Helsinki, 8 December 2021

Addressees
Registrant(s) of Perfluamine listed in the last Appendix of this decision

Registered substance subject to this decision (the Substance)
Substance name: Perfluamine
EC number: 206-420-2
CAS number: 338-83-0

Decision number: Please refer to the REACH-IT message which delivered this communication (in format SEV-D-XXXXXXXXXX-XX-XX/F)

DECISION ON SUBSTANCE EVALUATION

Under Article 46 of Regulation (EC) No 1907/2006 (REACH), you must submit the information listed below:

A. Information required to clarify the potential risk related to PBT/vPvB

1. **Bioaccumulation in aquatic species via dietary exposure (test method: Bioaccumulation in fish: aqueous and dietary exposure, EU C.13/ OECD TG 305) with the Substance:**
   - under flow-through conditions, to ensure the two phases of uptake (test substance-spiked feed) and depuration (clean, untreated feed));
   - In addition the growth-corrected lipid-normalised kinetic BMF and the corresponding BCF must be determined.

Deadline

The information must be submitted by **17 July 2023**.

Conditions to comply with the information requested

To comply with this decision, you must submit the information in an updated registration dossier, by the deadlines indicated above. The information must comply with the IUCLID robust study summary format. You must also attach the full study report for the corresponding study/ies in the corresponding endpoint of IUCLID.

You must update the chemical safety report, where relevant, including any changes to classification and labelling, based on the newly generated information.

You will find the justifications for the requests in this decision in the Appendix/ces entitled "Reasons to request information to clarify the potential risk".
You will find the procedural steps followed to reach the adopted decision and some technical guidance detailed in further Appendices.

Appeal

This decision may be appealed to the Board of Appeal of ECHA within three months of its notification to you. Please refer to http://echa.europa.eu/regulations/appeals for further information.

Failure to comply

If you do not comply with the information required by this decision by the deadline indicated above, ECHA will notify the enforcement authorities of your Member State.

Authorised[1] under the authority of Mike Rasenberg, Director of Hazard Assessment

[1] As this is an electronic document, it is not physically signed. This communication has been approved according to ECHA's internal decision-approval process.

Basis for substance evaluation

The objective of substance evaluation under REACH is to allow for the generation of further information on substances suspected of posing a risk to human health or the environment ('potential risk').

ECHA has concluded that further information on the Substance is necessary to enable the evaluating Member State Competent Authority (MSCA) to clarify a potential risk and whether regulatory risk management is required to ensure the safe use of the Substance.

The ECHA decision requesting further information is based on the following:

(1) There is a potential risk to human health or the environment, based on a combination of hazard and exposure information;
(2) Information is necessary to clarify the potential risk identified; and
(3) There is a realistic possibility that the information requested would allow improved risk management measures to be taken.

The Appendices entitled 'Reasons to request information' describe why the requested information are necessary and appropriate.

ECHA
EUROPEAN CHEMICALS AGENCY

Appendix A – Reasons to request information to clarify the potential risk related to PBT/vPvB properties

1. Potential risk

1.1 Potential hazard of the Substance

Following its assessment of the available relevant information on the Substance, the evaluating MSCA and ECHA have identified the following potential hazard(s) which must be clarified.

a) P/vP properties

If a substance fulfils the criteria in Section 1.1.1 or 1.2.1 of Annex XIII to REACH, it is considered that it has persistent (P) or very persistent (vP) properties.

For the purpose of the P/vP assessment and to check whether the criteria are fulfilled, the information listed in Section 3.2.1 to Annex XIII, including results from simulation tests, must be considered.

If no such data are available, it is necessary to consider the screening information of Section 3.1.1 to Annex XIII, such as QSAR predictions.

The available information suggests that the Substance is very persistent.

