Government of Canada Gouvernement du Canada

Canada

Revised Risk Management Scope for

1,3,5-Triazine-2,4,6-triamine (Melamine)

Chemical Abstracts Service Registry Number 108-78-1

Health Canada

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Summary of proposed risk management

This Revised Risk Management Scope document outlines risk management options under consideration for melamine to address risks outlined in the Human Health Risk Characterization Document for the Assessment of Melamine. Melamine is a substance that is part of the Certain Organic Flame Retardants Grouping, which has been proposed to be harmful to human health.
For the purposes of paragraph 77(1)(a) of the *Canadian Environmental Protection Act, 1999* (CEPA), the Government of Canada proposes to recommend that melamine be added to Part 2 of Schedule 1 of CEPA[1]. As a result, the Government of Canada is considering the following new risk management action(s):

Flame retardant uses: Regulatory and non-regulatory actions to help reduce prolonged dermal exposure of the general population and oral exposure of infants 0 to 3 years old to melamine in products made with polymeric foams such as polyurethane foam (PUF) (including upholstered furniture, mattresses, mattress toppers, and other foam-based products to which prolonged skin contact may be expected), and to reduce prolonged dermal exposure to infants and children to melamine in polymeric foam in infant and child restraint seats including booster seats.

Melaware and bambooware tableware and kitchen utensils: Regulatory and non-regulatory actions to help reduce dietary exposure of the general population to melamine from melamine-containing tableware and kitchen utensils ("melaware" including bambooware) through migration of melamine from melaware into food or beverages.

Do-it-yourself (DIY) products: Regulatory and non-regulatory actions to help reduce dermal and/or inhalation exposure to melamine in paints, and dermal exposure to melamine in sealants.

Cleaning products: Regulatory and non-regulatory actions to help reduce dermal exposure to melamine in cooktop cleaners.

To inform risk management decision-making, information on the following topics should be provided (ideally on or before March 26, 2025), to the contact details identified in section 8 of this document:

1) Ongoing and anticipated changes in the use of melamine in upholstered furniture, mattresses, mattress toppers, child restraint seats, and other foam-based products available to consumers, whether in response to:

[1] After an assessment of a given substance under Part 5 of CEPA, other than section 83, the ministers shall propose one of the following measures: take no further action with respect to the substance, add the substance to the List 1 referred to in section 75.1 of the Act (unless the substance is already on the List), recommend the addition of the substance to Part 1 of Schedule 1 to CEPA (for substances that pose the highest risk) or recommend the addition of the substance to Part 2 of Schedule 1 to CEPA (for other CEPA-toxic substances).

- changes in performance-based flammability requirements and/or standards
- market forces; and/or
- other reasons (please provide information on these reasons)

2) The use of melamine in textiles, including textile backings in furniture

3) The use of melamine in polymeric foams other than PUFs, which may be used in products such as upholstered furniture, mattresses, mattress toppers, and other foam-based products to which prolonged skin contact may be expected

4) The amount of melamine present in melamine-containing tableware and kitchen utensils (melaware and bambooware)

5) The amount of melamine necessary in melamine-containing tableware and kitchen utensils (melaware and bambooware) to ensure a functional product

6) The market share of bambooware made from melamine resin in the bambooware market

7) The use of melamine in paints, sealants, and cooktop cleaners

The risk management options outlined in this Revised Risk Management Scope may evolve through consideration of assessments and risk management options published for other Chemicals Management Plan (CMP) substances as required to ensure effective, coordinated, and consistent risk management decision-making.

Note: The above summary is an abridged list of options under consideration to manage this substance and to seek information on identified gaps. Refer to section 3 of this document for more complete details in this regard. It should be noted that the proposed risk management options may evolve through consideration of additional information obtained from the public comment period, literature and other sources.

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1. Context

The *Canadian Environmental Protection Act, 1999* (CEPA) (Canada 1999) provides the authority for the Minister of the Environment and the Minister of Health (the ministers) to conduct assessments to determine if substances are toxic to the environment and/or human health as set out in section 64 of CEPA[2][3], and, if so, to manage the associated risks.

The substance 1,3,5-triazine-2,4,6- triamine, Chemical Abstracts Service Registry Number[4] (CAS RN) 108-78-1, referred to throughout this document as melamine, is included in the Certain Organic Flame Retardants (OFR) Substance Grouping under Canada's Chemicals Management Plan (CMP) (Canada 2011), which includes ten organic substances having a similar function: application to materials to slow the ignition and spread of fire.

2. Issue

In 2016, Health Canada and Environment and Climate Change Canada conducted a joint screening assessment of melamine, CAS RN 108-78-1, in Canada. New information was received after that publication that led to a change to the proposed conclusions for this substance. As a result, Health Canada and Environment and Climate Change Canada updated the draft screening assessment of melamine and a notice summarizing the updated draft screening assessment for this substance was published in the *Canada Gazette*, Part I, on October 17, 2020, hereinafter referred to as the updated draft screening assessment for melamine (Canada 2020). Since the publication of that assessment, new critical health effects were identified and exposure to melamine was re-examined. Therefore, an updated characterization of the

[2] Section 64 [of CEPA]: For the purposes of [Parts 5 and 6 of CEPA], except where the expression "inherently toxic" appears, a substance is toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that

(a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity
(b) constitute or may constitute a danger to the environment on which life depends; or
(c) constitute or may constitute a danger in Canada to human life or health

[3] A determination of whether one or more of the criteria of section 64 are met is based upon an assessment of potential risks to the environment and/or to human health associated with exposures in the general environment. For humans, this includes, but is not limited to, exposures from ambient and indoor air, drinking water, foodstuffs, and the use of products available to consumers. A conclusion under CEPA is not relevant to, nor does it preclude, an assessment against the hazard criteria specified in the *Hazardous Products Regulations*, which are part of the regulatory framework for the Workplace Hazardous Materials Information System for products intended for workplace use. Similarly, a conclusion based on the criteria contained in section 64 of CEPA does not preclude actions being taken under other sections of CEPA or other Acts.

