate
241-527-8	17527-29-6	3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl acrylate
244-479-6	21615-47-4	Ammonium undecafluorohexanoate
246-791-8	25291-17-2	3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooct-1-ene
248-576-4	27619-89-2	3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctanesulphonyl chloride
248-580-6	27619-97-2	3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctanesulphonic acid
252-046-8	34455-29-3	Carboxymethyldimethyl-3-[[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulphonyl]amino]propylammonium hydroxide
253-994-5	38550-34-4	1,1,1,2,2,3,3,4,4,5,5,6,6-tridecafluoro-8-iodononane

[6] This indicative list has been prepared by ECHA based on the Background Document prepared by the German Competent Authorities and on the RAC opinion.
[7] https://echa.europa.eu/restrictions-under-consideration/-/substance-rev/25419/term

EC/list number	CAS number	Name
256-503-2	49859-70-3	2-[methyl[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)sulphonyl]amino]ethyl acrylate
257-473-3	51851-37-7	Triethoxy(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)silane
261-818-3	59587-38-1	Potassium 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctanesulphonate
269-927-8	68391-08-2	Alcohols, C8-14, γ-ω-perfluoro
277-551-0	73609-36-6	Dichloromethyl(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)silane
278-947-6	78560-45-9	Trichloro(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)silane
279-481-6	80475-32-7	N-[3-(dimethylamino)propyl]-3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctanesulphonamide N-oxide
288-657-1	85857-16-5	Trimethoxy(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)silane
288-658-7	85857-17-6	Dimethoxymethyl(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)silane
289-100-5	85995-91-1	Alkyl iodides, C8-14, γ-ω-perfluoro
292-474-2	90622-71-2	Alkyl iodides, C6-18, perfluoro
400-960-4	-	5(6)-endo(exo)-perfluorohexylbicyclo[2.2.1]hept-2-yl-methyl-polysiloxane
402-910-7	-	3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 3-dibutylaminopropionate
432-190-1	182176-52-9	ammonium 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-1-octanesulfonate; reaction mass of: 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-1-octanesulfonic acid
432-570-5	-	1,1,1,2,2,3,3,4,4,5,5,6,6,-tridecafluorotetradecane
432-580-1	-	F6H6
437-490-4	-	BIOSIL BASICS FLUORO GUERBET 3.5
459-520-5	132182-92-4	1,1,1,2,2,3,4,5,5,5-decafluoro-3-methoxy-4-(trifluoromethyl)pentane
459-790-4	-	[No public or meaningful name is available]
607-977-8	26650-09-9	Thiocyanic acid, 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl ester
608-993-8	34455-22-6	N-[3-(dimethylamino)propyl]-3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-octane-1-sulfonamide
610-711-3	51619-73-9	1-Octanesulfonamide, 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-N-(2-hydroxyethyl)-N-methyl-
611-565-3	57678-01-0	1-Octanol, 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-, 1-(dihydrogen phosphate)
620-625-8	356056-14-9	Diisopropyl(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)silane
620-643-6	324063-66-3	Bis(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)tin oxide
620-884-7	192212-66-1	(prop-2-en-1-yl)tris(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)stannane
621-546-1	193197-68-1	Tris[4-(tridecafluorohexyl)phenyl]phosphine

EC / list number	CAS number	Name
621-552-4	175354-32-2	tris(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)stannane
621-555-0	175354-31-1	bromotris(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)stannane
621-886-0	356055-76-0	4-(3,3,4,4,5,5,6,6,7,7,8,8,8-Tridecafluorooctyl)benzyl alcohol
621-915-7	219985-31-6	Tris[4-(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)phenyl]phosphine
622-809-3	313475-50-2	1-Methyl-3-(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)imidazolium hexafluorophosphate
622-943-2	556050-48-7	N-[4-(3,3,4,4,5,5,6,6,7,7,8,8,8-Tridecafluorooctyl)benzyloxycarbonyloxy] succinimide
623-262-3	16083-79-7	4,4,5,5,6,7,7,7-Octafluoro-2-hydroxy-6-(trifluoromethyl)heptyl methacrylate
623-391-5	916770-15-5	2-Chloro-4,6-bis[3-(perfluorohexyl)propyloxy]-1,3,5-triazine
623-580-2	452912-11-7	Bis(4,4,5,5,6,6,7,7,8,8,9,9,9-tridecafluorononyl) azodicarboxylate
624-016-8	932710-57-1	2,7-Bis(1H1H2H,2H-perfluorooctyl)-9-fluorenylmethoxycarbonyl chloride
624-766-6	127377-12-2	4,4,5,5,6,6,7,7,8,8,9,9,9-Tridecafluoro-2-hydroxynonyl acrylate
626-426-2	52447-22-0	Perfluoroheptanoyl chloride
626-437-2	27854-30-4	2H,2H,3H,3H-Perfluorononanoic acid
627-019-2	89889-20-3	4,4,5,5,6,6,7,7,8,8,9,9,9-Tridecafluorononyl iodide
628-448-8	34451-26-8	3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctane-1-thiol
631-514-9	16083-76-4	4,4,5,5,6,7,7,7-Octafluoro-2-hydroxy-6-(trifluoromethyl)heptyl acrylate
632-943-4	852527-50-5	N-(4,4,5,5,6,6,7,7,8,8,9,9,9-Tridecafluorononyl)iodoacetamide
632-945-5	852527-41-4	N-(4,4,5,5,6,6,7,7,8,8,9,9,9-Tridecafluorononyl)maleimide
632-949-7	852527-60-7	4,4,5,5,6,6,7,7,8,8,9,9,9-Tridecafluorononyl azide
633-216-4	65195-44-0	3,3,4,4,5,6,6,6-Octafluoro-5-(trifluoromethyl)hexyl methacrylate
633-617-4	932710-51-5	N-Succinimidyl 4,4,5,5,6,6,7,7,8,8,9,9,9-tridecafluorononanoate
640-818-0	86994-47-0	3-perfluorohexyl-2-hydroxypropyl methacrylate
641-169-6	-	2-Iodo-1-(perfluorohex-1-yl)octane
670-981-3	80806-68-4	4,4,5,5,6,6,7,7,8,8,9,9,9-tridecafluorononan-1-ol
671-469-2	102488-47-1	Chlorodimethyl(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-n-octyl)silane
671-492-8	54009-81-3	3-(Perfluoro-3-methylbutyl)-1,2-propenoxide 97%
671-615-5	51249-67-3	(7E)-7H,8H-Hexacosafluorotetradec-7-ene
672-655-6	212563-43-4	1H,1H-Tridecafluoro-1-iodoheptane
677-545-1	424-18-0	Methyl Undecafluorohexanoate
678-334-7	355-34-0	1H,1H-Undecafluorohexylamine
678-337-3	2708-07-8	Methyl Perfluoroamyl Ketone