Evidence based on experimental data

- Information on hydrolysis is not available for the Substance. Hydrolysis is however not expected, based on the structural formula and the functional groups of the Substance.
- Phototransformation in air was tested in a non-guideline study with the read-across substance 'Perfluorotriethylamine' ([redacted] thesis, 1993). Both indirect photolysis with *OH radical initiation and direct photolysis were investigated. A mercury lamp was used as light source. No degradation was observed for this read-across substance after 60 minutes (relative to trifluoromethane). A DT_{50} of more than 1 380 years was derived, based on an atmospheric lifetime of more than 2 000 years for perfluoroalkanes.
- Screening tests on biodegradation in water are available for read-across substances. A first test according to OECD TG 310 (Ready Biodegradability – CO_2 in Sealed Vessels, Headspace Test) (study report, 2007) was performed with the read-across substance FC-770 (EC number 473-390-7, CAS RN 1093615-61-2). Domestic, non-adapted sewage (aerobic) was used as inoculum. No degradation was observed after 28 days (measured as CO_2 evolution) for this read-across substance. The registration dossier also mentions BOD5 screening tests (aerobic) performed with several members of the group of C_5-C_{18} Perfluorinated Organic Chemicals (company studies, 2012). A trend analysis resulted in no observed biodegradation under the tested conditions.
- No water, water-sediment or soil simulation test is currently available for the Substance.

Evidence based on model predictions

- Estimations in EPI Suite (EPIWEB v4.1) show BIOWIN values for the Substance which meet the screening criteria for persistence: BIOWIN v4.10: BIOWIN 2 = 0.00 < 0.5, BIOWIN 3 = -1.02 < 2.25, BIOWIN 6 = 0.00 < 0.5.

Furthermore the BIOWIN user guide, section 7.2.2. mentions that a BIOWIN 3 value < 1.75 refers to an expected total degradation time of 'more than months'. In other words the Substance is 'recalcitrant'.

- The suitability of BIOWIN models for another perfluorinated compound, 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propionic acid, its salts and its acyl halides (covering any of their individual isomers and combinations thereof) (HFPO-DA) has been discussed previously (ECHA, 2019). It was considered that the BIOWIN models can not be expected to predict the biodegradability of perfluorinated alkyl carboxylic acids with high reliability. Nevertheless, it was considered that the result of BIOWIN modelling provides sufficient evidence that HFPO-DA adds to the weight-of-evidence that HFPO-DA is "potential P or vP". Some of the same reservations regarding the applicability of the BIOWIN models for HFPO-DA are relevant also to the Substance due to the high degree of fluorination. The BIOWIN predictions should be interpreted with caution, as the training data set is incompletely implemented for perfluorinated carbon chains. For example, there is no fragment coefficient for a non-terminal perfluorinated carbon in the BIOWIN models. ECHA considers that the BIOWIN results may underestimate the persistence of the Substance due to the above-described deficiencies, as also concluded for HFPO-DA (ECHA, 2019). In addition, unlike HFPO-DA, the Substance contains a tertiary amine fragment which has a negative coefficient in all BIOWIN models, thus contributing negatively to the predicted biodegradability. ECHA notes that the BIOWIN fragment coefficients are derived from a set of structurally varying compounds, most (or all) of which are not highly fluorinated compounds. Taking into account the training sets and the fragment coefficients of the BIOWIN models, and the fact that the BIOWIN results for the Substance are well below the cut-off values used for P/vP screening, ECHA considers that the BIOWIN results indicate that the Substance fulfills the P/vP screening criteria and that it has a low biodegradability.

Evidence based on structural properties

- The structure of the Substance consists of strong covalent carbon-fluorine bonds. Hiyama *et al*. (2000) stated that "*A C-F bond is the strongest among halogen-carbon bonds: heat of formation of a C-F bond is 456-486 kJ/mol; that of a C-Cl bond is roughly 350 kJ/mol, comparable to a C-H bond of 356-435 kJ/mol. The strong bond energy of C-F bonds contributes to the high thermal and oxidative stabilities of organofluorine compounds.*" Degradation of a substance, which almost entirely consists of strong carbon-fluorine bonds, such as the Substance, can be expected to be very slow or negligible under relevant environmental conditions. The same applies to the cleavage of the carbon-nitrogen bonds in the central part of the Substance, as breaking of these carbon-nitrogen bonds is sterically hindered by a cloud of many fluorine atoms.
- As described by Siegemund *et al*. (2000), the polarizability and the high bond energies of carbon-fluorine bonds cause these compounds to be the most stable and less reactive organic compounds known, and there are no indications that the Substance behaves differently.