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human health risk associated with exposure to melamine was conducted to inform the melamine assessment. A notice summarizing the scientific considerations of the updated human health risk characterization document for melamine was published in the *Canada Gazette*, Part I, on January 25, 2025 (Health Canada 2025). For further information, refer to the Updated Human Health Risk Characterization Document for the Assessment of Melamine.

2.1 Updated draft screening assessment conclusion

The updated draft screening assessment for melamine (Canada 2020) proposed that melamine was harmful to human health but not the environment under section 64 (*c*) of CEPA because it is entering the environment in a quantity or concentration or under conditions that constitute or may constitute a danger in Canada to human life or health. On the basis of the information available, the Updated Human Health Risk Characterization Document for the Assessment of Melamine proposes additional exposures of concern since the publication of the updated draft screening assessment in 2020 (Canada 2020); this includes expanded exposures from polyurethane foam (PUF). As such, this revised risk management scope supersedes the risk management scope published in 2020.

The exposure sources of concern, identified in the Updated Human Health Risk Characterization Document, are:

1) Dermal exposure of the general population and oral exposure to infants 0 to 3 years old to melamine from products made with PUF. Specifically, the potential concern is for prolonged skin contact with certain manufactured products made from PUF that contains melamine, as well as intermittent mouthing by infants 0 to 3 years old (Health Canada, 2025). These products include upholstered furniture, mattresses, mattress toppers, and other foam-based products to which prolonged skin contact may be expected. Dermal exposure to infants and children up to 13 years old to melamine in PUF in infant and child restraint seats including booster seats was also identified as a concern
2) Dietary exposure of the general population to melamine from melamine-containing tableware and kitchen utensils (“melaware” including bambooware) through migration of melamine from melaware into food or beverages
3) Dermal exposure of the general population to melamine in products available to consumers (such as paints, sealants, and cooktop cleaner)
4) Inhalation exposure of the general population to melamine in paints

As such, this document will focus on exposures to these products.

2.2 Proposed recommendation under CEPA

CEPA sets out a 2-track approach for managing risks.

Under sub-section 77(3), the ministers are required to propose recommending the addition of a substance that meets the criteria set out in paragraph (*a*), (*b*) or (*c*), to Part 1[5] of Schedule 1 of the Act and, in developing a proposed regulation or instrument respecting preventive or control actions, to give priority to the total, partial or conditional prohibition of activities in relation to the substance or to the release of the substance into the environment.

For other substances recommended for addition to Part 2 of Schedule 1 to the Act, the ministers shall give priority to pollution prevention, and this could include regulatory or non-regulatory measures such as prohibition if warranted.

Based on the findings of the updated draft screening assessment for melamine published in 2020 (HC 2020) and of the Updated Human Health Risk Characterization Document for the Assessment of Melamine pursuant to CEPA, the Minister proposed to recommend that melamine be added to Part 2 of Schedule 1 in CEPA[6] at this time. Addition of a substance to Schedule 1 to CEPA enables the Government to propose certain risk management measures under CEPA to manage potential ecological and human health risks associated with the substance.

Until regulations specifying criteria for the classification of substances that pose the highest risk or that are carcinogenic, mutagenic or toxic to reproduction are available, melamine is proposed to be recommended for addition to Part 2 of Schedule 1. Following the availability of the aforementioned criteria, the substances may be moved to Part 1 of Schedule 1, if applicable.

The Minister will take into consideration comments made by stakeholders during the 60-day public comment period on the Updated Human Health Risk Characterization Document and Revised Risk Management Scope document in the preparation of the final assessment and Risk Management Approach document. If the Minister finalizes the recommendation to add melamine to Schedule 1, risk management instrument(s) must, unless an exception in section 91 of CEPA applies, be proposed within 24 months from the date on which the final assessment is published, and finalized within 18 months from the date on

[5] Under subsection 77(3), a substance must be recommended for addition to Part 1 of Schedule 1 to the Act when the substance is determined to be toxic and the ministers are satisfied that:

a) the substance may have a long-term harmful effect on the environment and
    i. is inherently toxic to human beings or non-human organisms, as determined by laboratory or other studies
    ii. is persistent and bioaccumulative in accordance with the regulations
    iii. is present in the environment primarily as a result of human activity, and
    iv. is not a naturally occurring radionuclide or a naturally occurring inorganic substance
b) the substance may constitute a danger in Canada to human life or health and is, in accordance with the regulations, carcinogenic, mutagenic or toxic for reproduction; or
c) the substance is, in accordance with the regulations, a substance that poses the highest risk

[6] After an assessment of a given substance under Part 5 of CEPA, other than section 83, the ministers shall propose one of the following measures: take no further action with respect to the substance, add the substance to the List referred to in section 75.1 of the Act (unless the substance is already on that List), recommend the addition of the substance to Part 1 of the list of toxic substances in Schedule 1 to CEPA (for substances that pose the highest risk) or recommend the addition of the substance to Part 2 of the list of toxic substances in Schedule 1 to CEPA (for other CEPA-toxic substances).

which the risk management instrument(s) are proposed as outlined in sections 91 and 92 of CEPA (refer to section 8 for publication timelines applicable to this group of substances).

