EUROPEAN PANEL FEDERATION
WOOD-BASED PANELS

Brussels, 7 February 2020

EPF response to ECHA's public consultation on the CLH proposal for Melamine

General Comments

Melamine (CAS 108-78-1) is a resin polymer component in binder systems used in the wood-based panels industry for panel and paper laminates production. Melamine is incorporated into binder materials to improve the durability of wood panel products, especially in terms of water resistance and internal bonding.

Melamine-urea-formaldehyde (MUF) adhesive resins or melamine-formaldehyde (MF) impregnation resins are thermosetting polymers, which are made through a condensation reaction of its major constituents. Melamine is part of the polymer; in the case of MF resins, the melamine molecules are linked to each other by formaldehyde; in the case of MUF resins, melamine is linked partly to another melamine or to urea or smaller UF chains by formaldehyde. Based on the necessary and usual chemical procedure when producing such resins, the content of residual free melamine is negligible. In all cases melamine is added in the production procedure in the first or one of the first steps, but never as a final step; this means that there is always a surplus of formaldehyde when melamine is added in order to assure the reaction of all melamine added. This is even more important as melamine has low water solubility and, hence, unreacted melamine might precipitate, hindering the proper application and usage of the resin. Additionally the chemical linkage between melamine and formaldehyde is quite strong (much stronger than between urea and formaldehyde); this means that also during the life time of hardened melamine based resins in their usual application, e.g. as wood adhesive, no melamine can be set free and in case escape from the bonded product. Producing a wood-based panel (WBP) with such a resin in an acidly catalysed, thermosetting process leads to a new polymer with a much higher molecular weight. Also during this hardening reaction no free melamine will be generated.

The raw boards produced are always surface treated (coated) with various finishing systems such as laminates, films, powder coatings and lacquer systems, resulting in an end product intended for the furniture and kitchen markets. Melamine is also the main compound of MF paper laminates. After a three stage thermally driven chemical conversion pathway: MF resin → laminate → board surfacing, the finished "melamine faced chipboard" (MFC) features a surface without free melamine.

WBP produced by use of melamine containing resins with the melamine in such a polymeric matrix as outlined above are raw particleboards, MDF and OSB as well as MFC (melamine resin (MF, MUF) - faced particleboards) and other WBP like MDF and plywood surfaced with such a melamine resin-impregnated decorative paper as well as e.g. plywood bonded with low emission moisture resistant melamine containing (MUF) resins. From these WBP, complex final articles like furniture, construction and packaging materials are manufactured. This includes kitchen furniture, living room furniture and children bedroom furniture, which may result in accidental food contact. It is of greatest importance to stress that the very unlikely digestive exposure is not considered relevant and has not been specified in the CSR (Chemical Safety Report in the REACH Registration dossier).

Due to its high reactivity and the high bonding strength between melamine and formaldehyde on molecular level, cured MF and MUF resins also show low formaldehyde emission when selecting the proper and usual production procedures for the resins as well as for the boards. Additionally, especially

European Panel Federation
Rue Montoyer 24, 1000 Brussels, Belgium
Tel +32 2 556 25 89 - info@europanels.org - www.europanels.org
EU Transparency Register: 572064811767-22 – IBAN: BE33 4268 1660 1346 – VAT: BE 0464.722.149

melamine-based resins are used for their high chemical and hydrolytical resistance, yielding WBP for use under influence of higher moisture content and outdoor conditions.

Due to the absence of free unreacted melamine in adhesive and impregnation resins and, hence in WBP (including MFC) it is not present in samples achieved by extraction methods under short time conditions as given during usual application e.g. in kitchens. Melamine as an isolated substance has a very low solubility in cold water (3.2 g/l at 20°C). Under the impact of boiling water over longer times (at least several hours, which is most unlikely during usual application of WBP) a certain hydrolysis of the cured MF or MUF resin can take place; this might destroy the WBP and its performance, but will most likely not deliberate molecular free melamine.

So far only one test method for the detection of free melamine in MF resins is mentioned in the chemical literature and only in one paper: Scheepers, M. L., Meier, R. J., Markwort, L., Gelan, J. M., Vanderzande, D. J., & Kip, B. J. (1995). Determination of free melamine content in melamine-formaldehyde resins by Raman spectroscopy. Vibrational Spectroscopy, 9(2), 139-146. For cured MF resins with a composition as given in today's industrial impregnating resins no free melamine was detected. This Raman spectroscopy test methods does not need any pretreatment of the sample. Until now only cured resin samples had been investigated, but not WBP or decor films. It is essential that during the analysis it can be guaranteed that no change of the substance to be investigated and analysed can occur. Therefore, all other proposed test methods based on extraction methods include the risk that the substance to be analysed is changed. Cured MF and MUF resins are insoluble in all solvents; when partially destroying the chemically hardened network (e.g. by treatment with concentrated sulfuric acid), some raw materials (such as molecular melamine) might be formed again by hydrolysis. Such effects can happen during extraction processes when preparing samples for analysis. But this partial chemical decomposition and cleavage of bonds within the polymers changes the product to be tested immediately during the test, which means that such a pretreatment during the test is not correct in terms of proper investigation and analysis of free melamine.