Based on the available experimental read-across data, on model predictions performed with the Substance and based on its structural properties, the evaluating MSCA considers that the available information is sufficient to assess the persistency of the Substance at this step of the evaluation.

b) Potential B/vB properties

If a substance fulfils the criteria in Section 1.1.2 or 1.2.2 of Annex XIII to REACH, it is considered that it has bioaccumulative (B) or very bioaccumulative (vB) properties.

For the purpose of the B/vB assessment and to check whether the criteria are fulfilled, the information listed in Section 3.2.2 of Annex XIII must be considered, including bioconcentration factor (BCF) values. Notably, if the BCF-value is > 5000, the Substance fulfils the criteria for vB.

Evidence based on experimental data

- The registration dossier provides a log K_{ow}-range for the Substance of 5.3 to 6.1, which was determined via read-across from perfluoroheptanes and perfluorotributylamines (CAS RN 1064698-16-3 and CAS RN 1064698-37-8). Both ends of the read-across log K_{ow}-range exceed 4.5, and therefore the screening criterion for B/vB is fulfilled.
- No experimental log K_{ow}-value and no bioaccumulation test are available for the Substance.

Evidence based on model predictions

- In the registration dossier you referred to the low water solubility (average measured value: 0.381 µg/L at 23°C, Shake Flask Method), the high vapor pressure (3.87 mm Hg (0.516 kPa) at 20°C, deviations from OECD TG 104) and the high Henry's Law Constant range (140 000 – 166 000 dimensionless at 23°C and 760 mm Hg, read-across) of the Substance. You stated that based on these physico-chemical properties, the Substance will not partition to water or sediment, but will remain in the atmosphere when released from industrial applications. However, the predictions provided by the Level III Fugacity Model (EPIWEB v4.1) from EPI Suite (Table 3) indicate that substantial percentages of the Substance can be further distributed to other compartments than air.

Table 1: Distribution modelling for the Substance (Level III Fugacity Model; EPIWEB v4.1)

Release	Air	Water	Soil	Sediment
Only to air	99.9 %	0.000017 %	0.13 %	0.0013 %
Only to water	0.041 %	1.32 %	0.000055 %	98.6 %
Equal	1.15 %	1.3 %	0.42 %	97.1 %

It should be noted that model predictions are defined by the structure of the compartments and the parameters of connection between those compartments. Nevertheless, the environmental distribution modelling described above demonstrates that mass distribution of the Substance may occur to all environmental compartments.
Furthermore, the registration dossier mentions a calculated Log K_{oc}-range of 4.4 to 5 for the Substance. Estimations in EPI Suite (EPIWEB v4.1; KOCWIN v2.00) showed Log K_{oc}-values of 4.28 (K_{ow} Method) and 6.67 (MCI Method), respectively. These values indicate that the Substance shows a high adsorption potential to organic particles.
As mentioned above, the Substance has a low water solubility and a high volatility. Therefore, the Substance is not expected to remain in surface water or soil for long periods of time. Nevertheless, based on the high log K_{oc}-values, the Substance can adsorb to particulate matter in water and precipitate into the sediment compartment.

- Estimations in EPI Suite (EPIWEB v4.1) on the Substance show an estimated log K_{ow}-value of 6.19 and an estimated BCF-value of 5650. This estimated log K_{ow}-value exceeds 4.5, and therefore the screening criterion for B/vB is fulfilled. Moreover, the estimated BCF value above 5 000 indicates potential B/vB properties.

You have waived bioaccumulation testing in the registration dossier, and justified that due to the low water solubility, the high volatily and the high (read-across) Henry's Law Constant range, the Substance will not have a significant presence in the aquatic compartment. However, according to environmental distribution modelling, distribution of the Substance may occur to all environmental compartments.

Furthermore, the high log K_{ow}-range provided in the registration dossier based on read-across, and the high log K_{ow}- and BCF-values estimated for the Substance in EPI Suite, indicate that there is a concern for bioaccumulation.

The available information suggests that the Substance may have potential B/vB properties. The available and current information is not sufficient to draw a conclusion on the bioaccumulation potential. Further information is needed on bioaccumulation of the Substance in order to clarify the potential risk.

c) Potential T properties

The available information does not allow concluding on whether the Substance fulfils the T criteria in Annex XIII of REACH. Further ecotoxicity and human health data are requested under dossier evaluation.