3. Proposed risk management

3.1 Proposed human health objective

Proposed human health objectives are quantitative or qualitative goals to address human health concerns.

For this substance, the proposed objectives address the exposure sources of concern outlined in section 5 of this document. The proposed human health objective is to reduce exposure of people to melamine to levels that are protective of human health.

3.2 Proposed risk management objective

Risk management objectives set quantitative or qualitative targets to be achieved by the implementation of risk management regulations, instrument(s) and/or tool(s) for a given substance or substances. In this case, the proposed risk management objectives for melamine to address the following use categories are:

- **Flame retardant uses:** Reduce dermal exposure of people of all ages, and oral exposure of infants 0 to 3 years old, to melamine in products made with polymeric foams (such as mattresses, upholstered furniture) and to reduce dermal exposure to infants and children to melamine in polymeric foam in infant and child restraint seats including booster seats
- **Melaware and bambooware tableware and kitchen utensils**: Reduce dietary exposure of people of all ages to melamine from melamine-containing tableware and kitchen utensils (“melaware” including bambooware) through migration of melamine from melaware into food or beverages
- **DIY products:** Reduce dermal and/or inhalation exposure of adults to melamine in DIY products available to consumers such as paints and sealants; and
- **Cleaning products:** Reduce dermal exposure of adults to melamine in cooktop cleaners

These objectives will be refined on the basis of stakeholder consultation and new information, the proposed risk management, the outcome of the assessment, and socio-economic and technical considerations (refer to section 6). Revised environmental and human health and risk management objectives will be presented in the risk management approach for melamine that will be published concurrently with the final assessment.

3.3 Proposed risk management options under consideration

To achieve the risk management objective and to work towards achieving the human health objective, for the purposes of paragraph 77(1)(a) of CEPA, the Government of Canada is considering the following new risk management actions:

Flame retardant uses: Regulatory and non-regulatory actions to help reduce prolonged dermal exposure for all age groups and oral exposure of infants 0-3 years old to melamine in products made with polymeric foams such as PUF (including upholstered furniture, mattresses, mattress toppers, and other foam-based products to which prolonged skin contact may be expected), and to reduce prolonged dermal exposure to infants and children to melamine in polymeric foam in infant and child restraint seats including booster seats. This could include regulatory measures under the *Canada Consumer Product Safety Act* (CCPSA) or under CEPA. Non-regulatory measures could include the development of a code of practice or a performance agreement.

Melaware and bambooware tableware and kitchen utensils: Regulatory and non-regulatory actions to help reduce dietary exposure of the general population to melamine from melamine-containing tableware and kitchen utensils ("melaware" including bambooware) through migration of melamine from melaware into food or beverages. This could include regulatory measures under the CCPSA or under CEPA. Non-regulatory measures could include the development of a code of practice or a performance agreement. Conducting a consumer outreach campaign to inform Canadians of the potential risk associated with the use of melaware/bambooware as tableware and kitchen utensils could be a complimentary tool to proposed regulatory or non-regulatory measures.

DIY products: Regulatory and non-regulatory actions to help reduce dermal and/or inhalation exposure to melamine in paints, and dermal exposure to melamine in sealants. This could include regulatory measures under the CCPSA or under CEPA. Non-regulatory measures under CEPA, such as performance agreements or codes of practice could also be considered and developed in partnership with industry stakeholders.

Cleaning products: Regulatory and non-regulatory actions to help reduce dermal exposure to melamine in cooktop cleaners. This could include regulatory measures under the CCPSA or under CEPA. Non-regulatory measures under CEPA such as performance agreements, codes of practice or public information material could also be considered.

Note that the proposed risk management options described in this document are preliminary and subject to change. Following the publication of this Risk Management Scope document, additional information obtained from the public comment period and from other sources will be considered, along with the information presented in this document, in the instrument selection and

development process[7]. The risk management options outlined in this document may evolve through consideration of assessments and risk management options published for other CMP substances to ensure effective, coordinated, and consistent risk management decision-making.

3.4 Performance measurement and evaluation

Performance measurement evaluates the ongoing effectiveness and relevance of the actions taken to manage risks from toxic substances[8]. Environment and Climate Change Canada and Health Canada have developed a Performance Measurement Evaluation Strategy that sets out the approach to evaluate the effectiveness of actions taken on substances found toxic under CEPA. The aim is to determine whether human health and/or environmental objectives have been met and whether there is a need to revisit the approach to risk management for those substances. Selection of a substance for performance measurement evaluation is conducted through readiness, prioritization and workplanning as outlined in the Performance Measurement Evaluation Strategy. In evaluating progress and revisiting risk management, as warranted, these activities together will aim to manage risks effectively over time.