There are also analysis methods available to determine melamine as such and in not reacted state. These methods, however, are solely applicable when only pure unreacted melamine is present in the sample, because the method does not distinguish between pure unreacted melamine and melamine in reacted form, such as in an MF or MUF resin. Melamine as pure chemical substance added into food (and not undergoing any further chemical reaction) can be determined very precisely; such food analysis is performed e.g. in labs run by authorities. For articles intended to come into contact with food an own legislation exists (basis: white-listed substances with a specific migration limit SML). For articles intended to come into contact with food the finished article has to be tested. This means consumer articles (e.g. kitchen worktops) have to be tested for compliance with the SML's using a method shown in test reports which measures the amount of melamine released from the tested surface. As (i) only articles intended to come into contact with food are regulated regarding melamine release and (ii) the analytics is done with a standardised procedure and method specified by the European Food safety Authority (EFSA), this is a moot issue.

Test results in the framework of food contact regulations confirm that the release of melamine in accordance with CEN/TS 13130-27:2005-05 shows HPLC results very close to the detection limit. All such reports known to EPF confirm compliance of the tested WBP with food contact regulation requirements. Consequently, there is no migration of melamine from WBPs nor from articles made thereof.

Emission tests as usually performed for volatile substances do not work, because melamine is not volatile.

Decades of experience with the use of melamine in WBP and related materials and articles have not shown any health problems neither at the workplace in the factories nor with the final articles. In the few operations where free melamine is handled, workers are required to wear appropriate PPE and/or the

respective OELs are complied with. Furthermore, eating or drinking is not allowed in any of these places in the factory, so there is no risk of digestive exposure.

Classifying melamine as a carcinogen by ingestion, like in the CLH proposal, would risk tremendous unintended negative consequences for the wood-based industry. Firstly, customers will not distinguish between free unreacted melamine and reacted melamine in a polymeric matrix. Many customers will simply ask for products free of melamine. This will create a colossal image problem for WBP and articles made thereof, aggravated by the fact that there is no substitute for melamine in the huge volumes required due to its variety of applications. Additionally, substitutes that exist for specific niche applications tend to be perceived as more hazardous than melamine (e.g. isocyanates). Consequently, sustainable wood-based panel products made of the naturally renewable raw material wood and with a very low carbon footprint will come under tremendous pressure to be substituted by other materials with a much higher carbon footprint such as oil based plastic materials.

An additional unintended consequence of a classification is that it will jeopardise the circular economy and recycling of wood articles and wastes, with a tremendous increase in the costs of hazardous wood waste treatments including even incineration. Using extraction methods with acids will lead to artificially high and not correct test results and is therefore no possibility, due to the fact that such pretreatments (partially) destroy the matrix thereby freeing some melamine, because these fake results might lead to frequent exceedences of the 1% threshold for carcinogens. Accepting such results based on wrong test methods would lead to very high volumes of wood waste as hazardous wastes, making recycling impossible and even combustion for energy recovery will not be allowed. This will result in very high costs for treating such wrongly classified hazardous wood wastes in dedicated waste incinerators.

Last but not least, a classification of melamine with STOT RE 1 H372 will result in much stricter requirements for storage (e.g. according to TRGS 510 in Germany). Resin producers need to check whether their storage facilities for melamine do include a storage permit for the storage class 6.1 D.

Conclusion:
Both facts, the negligible melamine residue concentration in final wood-based articles and the firm incorporation of the melamine in the resin matrix of these products do not justify a harmonised classification obligation under CLP neither for melamine as a substance nor for articles manufactured from it. Furthermore, a classification of melamine as carcinogenic will jeopardise the recycling of wood articles and of wastes. Therefore, such a classification would be counterproductive as it would hamper the EU's ambitions for moving to a circular economy and for increasing the targets for wood recycling.

Comments on the open hazard classes:
Carcinogenicity: EPF supports the scientific comments of EMPA (European Melamine Producers Association) on this topic. Specifically, EPF questions whether results from studies based on consequences of criminal addition of melamine to milk in China can be considered suitable for a science-based classification of this substance.

About EPF
EPF – the European Panel Federation has members in 25 countries and represents the manufacturers of particleboard, MDF, OSB, hardboard, softboard and plywood. The EU wood panel industry has an annual turnover of about 22 billion Euros, creates over 100,000 jobs directly and counts more than 5,000 enterprises in Europe.