1.2 Potential exposure

According to the information you submitted in all registration dossiers, the aggregated tonnage of the Substance manufactured or imported in the EU is in the range of 1 000 – 10 000 tonnes per year.

Furthermore, you reported that the Substance is used by industrial workers and professionals, among other uses, for:

- Manufacture;
- Formulation into mixture;
- Uses at industrial sites: Industrial end use in mixtures, open and closed systems, and industrial equipment charging and discharging;
- Uses by professional workers: Professional end use, and professional charging and discharging.

Therefore, the exposure to workers and the environment cannot be excluded.

1.3 Identification of the potential risk to be clarified

Based on all information available in the registration dossier, and QSAR data, there is sufficient evidence to argue that the Substance may be a PBT/vPvB substance.
The information you provided on manufacture and uses demonstrates a potential for exposure of the environment.

Based on this hazard and exposure information the Substance poses a potential risk to the environment.

As explained in Section 1.1 above, the available information is not sufficient to conclude on the potential B/vB properties. Consequently, further data is needed to clarify the potential risk related to PBT/vPvB properties.

1.4 Further risk management measures

If the Substance is confirmed as meeting the P, B and T or vP and vB criteria it can be identified as a PBT/vPvB. The evaluating MSCA will analyse the options to manage the risk(s) and will assess the need for:

- further regulatory risk management in the form of identification as a substance of very high concern (SVHC) under Article 57 of REACH;
- a subsequent authorisation or a restriction of the Substance. This would lead to stricter risk management measures than those currently in place, such as minimisation of emissions.

2. How to clarify the potential risk

2.1 Development of the testing strategy

The information resulting from the requested study will constitute the first tier in a testing strategy to conclude on the PBT/vPvB hazard. The evaluating MSCA will review the information you submit as an outcome of the first tier of the testing strategy, and evaluate whether further information is still needed to clarify the potential risk for PBT/vPvB.

2.2 Bioaccumulation in aquatic species (test method: Bioaccumulation in fish: aqueous and dietary exposure, EU C.13 / OECD TG 305, dietary exposure)

a) Aim of the study

The aims of the requested study are:

- To obtain the Substance-specific half-life ($t_{1/2}$, from the depuration rate constant, k_2), the assimilation efficiency (absorption across the gut; α), the kinetic dietary biomagnification factor (BMF_K), the growth-corrected kinetic dietary biomagnification factor (BMF_{Kg}), and the lipid-corrected kinetic dietary biomagnification factor (BMF_{KL}) (and/or the growth- and lipid-corrected kinetic dietary biomagnification factor, BMF_{KgL}) for the Substance in fish. In addition, if it is estimated that steady-state was reached in the uptake phase, an indicative steady-state BMF can be calculated.
- To determine, based on the obtained bioaccumulation data, whether the B/vB criterion is met for the Substance.

The study requested is a standard information requirement of Annex IX to REACH, which may be subject to a compliance check under Article 41 of REACH. You have registered the Substance at the Annex X level, which means that using substance evaluation does not affect your rights or obligations as compared to compliance check. Due to the expected complexicity of the B-assessment, the request is retained under the SEv procedure.

b) Specification of the requested study

Exposure

The OECD TG 305 states the following: "*If a stable concentration of the test substance in water cannot be demonstrated, an aqueous study would not be appropriate thus the dietary approach for testing the substance in fish would be required (although interpretation and use of the results of the dietary test may depend on the regulatory framework).*"

It is deemed technically not possible to conduct the aqueous exposure test given the properties of the Substance:

- low water solubility (average measured value: 0.381 µg/L at 23 °C, Shake Flask Method);
- the high potential for adsorption reflected by the high calculated Log K_{oc}-range (4.4 to 5);
- the high estimated Log K_{oc}-values (EPIWEB v4.1; KOCWIN v2.00; 4.28 (K_{ow} Method) and 6.67 (MCI Method)).

Therefore the requested study must be performed according to OECD TG 305 with dietary exposure.