The Government of Canada may measure the effectiveness of the risk management action(s) and the progress towards meeting the risk management and human health objective for melamine.

To do so, the Government of Canada may collect and analyze data, such as industry reporting on the presence of melamine in the products of concern.

When undertaken, the results of performance measurement and evaluation are used to inform whether further risk management action is warranted and are made available to Canadians along with recommendations for further action, if applicable.

[7] The proposed risk management regulation(s), instrument(s) or tool(s) will be selected using a thorough, consistent and efficient approach and take into consideration available information in line with the Government of Canada's Cabinet Directive on Regulation (TBS 2018), Red Tape Reduction Action Plan (TBS 2012) and the *Red Tape Reduction Act* (Canada 2015).

[8] Performance measurement can be performed at 2 levels:

- Instrument-based performance measurement evaluates the effectiveness of an individual instrument in meeting the specific risk management objectives that were set out when the risk management tool was designed. The results of performance measurement will help determine if additional risk management or assessment is needed (that is, evaluate whether risk management objectives have been met); and
- Substance-based performance measurement considers performance of all final risk management instruments applied to a chemical substance and relevant data or indicators of exposure to the environment or human health (that is, evaluate whether human health and/or environmental objectives have been met)

For more information on performance measurement evaluation (including Health Canada and Environment and Climate Change Canada's Performance Measurement Evaluation Strategy) please visit Performance measurement for toxic substances.

3.5 Risk management information gaps

Interested stakeholders can provide further information to inform risk management decision-making regarding melamine, including:

1) The use of melamine in melaware, bambooware, and other plant-based tableware and kitchen utensils.

2) Ongoing and anticipated changes in the use of melamine in upholstered furniture, mattresses, mattress toppers, and other foam-based products available to consumers, whether in response to:

- changes in performance-based flammability requirements and/or standards
- market forces; and/or
- other reasons (please provide information on these reasons)

3) The use of melamine in textiles, including textile backings in furniture.

4) The use of melamine in polymeric foams other than PUFs, which may be used in products such as upholstered furniture, mattresses, and other foam-based products to which prolonged skin contact may be expected.

5) The use of melamine in paints, sealants, and cooktop cleaners.

Stakeholders that have information to help address these gaps should provide it on or before MARCH 25, 2025 to the address identified in section 8.

4. Background

4.1 General information on melamine

Melamine is a discrete organic chemical characterized by a high nitrogen content. It belongs to a chemical subgroup of substances known as triazines. Melamine does not occur naturally; it is produced industrially using urea as a starting material. The name ‘melamine’ is also often used to refer to the thermoset plastic made from melamine (Health Canada 2025).

4.2 Current uses and identified sectors

Melamine has a wide variety of uses across industrial sectors. Globally, melamine is used primarily in the synthesis of melamine–formaldehyde resins for the manufacture of laminates (for example, for kitchen countertops, tabletops), plastics, coatings, commercial filters, products available to consumers such as glues or adhesives, cleaning products and moulding compounds for melaware and bambooware tableware and kitchen utensils (WHO 2009; Scorecard c2011;

BfR 2019; CPID c2001-2022).

Furthermore, melamine is used as a flame retardant, often in combination with other substances, including the flame retardants TCPP and Dechlorane Plus (Danish EPA 2016a; EFRA 2007). Melamine can also be used to produce flame retardants such as melamine cyanurate, melamine phosphate, melamine polyphosphate, and melamine pyrophosphate (EFRA 2007). Other global uses of melamine include its application as an impregnating or adhesive resin in wood-based panels for furniture and flooring, and in paper money, glossy magazines, and textiles (DSM 2010; Health Canada, 2025).

In Canada, responses to a CEPA section 71 survey (ECCC 2013-2014) indicated that 10 million kg to 100 million kg of melamine were imported into Canada in 2011, both as the neat substance and in consumer, commercial or industrial products. This estimate may not fully capture quantities of the substance in imported manufactured items. Melamine was not manufactured in Canada above the reporting threshold of 100 kg.

Uses of melamine identified in Canada based on the section 71 survey (ECCC 2013-2014) include:

- in paints and coatings available to consumers and those used for commercial purposes
- in PUF seating and bedding
- in melamine-formaldehyde resin used for decorative laminates; and
- as a plasticizer in concrete and automobile brake tubes and hoses

Other identified uses in Canadian products (Health Canada, 2025) include the following:

- thermally-fused melamine paper and shelves
- whiteboards and flakeboards
- paints
- sealants for mechanical, electrical and plumbing applications; and
- inkjet ink

Melamine is not an approved food additive in the Lists of Permitted Food Additives incorporated by reference into Marketing Authorizations issued under the *Food and Drugs Act* (Health Canada [modified 2024]), nor would it be permitted for such use. Respondents to a CEPA section 71 survey did not report any uses of melamine in materials that come in contact with food (ECCC 2013-2014), but melamine may be used as a monomer in polymers like melamine-formaldehyde resins for the manufacture of food packaging products in Canada (Health Canada, 2025). These include:

- interior coating of cans (excluding infant formula cans)
- coating of metallic closures of glass jars for baby food
- glass and plastic bottles for liquid infant formula
- paper used to package bread or margarine; and
- films for milk packaging

Melamine has applications in agriculture. Due to its high nitrogen content, melamine has been tested and used as a slow-release fertilizer (Health Canada, 2025). In addition, melamine is a metabolic by-product of the insecticide cyromazine. In Canada, cyromazine is registered for use in products to control the Colorado potato beetle in potato crops, and insects in certain other crops and ornamentals not grown for cut flowers (Health Canada 2021). Melamine is not used as an active ingredient or a formulant in registered pest control products in Canada (Health Canada, 2025).

