

EFCC Position on the proposal for a Harmonized Classification and Labelling (CLH) of Melamine as a Carcinogen

Background

For more than 50 years melamine, a white powder, is an important intermediate for companies manufacturing e.g. wood-based panels, coatings, and moulding plastics. It helps improving the durability of common products. Melamine is registered under REACH as a non-hazardous substance for physical, environmental and health hazards, provided that the registrant ensures that any resulting risks are adequately controlled.

Notwithstanding that:

- In 1983, a study has reported carcinogenic effects of melamine by male rats at high oral doses in the diet, causing transitional-cell carcinomas in the urinary bladder, and hence cancers in presence of bladder stones. (but not by female rats or mice of either sex, even with developed bladder stones)
- In 2008, in China a criminal adulteration occurred, as the powdered infant formula manufacturer illegally added melamine with the intention to increase the protein content of the milk.
- More recently, Prof. Samuel M. Cohen (University of Nebraska Medical Center) stated that melamine ingested at high levels can form urinary tract crystals and calculi, leading potentially to either renal damage or urothelial cytotoxicity with regenerative proliferation, and ultimately with continued exposure, the formation of bladder tumours in rodents.

However, despite the above observations there is no conclusive evidence of a carcinogenic risk to humans. In June 2017, the International Agency for Research on Cancer (IARC) classified melamine as a Category 2B, *possibly carcinogenic to humans*, based on the assessment of existing toxicology data on rodents. Furthermore, the German competent authority, BAuA, submitted on the 25th of August 2017 an intention to ECHA to make a CLH proposal to classify melamine as a Category 2 carcinogen and a STOT 1 RE (Specific Target Organ Toxicity, single (1) Repeat Exposure). BAuA based their submission on the following:

- Observation of carcinogenic activity caused by dietary melamine exposure in experimental animals
- A causal relationship between melamine administration and an increasing incidence of tumours
- The relevance of the mode of action in rats for humans: urinary bladder is one of the carcinogenicity targets

The intrinsic properties of melamine to induce neoplastic lesions and epidemiological studies on humans with persistent melamine-stones already after low level exposures.

On the 29th of August 2019, BAuA submitted to ECHA a melamine CLH dossier. Following the submission, ECHA proceeded to make an accordance check on the dossier, followed by a public consultation running until 7 February 2020 for evidence for a CLH proposal to classify melamine as a carcinogen.

The Risk Assessment Committee (RAC) of ECHA, as the European Union's Safety Authority, has to give an opinion on the proposal. A decision to classify melamine will be taken by the European Commission.

How the Construction Chemicals sector could be affected

Occupational exposure to melamine can occur by inhalation of melamine dust during the production, handling and subsequent downstream use as a raw material. Exposure could also occur at very low levels, below the exposure limit, e.g. via melamine migration from food contact articles made from melamine-resin.

In case of a reclassification, the following potential consequences could be expected:

- **Manufacturers:** The manufacturers of melamine would have to perform risk assessment scenarios for the applicable uses of melamine and provide information on the safe use in the SDS and updated eSDS, as well as appropriate labelling and packaging (e.g. pictogram). Moreover, manufacturers have to advise safe work conditions and protect the environment. Industry has to prove that exposure levels of melamine by workers do not exceed the maximum allowed exposure level, DNEL (the current DNEL is not expected to be changed).
- **Downstream Users (DUs):** for DUs *following aspects have to be first to be considered:*
 - End-products in which melamine has been reacted and thus the remaining melamine is an impurity without function:
 - In resin synthesis and subsequent products, such as decorative surface laminates for kitchen worktops, floors, adhesives for board material, products applied in fields coatings, thermosetting or moulding compounds, and concrete plasticizers, melamine is an intermediate monomer.
 - In the Melamine-Formaldehyde (MF) resin, potentially unreacted melamine monomer is an unintended impurity. MF (tightly bound formaldehyde reduces emissions) is used for wood-based panels production and underlay materials, such as glues.
 - Products in which unreacted melamine is still present and has a specific function:
 - Various matrices (plastics) that contain unreacted melamine as an additive or where it ends up in a solid matrix
 - The intended use of melamine in applications such as PU foams or ‘intumescent’ coatings.