Test conditions

- Flow-through conditions are requested to limit potential exposure to the Substance via water as a result of any desorption from spiked food or faeces. The test consists of two phases: uptake (test substance-spiked feed) and depuration (clean, untreated feed).
- An uptake phase that lasts 7-14 days is generally sufficient, based on experience from the method developers. However, in some cases the uptake phase may be extended, as it may be known whether uptake of chemical in the fish over 7-14 days will be insufficient for the food concentration used to reach a high enough fish concentration to analyse at least an order of magnitude decline during depuration, either due to poor analytical sensitivity or to low assimilation efficiency. In such cases it may be advantageous to extend the initial feeding phase to longer than 14 days, or, especially for highly metabolisable substances, a higher dietary concentration should be considered. However, care should be taken to keep the body burden during uptake below the (estimated) chronic no effect concentration (NOEC) in fish tissue.
- The depuration phase begins when the fish are first fed unspiked diet and typically lasts for up to 28 days or until the test substance can no longer be quantified in whole fish, whichever is the sooner. The depuration phase can be shortened or lengthened beyond 28 days, depending on the change with time in measured chemical concentrations and fish size.

Food

- The dose daily administered should preferably be 10 times higher than the Limit of Quantification in fish.
- The stability of the Substance within the feed mix must be maintained.

Data collection

- Growth-corrected lipid-normalised kinetic BMF and the corresponding BCF must be determined.

To address the missing information identified above, the OECD TG 305 (dietary exposure) study will allow to obtain data on bioaccumulation of the Substance, which is required to conclude on the B/vB properties.

Consideration of the time needed to perform the requested study

The usual period of time granted for performing an OECD TG 305 study is 9 months. In your comments to the draft decision, you requested that this deadline is extended to a minimum of 19–22 months, providing a well-documented justification from the contract laboratory declaring the impossibility to conduct the test within the defined timeframe.

Based on the evidence provided, ECHA has modified the timeline to perform the requested study from 9 to 19 months.

Request for the full study report

You must submit the full study report which includes:

- A complete rationale of test design;
- Interpretation of the results;
- Access to all information available in the full study report, such as implemented method, raw data collected, interpretations and calculations, consideration of uncertainties, argumentation, etc.

This will enable the evaluating MSCA to fully and independently assess all the information provided, including the statistical analysis, and to efficiently clarify the potential hazard for the PBT/vPvB properties of the Substance.

c) Alternative approaches and how the request is appropriate to meet its objective

The request is:

- Appropriate, given the properties of the Substance, and because the test is suitable and necessary to obtain data on bioaccumulation of the Substance and to clarify whether the Substance fulfils the B or vB criteria;
- The least onerous measure, because there is no equally suitable alternative methodology available to obtain the information that would clarify the potential hazard.

2.3 References relevant to the requests (which are not included in the registration dossier)

ECHA (2019). Member State Committee Support Document for 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propionic acid, its salts and its acyl halides (covering any of their individual isomers and combinations thereof). EC Number: -. CAS Number: -. Available at https://echa.europa.eu/candidate-list-table/-/dislist/details/0b0236e1833efc3e (accessed September 2021).

Hiyama, T., Kanie, K., Kusumoto, T., Morizawa, Y. & Shimizu, M. (2000). Organofluorine Compounds: Chemistry and Applications. Chapter 5: Biologically Active Organofluorine Compounds. ISBN 3-540-66689-3, Springer-Verlag Berlin Heidelberg New York.

OECD Guidelines for the Testing of Chemicals, Section 3. (2012). Test No. 305: Bioaccumulation in Fish: Aqueous and Dietary Exposure. ISBN: 9789264185296. https://doi.org/10.1787/9789264185296-en

Siegemund, G., Schwertfeger, W., Feiring, A., Smart, B., Behr, F., Vogel, H. & McKusick, B. (2000). Fluorine Compounds, Organic. Ullmann's Encyclopedia of Industrial Chemistry.

Appendix B: Procedure

This decision does not imply that the information you submitted in your registration dossier(s) are in compliance with the REACH requirements. ECHA may still initiate a compliance check on your dossiers.

12-month evaluation

Due to initial grounds of concern for PBT/vPvB and exposure of environment, the Member State Committee agreed to include the Substance (EC number 206-420-2, CAS RN 338-83-0) in the Community rolling action plan (CoRAP) to be evaluated in 2020. Belgium is the competent authority ('the evaluating MSCA') appointed to carry out the evaluation.