Melamine is listed in the Natural Health Products Ingredients Database with a non-natural health product role because it is not a naturally occurring substance included in Schedule 1 to the *Natural Health Products Regulations*. As such, it is not listed in the Licensed Natural Health Products Database as being present in currently licensed natural health products in Canada (NHPID [modified 2023]; LNHPD [modified 2023]).

5. Exposure sources and identified risks

Exposure of the general population to melamine is primarily from use of certain products available to consumers and from food, and to a lesser extent from environmental media.

Based principally on the weight of evidence from assessments from international agencies and other available information, Health Canada determined the critical effects associated with exposure to melamine as reproductive toxicity. Melamine is also associated with effects on the urinary system as well as carcinogenicity (Health Canada, 2025).

<u>Migration From Melamine-containing Tableware and Kitchen Utensils (“melaware” including bambooware):</u>
Melamine reacts with formaldehyde to produce a thermoset plastic called “melamine” or “melaware” which can be used as tableware or kitchen utensils. Some melaware tableware are prepared using bamboo fibre as a filler during the manufacturing process and the resulting plastic is sometimes referred to as “bambooware” (BfR 2019).

Studies on migration of melamine from melaware and bambooware tableware and kitchen utensils into foods, water and other beverages were identified (Health Canada, 2025). Based on these studies, concentrations measured in food items heated in melaware appear to be significantly higher than concentrations measured in items left at room temperature. Migration of melamine from melaware is characterized by high variability, depending on various factors such as manufacturing process, alterations to the surface due to service life, time and temperature conditions of use, as well as characteristics of food (for example, acidic, aqueous, fatty or dry). Consequently, this may result in higher levels of melamine residue (EFSA 2010). Migration of melamine from bamboo articles was almost 3 times higher than migration concentration from

melaware articles (Health Canada, 2025). **Dietary exposure with the use of melaware was identified as a concern for people of all ages.**

Foam-based Products:

Melamine has been identified as being present in foam seating and bedding in Canada at concentrations of up to 29% (ECCC 2013-2014). The United States (US) Consumer Product Safety Commission (CPSC) analyzed concentrations of melamine in foam-based furniture and found concentrations of up to 34% by weight. Additionally, melamine has been detected in PUF, polypropylene foam, and textile of car seats (Ecology Center 2015). Melamine can migrate from foam-based products, resulting in exposure.

Dermal and oral exposure to melamine from foam-based products was estimated in the updated draft screening assessment, based on extrapolated migration rates (Health Canada, 2025). **Oral exposure – such as mouthing of foam-based products by a child – was identified as a concern for infants 0 to 3 years old. As well, dermal exposure from prolonged contact with polymeric foam-based products such as upholstered furniture, mattresses, mattress toppers, and other foam-based products was identified as a concern for people of all ages; and dermal exposure of infants and children (up to 13 years old) from prolonged contact with infant and child restraint seats including booster seats was also identified as a concern.**

Other products available to consumers:

Melamine is used in a wide variety of other products available to consumers in Canada. Exposure to melamine in paper and shelves, whiteboards and flakeboards, and inkjet ink were not assessed as exposure is expected to be low.

The updated human health risk characterization document did consider inhalation and/or dermal scenarios for one-time per event exposures to melamine from consumer use of airless paint spray equipment, brush and roller paints, and caulking and sealants in the home as well as use of cook top cleaner. **Dermal and/or inhalation exposure to paint, and dermal exposure to sealants and cooktop cleaners were identified as a concern for adults in the updated risk assessment** (Health Canada, 2025).

Textiles:

Melamine was measured in textiles and dermal and oral exposures were estimated in studies evaluating the concentration in clothing before and after washing, and in infant clothing made from various materials. Concentration values were low, and exposure was not identified as a concern for children or the general population in the updated human health risk characterization document.

Food:

Various international studies have investigated the migration of melamine into food and beverages from food packaging materials such as can coatings and jar closures. Studies on the migration of melamine from ‘melamine’ or ‘melaware’ plastic tableware and kitchen utensils into foods have also been conducted

internationally.

Concentrations of melamine in food were also measured in many countries, primarily as a follow-up to the identification of melamine-adulterated food and animal feed ingredients sourced from China (for example, raw milk, wheat and vegetable proteins) that were subsequently used in the manufacture of other foods or feeds (Health Canada, 2025).

Health Canada has conducted research to measure background levels of melamine in food sold in Canada. The Health Canada surveys focused on foods with the greatest probability of containing residual levels of melamine, such as dairy foods and other milk- and soy-containing products, vegetable products, and marine foods. Surveys to measure levels of melamine in food were also conducted by the Canadian Food Inspection Agency (CFIA) from 2009 to 2020, to ensure continued compliance with Health Canada's Interim Maximum Levels for melamine in food (Health Canada, 2025). Dietary exposure was estimated in the updated human health risk characterization document for all age groups, including infants, and was not identified as a concern. All food exposure estimates were below the 0.2 mg/kg bw/day tolerable daily intake derived by the World Health Organization (WHO 2009).

