

pinfa frequently asked questions (FAQ) about melamine-based flame retardants and recent regulatory risk management measures on melamine.

Melamine has recently been identified as SVHC (Substance of Very High Concern) under EU REACH and a harmonized classification and labelling of melamine as Carc. 2, H351 and STOT RE 2, H373 has been added to the CLP Regulation. This document outlines the impact on melamine-based flame retardants and for use of melamine itself as a flame retardant.

Introduction: uses of melamine to improve fire safety

Melamine is used in different ways to improve fire safety of materials. The regulatory implications and toxicity/ecotoxicity properties are different for the two cases outlined below. Both cases concern flame retardants and are covered in this pinfa document.

A) Melamine-based flame retardants (FRs).

Here, melamine is chemically reacted with another substance which leads to a new and different substance. Widely used melamine-based FRs today include melamine phosphate, melamine cyanurate, melamine polyphosphate, melamine-poly(zinc phosphate), melamine pyrophosphate, . These substances typically are added in the range of 5 – 25 % w/w to polymers, or to intumescent paints or coatings, to reduce fire risk, often in combination with other flame retardants or synergists.

B) Melamine itself is used as a flame retardant.

In this case, melamine itself is used as a flame retardant, e.g., in polymers, intumescent coatings, polyurethane foams. Melamine can also be used as a synergist with substances mentioned under point A.

pinfa estimates that use of melamine for flame retardants is <5% of total melamine use. The most significant uses of melamine-based FRs are in engineering thermoplastics and epoxies, in applications such as electrical and electronic equipment, e-mobility, aerospace, wires and cables. Melamine-based flame retardants are considered as an alternative to halogenated flame retardants. Several melamine-based FRs are validated in labels or certifications such as TCO or Ökotex.



Melamine is also used (itself or chemically reacted to another substance, e.g., co-polymerisation), in composite materials, foams, fibres (in fire safety textiles), and in many other materials. The use of melamine may contribute to fire resistance in these applications, but the melamine use is not as a flame retardant. Such uses are not addressed in this document.

A) Regulatory implications for melamine-based FRs

1. Will there be an impact from the harmonized classification and labelling of melamine as Carc. 2, H351 and STOT RE 2, H373 on melamine-based flame retardants?

Melamine-based FRs are not themselves directly impacted by the classification of melamine, because they are different substances (with a different chemical formula and a different REACH dossier and EC (European Commission) number), with different toxicity and ecotoxicity properties. Full information on each melamine-based FR can be found in that substance's REACH dossier. However, following the data now available and the resulting classification of melamine, pinfa member companies are currently reassessing relevant data for melamine-based FRs.

2. Are there any changes to the applicable eco- and human toxicology limit values for melamine-based flame retardants based on the SVHC (Substance of Very High Concern) listing of melamine?

We do not expect any changes to eco- and human toxicology limit values for melamine-based flame retardants with the identification of melamine as SVHC. Please refer to the safety data sheet (SDS) of your respective supplier for the existing applicable eco- and human toxicology limit values.

3. Is the identification of melamine as SVHC expected to result in consequential regulatory risk management measures?

There is currently no indication of potential further regulatory risk management measures under REACH such as authorization or restriction for melamine and melamine-based FR by ECHA or Member States. The 2023 ECHA (European Chemicals Agency) [Regulatory Strategy on Flame retardants](#) identified that several nitrogen flame retardants are low hazard and concluded that no regulatory actions are needed now. Your supplier will inform you in due time if any need for changes is identified. Please also refer to question no 4.

4. What is the possible residual content of melamine itself in melamine-based flame retardants, and does this have regulatory consequences?

Melamine-based FRs may contain some residual free melamine, remaining from the production process in which melamine was reacted to form the melamine-based FR substance. Levels exceeding a threshold of 0.1% w/w residual melamine must be declared and identified as SVHC component in the SDS (Safety Data Sheet) provided by melamine-based FR manufacturers.



Melamine-based FR manufacturers may offer products below this limit and may state that in their certificate of analysis. Please contact your supplier for specific information.