In accordance with Article 45(4) of REACH, the evaluating MSCA carried out its evaluation based on the information in the registration dossier(s) you submitted on the Substance and on other relevant and available information.

The evaluating MSCA completed its evaluation considering that further information is required to clarify the following concerns: PBT/vPvB.

Therefore, it submitted a draft decision (Article 46(1) of REACH) to ECHA on 15 March 2021.

Decision-making

ECHA notified you of the draft decision and invited you to provide comments.

For the purpose of this decision-making, dossier updates made after the date the draft of this decision was notified to you (Article 50(1) of REACH) will not be taken into account.

(i) Registrant(s)' commenting phase

ECHA received your comments and forwarded them to the evaluating MSCA. The evaluating MSCA took your comments into account.

The use of test item radiolabelled with a ^{14}C atom was proposed in the initial draft decision, if the chemical analysis was shown to be not sensitive enough to perform the study in a reliable manner. In your comments to the draft decision, you provided various arguments supporting your claim that radiolabelling of the test material would be time consuming and very costly. Consequently the request was amended to remove the requirement for radiolabelling.

(ii) Proposals for amendment by other MSCAs and ECHA and referral to the Member State Committee

The evaluating MSCA notified the draft decision to the competent authorities of the other Member States and ECHA for proposal(s) for amendment.

Subsequently, the evaluating MSCA received proposal(s) for amendment to the draft decision and modified the draft decision (see Appendix A). ECHA referred the draft decision, together with your comments, to the Member State Committee.

ECHA invited you to comment on the proposed amendment(s). The Member State Committee did not take into account any of your comments to the draft decision as they were not related to the proposal(s) for amendment made and are therefore considered

outside the scope of Article 52(2) and Article 51(5).

(iii) MSC agreement seeking stage

The Member State Committee reached a unanimous agreement in its MSC-76 written procedure and ECHA took the decision according to Article 52(2) and Article 51(6) of REACH.

After the deadline set in this decision has passed, the evaluating MSCA will review the information you will have submitted and will evaluate whether further information is still needed to clarify the potential risk, according to Article 46(3) of REACH. Therefore, a subsequent evaluation of the Substance may still be initiated after the present substance evaluation is concluded.

Appendix C: Technical Guidance to follow when conducting new tests for REACH purposes

Test methods, GLP requirements and reporting

Under Article 13(3) of REACH, all new data generated as a result of this decision must be conducted according to the test methods laid down in a European Commission Regulation or to international test methods recognised by the Commission or ECHA as being appropriate.

Under Article 13(4) of REACH, ecotoxicological and toxicological tests and analyses must be carried out according to the GLP principles (Directive 2004/10/EC) or other international standards recognised by the Commission or ECHA.

Under Article 10(a)(vi) and (vii) of REACH, all new data generated as a result of this decision must be reported as study summaries, or as robust study summaries, if required under Annex I of REACH. See ECHA Practical Guide on How to report robust study summaries[2].

Test material

Before generating new data, you must agree within the joint submission on the chemical composition of the material to be tested (Test Material) which must be relevant for all the registrants of the Substance.

1. *Selection of the Test material(s)*

   The Test Material used to generate the new data must be selected taking into account the following:

   - the variation in compositions reported by all members of the joint submission;
   - the boundary composition(s) of the Substance;
   - the impact of each constituent/ impurity on the test results for the endpoint to be assessed. For example, if a constituent/ impurity of the Substance is known to have an impact on (eco)toxicity, the selected Test Material must contain that constituent/ impurity.

2. *Information on the Test Material needed in the updated dossier*

   a) You must report the composition of the Test Material selected for each study, under the 'Test material information' section, for each respective endpoint study record in IUCLID;
   b) The reported composition must include all constituents of each Test Material and their concentration values.

This information is needed to assess whether the Test Material is relevant for the Substance and whether it is suitable for use by all members of the joint submission.
Technical instructions on how to report the above is available in the manual "How to prepare registration and PPORD dossiers"[3].

[2] https://echa.europa.eu/practical-guides
[3] https://echa.europa.eu/manuals