Environmental media:

Limited data on environmental media were available; exposure from environmental media was not identified as a concern in the updated human health risk characterization document.

No other sources of exposure to melamine of concern were identified in the Updated Human Health Risk Characterization Document (Health Canada, 2025). Risk characterization based on urinary biomonitoring results from several studies (Panuwet et al. 2012; Sathyanarayana et al. 2019; Melough et al. 2022; Choi et al. 2022) support the conclusions that margins of exposure may be inadequate, in particular for young children.

The Government of Canada considered, where available, risk assessment information relevant to children's exposure to this substance. As part of the CMP, the Government asked industry and interested stakeholders to submit any information on the substance that may be used to inform risk assessment, risk management and product stewardship.

6. Risk management considerations

6.1 Alternatives and alternate technologies

Foam-based products:
Flame retardant substances may potentially be used in foam-based products to meet performance-based flammability requirements and/or standards. These requirements do not specify that chemical flame retardants need to be used; rather they may require a product, or components thereof, to pass a laboratory test such as a cigarette smoulder test or open flame ignition test (for restraint systems and booster seats only). Performance-based flammability requirements exist internationally for various types of products, including electronics, building materials, mattresses and upholstered furniture, among others (UL 2014; ASTM 2014; Canada 2016a; California 2013; US CPSC 2004, 2006). They can be regulatory, and may exist at different levels of government (Canada 2016a; California 2013). Voluntary standards for flammability are also developed by independent standard development organizations (ASTM 2014; ISO 2014; UFAC 2014; UL 2014; ULC 2017).

Using chemical flame retardants in their products is one means through which companies can help ensure that their products meet performance-based flammability requirements. However, technologies other than chemical flame retardants that allow products to meet performance-based flammability requirements also exist. Products may be made of materials with a low flammability or materials that require lower quantities of flame retardants to meet standards. For example, concentrations of flame retardants tend to be higher in lower density foams, which tend to ignite more easily than higher density foams (CEC 2015b). Materials such as foams may also be covered with a protective barrier made of a material that does not burn easily (US EPA 2005).

In June, 2021, Health Canada published a Notice to stakeholders on the use of flame-retardant chemicals in certain consumer products in Canada. The objective of the Notice is to remind stakeholders that compliance with the flammability performance requirements for certain consumer products set out in regulations under the CCPSA can be achieved without the use of chemical flame retardants and encourages the use of safe, non-chemical alternatives.

Where chemical flame retardants are concerned, a number of factors come into play in determining whether one flame retardant is a good alternative to another. Different flame retardants are appropriate for application to different materials and for different end uses. Their physical and chemical properties affect their ability to meet performance-based flammability requirements as well as the uses in which they can be effective. Flame retardant properties such as pH, viscosity, the ability to mix evenly and stability in exothermic reactions can impact the quality of end products such as foams (CEC 2015b; Danish EPA 2016a). The potential for effects on health and the environment are key considerations in the

selection of alternatives. The US Environmental Protection Agency updated its 'Design for the Environment' report comparing the health and environmental properties of a variety of flame retardants for use in flexible PUF in 2015 (US EPA 2015). The Danish Environmental Protection Agency (Danish EPA 2016a, 2016b) also recently published a report on some flame retardants which may be used in flexible PUF. Finally, cost is also a factor companies consider in decisions regarding alternative flame retardants.

Melamine-containing tableware and kitchen utensils ("melaware" including bambooware):
There are a number of alternatives available to melaware or bambooware. Stainless steel, tempered glass, ceramic, silicone, and enamelled dishes can replace tableware and kitchen utensils containing melamine.

Paints, sealants, and cooktop cleaners:
Although there are alternative paint, sealant, and cooktop cleaners available that do not contain melamine, in order to address the potential socio-economic impact and feasibility of proposed risk management measures, further consultation with industry associations will be necessary to determine the effectiveness of alternatives to melamine in these products.

6.2 Socio-economic and technical considerations

Socio-economic considerations:
Socio-economic factors will be considered in the selection process for a regulation or instrument respecting preventive or control actions, and in the development of the risk management objective(s) as per the guidance provided in the Treasury Board document Policy on Regulatory Development (TBS 2018).

In addition, socio-economic factors will be considered in the development of regulations, instrument(s) or tool(s), to address risk management objective(s), as identified in the Cabinet Directive on Regulation (TBS 2018) and Red Tape Reduction Action Plan (TBS 2012) and the *Red Tape Reduction Act* (Canada 2015).

Technical considerations - Foam-based products:
Changes to performance-based flammability requirements are affecting the need for chemical flame retardants, particularly flame retardants used in polymeric foams such as flexible PUF. While uncovered PUF products such as mattress toppers are often excluded from flammability standards for mattresses or upholstered furniture (California 2013; US CPSC 2016; Canada 2016a), the standards may nevertheless affect the use of flame retardants in these products, as they can drive the use of flame retardants in foam used for a wide variety of products. Companies producing foam may manufacture their foam so that it can pass the most stringent flammability standards for any product in which it is used, even if many of the end products containing the foam are not subject to those stringent flammability standards. For example, it has been reported that 80% of the foam manufactured in the United Kingdom (UK) contains flame retardants,

even though only specific products are subject to flammability standards (EU 2008). Foam-based products containing flame retardants, but not subject to regulatory flammability standards, have been identified in several studies (Stapleton et al. 2011; Danish EPA 2015, 2016a).