EC/list number	CAS number	Name
678-417-8	383177-55-7	Ethyl Perfluoroamyl Ketone
679-831-1	77758-84-0	(Perfluorohexyl)phenyliodonium Trifluoromethanesulfonate
680-286-7	252237-40-4	[No public or meaningful name is available]
682-841-9	59587-39-2	Ammonium Perfluorohexylethylsulfonate
690-822-1	55756-24-6	1H-Perfluorooct-1-yne
691-551-1	423-46-1	1-hexanol, 2,2,3,3,4,4,5,5,6,6,6-undecafluoro-
696-198-7	133331-77-8	1-(Perfluorohexyl)octane
696-203-2	423-49-4	1H,1H-Tridecafluoroheptylamine
700-161-3	-	reaction mass of mixed (3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) phosphates, ammonium salt
700-403-8	-	Ammonium salts of mono- and bis[3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl and/or poly (substituted alkene)] phosphate
-	-	Phosphoric acid, mixed esters with 3,3,4,4,5,5,6,6,7,7,8,8,8 – tridecafluorooctan-1-ol and polysubstituted alkane, mono- and diammonium salts
700-684-7	80793-17-5	1,1,1,2,2,3,3,4,4,5,5,6,6-tridecafluorooctane
-	-	Amphoteric Fluorinated Surfactant
700-812-1	1189052-95-6	sodium hydrogen (3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)phosphonate
800-094-0	261503-44-0	1H-Tridecafluoro-3,3-dimethylhex-1-yne
801-260-5	96383-55-0	3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl 2-chloroacrylate
811-522-0	62880-93-7	sodium 2-methyl-2-({3-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)thio]propanoyl}amino)propane-1-sulfonate
811-523-6	88992-45-4	2-hydroxy-N,N,N-trimethyl-3-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)thio]propan-1-aminium chloride
811-734-3	36097-07-1	4-[(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl)thio]butane-1-thiol
811-846-2	130676-81-2	Triethoxy[5,5,6,6,7,7,7-heptafluoro-4,4-bis(trifluoromethyl)heptyl]silane
812-877-4	1228350-17-1	4,4,5,5,6,6,7,7,8,8,9,9,9-tridecafluorononyl methacrylate
812-911-8	87375-53-9	(Perfluorohexyl)trifluorooxirane
813-291-1	335-53-5	Perfluorohexanoyl chloride
-	-	Alkali metal [bis(4,4,5,5,6,6,7,7,8,8,9,9,9-tridecafluoro-2-substitutednonyl)amino]alkanesulfonate
813-621-4	914637-05-1	3,3,4,4,5,5,6,6,7,7,7-Undecafluoroheptan-2-ol
819-933-7	308-13-4	Perfluorohexanoic Anhydride
820-663-7	825651-73-8	1-(Perfluorohexyl)docosane
825-950-0	1189052-97-8	(3,3,4,4,5,5,6,6,7,7,8,8,8-Tridecafluorooctyl)phosphonic acid monoethyl ester
833-844-0	135841-49-5	Trimethyl(tridecafluorohexyl)silane

EC / list number	CAS number	Name
911-270-2	-	Reaction mass of 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl methacrylate and 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluorodecyl methacrylate and 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-henicosafluorododecyl methacrylate and 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,14-pentacosafluorotetradecyl methacrylate and 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,15,15,16,16,16-nonacosafluorohexadecyl methacrylate
-	-	Reaction mass of bis(polysubstituted hexanoic acid) bis(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) diphosphate and bis(polysubstituted hexanoic acid) 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl phosphate and polysubstituted hexanoic acid bis(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) hydrogen diphosphate and polysubstituted hexanoic acid bis(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) phosphate and polysubstituted hexanoic acid 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl hydrogen phosphate
939-126-4	-	Reaction mass of mixed (3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) phosphates, ammonium salts
940-286-2	-	3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl octadecanoate
940-287-8	-	di-(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) dodecanedioate
940-803-1	-	Reaction mass of ammonium(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) hydrogen phosphate and ammonium bis(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) phosphate
944-352-1	-	Reaction mass of mixed (3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) phosphates, ammonium salt
948-270-7	-	Reaction mass of ammonium(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) hydrogen phosphate and ammonium bis(3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctyl) phosphate