In most applications, melamine is a reactant for new substances (e.g. resins) and possibly final articles (e.g. laminate) that might contain unreacted melamine as an impurity. In other applications, melamine might end up unreacted in mixtures (e.g. polyol-melamine) or related articles (e.g. foams) eventually.

For mixtures (e.g. melamine resins and coatings) where melamine is either an impurity or an additive, the DUs have to follow classification rules as indicated in the following table:

Potential Melamine Classification	Generic concentration limit for unreacted melamine classification in a substance/mixture	Classification of substance/mixture containing Melamine
Carcinogenic 1B	≥ 0,1 %	Carcinogenic 1B
Carcinogenic 2	≥ 1,0 % (SDS available upon request if concentration ≥ 0,1 %)	Carcinogenic 2
STOT RE 1	≥ 10 % 1,0 % ≤ concentration < 10 %	STOT RE 1 STOT RE 2
STOT RE 2	≥ 10 % (SDS available upon request if concentration ≥ 1,0 %)	STOT RE 2

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- Based on the survey results in the last quarter of 2018, exposure of workers to melamine at the workplace appears to be very limited in terms of inhalation exposure. Data on the inhalation exposures of the inhalable fraction demonstrate that the estimated worst-case exposure levels are well below the occupational exposure limit for (general) dust. Therefore, it can be assumed that these results apply to total inhalable dust, without distinguishing between dust formed by melamine or other substances.
- The proposal for a harmonized classification of melamine is based on the assumption that melamine, under specific conditions, can cause tumours of the bladder. This assumption is based on studies on rats and on the Chinese criminal case (criminally contaminated infant food).
- Relevant scientific studies, such as published by Prof. Cohen, demonstrate that: i) tumours were only observed in male rats (one species, one sex), and ii) melamine has no intrinsic properties that could be linked to cancer, other than a “particle” effect at very high dosage, which could (above a certain threshold) potentially cause cancer.
- As stated in CLP, “*Classification as a carcinogen is...intended to be used for substances which have an intrinsic property to cause cancer*”. As argued above, this is not the case for melamine.
- As per CLP, only “*reasonably expected uses*” of a substance should be taken into consideration for a classification. Toxicity of melamine to humans was only observed in the Chinese incidence with criminally adulterated infant food. Clearly, this is not a “reasonably intended use”.
- Finally, the following needs to be taken into account: i) the toxicological profile of melamine and carcinogenicity data of different studies, ii) the biology of melamine bladder stones in experimental animals or humans (scientific studies), iii) the specificities of the human’s anatomy, iv) the CLP classification criteria, and v) the fact that only not “reasonably intended uses” are known to cause lesions in humans

EFCC supports the European Melamine Producers Association’s scientific arguments and concludes that key aspects in the proposal to classify Melamine as carcinogen are not justified. And naturally, EFCC fully agrees with the proposed non-classification for mutagenicity in the CLH proposal.

EFCC emphasizes its commitment to the safe use of chemicals under REACH and CLP, and supports BAuA’s goals to manage risks related to the melamine exposure at the workplace.

However, EFCC fears that the proposed classification, given the complexity of the use of melamine as polymer and without reliable data on exposure, would not contribute to a higher level of human protection and might lead to an additional administrative burden.

Furthermore, the unintended downstream consequences in case of an agreed harmonised classification of melamine as carcinogen, would have a significant impact on the industry, such as increased cost, loss of EU market share, diverging threshold limits, at the background of the absence of suitable alternatives.



About EFCC

The European Federation for Construction Chemicals “EFCC” based in Brussels is since 2007 the European Association representing directly or indirectly, more than 130 Companies in the Construction Chemicals sector.

Construction Chemicals deals with all those chemicals and all related applications which find utilization in the Construction Industry, from admixtures for concrete, to mortar systems, to flooring applications, to sealants & adhesives, to waterproofing systems, to anticorrosion agents and many other additives & solutions aimed at improving performances, durability, energy efficiency and overall sustainability in the Construction applications.

The global Construction Chemicals market size is valued at approx. 40 billion Euro and the European market of Construction Chemicals is the second largest one with a value of approx. 10 billion Euro

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