Within North America, California standard Technical Bulletin 117 previously required that upholstered furniture in the California marketplace pass an open flame test, creating a market for flexible PUFs containing certain flame retardants (California 2000; Stapleton et al. 2011, 2012). The revised standard, California Technical Bulletin 117-2013 (California 2013), which came into effect on January 1, 2015, no longer requires an open flame test, but still requires a cigarette smoulder test. It also allows the use of upholstery cover fabrics and resilient filling materials (such as PUF) that fail testing if a barrier material that passes testing is used between the cover fabric and the filling. Flexible foam manufacturers and members of related trade associations expect that both the concentrations of flame retardants in the foam and the percent of foam that contains flame retardants will be generally reduced as a result of the change in the California standard, according to a study by the Commission for Environmental Cooperation (CEC 2015b).

Two federal flammability rules exist for mattresses in the US: The Standard for the Flammability of Mattresses and Mattress Pads, 16 CFR 1632 (eCFR 2017); and the Standard for the Flammability (Open Flame) of Mattress Sets, 16 CFR 1633 (US CPSC 2006). The Open Flame rule for mattress sets (16 CFR 1633) was recently reviewed and some commenters raised concerns about the possible need for flame retardants to meet either the open flame test or the cigarette smoulder test of 16 CFR 1632. However, in a briefing document (not reviewed or accepted by the US CPSC), CPSC staff pointed out that the tests are performance-based (they do not prescribe the use of flame retardants) and indicated that they are aware of several mattress models that do not require the use of flame retardant chemicals to pass the tests. They also pointed to the availability of flame retardant-treated barrier materials that can help mattresses to pass the tests (US CPSC 2016). The US CPSC Standard for the Flammability (Open Flame) of Mattress Sets (16 CFR 1633) applies to mattresses or mattress sets with resilient material enclosed by a cover material; as such, it does not apply to uncovered foam mattress toppers or pads (US CPSC 2006). The Standard for the Flammability of Mattresses and Mattress Pads (16 CFR 1632; eCFR, 2017) excludes convoluted foam pads which are not totally encased in a cover material.

In the UK and Ireland, regulatory requirements such as the Furniture and Furnishings (Fire) (Safety) Regulations 1988 (UK 1988) and the Industrial Research and Standards (Fire Safety) (Domestic Furniture) Order, 1995 (Ireland 1995) may be contributing to the use of flame retardants, including TCPP (EU 2008; Danish EPA 2016). The UK has consulted on proposed changes to its Furniture and Furnishings (Fire) (Safety) Regulations 1988, which could reduce the use of flame retardants and better reflect modern furniture manufacturing processes, while maintaining safety (UK Department for Business, Energy and

Industrial Strategy 2016). New regulations have yet to be published.

Canada has regulations under the CCPSA that set out performance-based flammability requirements for mattresses and other textile products that are manufactured, imported, sold or advertised in Canada (for example, Canada 2016a, 2016b). As with other performance-based standards, the applicable regulations under the CCPSA do not prescribe how the requirements are to be met. Various options are available to manufacturers to meet the flammability requirements, including the use of materials that are less flammable or that are inherently flame resistant (such as wool), fire barrier systems or chemical flame retardants. It is not expected that Canada's *Mattresses Regulations* (Canada 2016a) drive the flame retardant market as they prescribe a cigarette smoulder test; open flame testing is not required for mattresses marketed in Canada. Foam mattress pads are not considered mattresses, but they are subject to the flammability requirements for bedding under the *Textile Flammability Regulations* (Canada 2016b) if they have a textile cover. There are no flammability requirements for uncovered foam mattress pads. Canada also does not have a federal regulation for the flammability of upholstered furniture. Note that separate flammability standards exist for child restraint systems and booster seats, as outlined in the *Motor Vehicle Restraint Systems and Booster Seats Safety Regulations* under the *Motor Vehicle Safety Act* (Canada 2010).

7. Overview of existing risk management

7.1 Canadian risk management context

- Melamine is not listed as an approved food additive in the Lists of Permitted Food Additives, which have been incorporated by reference into their respective Marketing Authorizations issued under the *Food and Drugs Act* (Health Canada [modified 2024])

- In Canada, interim maximum levels for melamine have been set at 0.5 mg/kg for infant formula and sole source nutrition products, including meal replacement products, and at 2.5 mg/kg in food products containing milk and milk-derived ingredients (Health Canada 2009, 2016)

- The safety of chemicals used in food packaging materials is subject to the provisions of section 4(1)(a) of the *Food and Drugs Act* and Division 23 of the *Food and Drug Regulations* (Government of Canada 2018a). Melamine is used in Canada in certain food packaging materials (see section 4.2 on uses) (July 2021 email from the Food Directorate, Health Canada to the Existing Substances Risk Assessment Bureau, Health Canada; unreferenced)