Users should verify that the residual levels of melamine in the melamine-based FRs used result in levels of <0.1% w/w in the final article or material. If this 0.1% w/w limit is met, then the SVHC identification of melamine does not trigger any regulatory action by manufacturers of articles or materials containing melamine-based FRs.

Because melamine is listed as SVHC, EU suppliers of articles containing melamine at > 0.1% w/w, when the article is placed on the EU (European Union) market, must notify ECHA under REACH and under the Waste Framework Directive and submit information on these articles. This information will be published in the SCIP database established under the Waste Framework Directive, so making it available to waste operators and consumers.

5. What about polymeric melamine-based FRs?

Melamine-based FRs which are polymeric (e.g., melamine polyphosphate) and so are not registered under REACH, are not impacted by the classification of melamine as long as the threshold of 0.1% w/w residual melamine is met. As above, pinfa members are monitoring developments and reassessing data, and your supplier will inform you in due time if any need for changes is identified.

6. Are there analytical standards for the determination of residual melamine content in melamine-based FRs, or articles?

There are methods available, but they must be carefully selected and evaluated for the specific purpose and material. Please contact your melamine-based FR supplier for specific methods that are applicable to the specific flame retardant and use/application. Melamine-based FR manufacturers can provide data for residual melamine content on a lot-by-lot basis and make them available on their respective CoA's (certificate of analysis).

7. Is a release of melamine possible under normal conditions of use?

Melamine-based FRs are designed to be stable, and generally there should be no significant breakdown to release melamine itself under normal processing, use conditions and appropriate end of life management. Also, flame retardants are generally embedded in a polymer matrix, which significantly mitigates potential release and exposure.

8. What are the implications for handling and processing of melamine-based FRs in the user chain (compounding, injection molding, application of intumescent coatings ...)

The SDS (Safety Data Sheet, as specified in REACH) provided by your melamine-based FR supplier specifies conditions and any precautions necessary for safe handling of these flame retardants during processing and use. Please note that the precautions required for melamine itself are not applicable (see above concerning release).



- 9. Will a possible inclusion of melamine in Annex XIV have an impact on other melamine compounds and/or mixtures, in particular regarding the possibility to produce them and the availability of the corresponding melamine derivatives?**

The inclusion of Melamine into Annex XIV will have an impact to all products, which contain more than 0.1% free melamine. Mixtures containing melamine are also affected. As intermediate uses are exempted from listing to Annex XIV (authorization), melamine-based FRs and polymers produced with melamine are not affected.

- 10. Some intermediate uses of substances listed in Annex XIV REACH are exempted from authorization requirements. Under which circumstances does the use of melamine to produce derivatives such as melamine-based FRs qualify as an intermediate use? In other words, does the use of melamine to produce melamine derivatives fall within the scope of the authorisation requirement or not?**

According to our understanding, the production of melamine-based FRs is an intermediate use which is exempted from authorisation. The content of free melamine in the finished product must be < 0.1%. Any mixture containing > 0.1% melamine will be subject to Annex XIV (authorisation) listing.

- 11. Will the use of melamine-based FRs be affected by the listing of melamine in Annex XIV? Which consequences might be expected?**

Melamine-based FRs are not directly affected by a listing of melamine in Annex XIV if the free melamine content is < 0.1%.

- 12. Melamine cyanurate FRs is classified as Repr. 2 Carc. 2 by the registrants themselves. Could this mean that melamine cyanurate could be subject to a similar regulatory approach as melamine in the future?**

The classification of Repr. 2 and Carc. 2 is specific to melamine cyanurate and does not justify listing on the candidate list as SVHC.

- 13. Could the use of melamine for the production of melamine-based FRs fall under the scope of the authorisation requirements or whether this could affect the availability of melamine cyanurate.**

The intermediate use of melamine for the manufacture of melamine-based FRs is not subject to authorisation.

B) Implications when melamine itself is used as a flame retardant (including in mixtures)

In this case, the classification and SVHC identification of melamine applies directly, so requiring appropriate health and safety actions throughout the handling and processing chain and supply chain information.



For information concerning melamine itself, see EMPA (European Melamine Producers Association) regulatory page ([link](#))

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