- Natural health products are regulated under the *Natural Health Products Regulations* (Government of Canada 2018b). Melamine is listed in the Natural Health Products Ingredients Database with a non-natural health

product role. It is not listed in the Licensed Natural Health Products Database as being present in currently licensed natural health products in Canada (NHPID [modified 2017]; LNHPD [modified 2016])

- The maximum residue limit (MRL) for the pesticide cyromazine (which includes its metabolite melamine) varies depending on the commodity (up to 35 ppm) (PMRA 2023)

7.2 Pertinent international risk management context

7.2.1 United States

- Melamine is not an approved food additive (US FDA 2008)
- An interim Safety and Risk Assessment concluded that there was too much uncertainty to establish a level of melamine and its analogues in infant formula that does not raise public health concerns
- In foods other than infant formula, the US Food and Drug Administration (FDA) concludes that levels of melamine and melamine-related compounds below 2.5 ppm do not raise public health concerns (US FDA 2008)
- Melamine-formaldehyde resin may be safely used as the food-contact surface of molded articles intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food, not to exceed 0.5 milligram per square inch of food-contact surface. Melamine may be used in the manufacture of paper and paperboard products that hold food, and adhesives and coatings in products that hold food. It may also be used as a resin in cellophane (US eCFR 2023a, 2023b, 2023c, 2023d, 2023e, 2023f)
- Combined residue tolerances of up to 35 ppm are allowed on agricultural products for the pesticide cyromazine (an insecticide) and melamine (its metabolite) (US EPA 2019)
- California has passed legislation prohibiting the sale of new covered upholstered furniture, children's products, and mattresses that contain flame retardants above 1000 ppm. The repair of upholstery with foam-containing flame retardants above 1000 ppm is also prohibited. The prohibition came into effect on January 1, 2020 (California 2018)
- Maine has passed legislation to prohibit the sale of new residential upholstered furniture containing flame retardants above 1000 ppm starting on January 1, 2019 (Maine 2017)
- Maryland has passed legislation prohibiting the sale of any juvenile product, mattress, upholstered furniture or reupholstered furniture that contains more than 0.1% of flame retardant chemicals by mass (Maryland 2020)
- Minnesota has passed legislation that bans the manufacture and sale of halogenated, phosphorus-based, nitrogen-based and nanoscale flame retardants in residential upholstered furniture, children’s products and business textiles. The prohibition came into effect in July 2021 (Minnesota 2019)
- New Hampshire has passed legislation that prohibits the manufacture and sale of upholstered furniture containing in its fabric or other covering or in its

cushioning materials more than 0.1 percent of a halogenated, phosphorus-based, nitrogen-based or nanoscale flame-retardant chemical or more than 0.1 percent of a mixture that includes flame-retardant chemicals. The prohibition fully came into effect in January 2021 (New Hampshire 2019)
- New York has passed legislation that prohibits the use of a halogenated, organophosphorus, organonitrogen flame retardant chemical in upholstered furniture, mattresses and electronic enclosures. This law will come into effect in January 2024 (New York 2021)

7.2.2 Europe

- Melamine is not approved as a food additive in the European Union
- As a contaminant, the maximum level in food is set at 2.5 mg/kg. For infant formula, more restrictive limits exist for powders of 1 mg/kg and liquids of 0.15 mg/kg. Migration limits of 2.5 mg melamine per kg food for plastic materials and articles which may come into contact with food (EU 2011a)
- Maximum residue limits of up to 15 ppm for the pesticide cyromazine (melamine is the metabolite) on various commodities; limits are set to decrease as of August 2023 (EU 2023)

7.2.3 Global standards

- The World Health Organization has established a Tolerable Daily Intake (TDI) value of 0.2 mg/kg bw/d for exposure to melamine (WHO 2009)
- The Codex Alimentarius international food standard sets out a maximum concentration of melamine of 0.15 mg/kg in liquid infant formula; 1 mg/kg in powdered infant formula; and 2.5 mg/kg in other food (FAO and WHO 2015)
- Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) added melamine to the Candidate List of substances of very high concern (Equivalent level of concern having probable serious effects to human health (Article 57 f – human health); Equivalent level of concern having probable serious effects to the environment (Article 57 f – environment)) (REACH 2023)
- The authorities of Netherlands, Belgium and Luxembourg issued a joint communication on February 15, 2021, announcing that business operators will have to withdraw “Bamboo-Melamine” materials and articles from the market immediately, as the use of bamboo (or other natural constituents) in combination with polymers such as melamine (so called “Bamboo-Melamine”) for the manufacture of plastic Food Contact Materials (“FCMs”) does not have an explicit authorization under article 5 of Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food (Food Packaging Forum 2021)

8. Next steps

8.1 Public comment period

Industry and other interested stakeholders are invited to submit comments on the content of this Risk Management Scope or other information that would help to inform decision-making (such as outlined in section 3.3). Please submit additional information and comments prior to March 26, 2025.

If the final assessment confirms that melamine is toxic, a risk management approach, outlining and seeking input on the proposed risk management instruments, would be published concurrently with the assessment. At that time, there would be further opportunity for consultation.

Comments and information submissions on the Risk Management Scope should be submitted to the address provided below:

Environment and Climate Change Canada
Gatineau, Quebec K1A 0H3
Telephone: 1-800-567-1999 (in Canada) or 819-938-3232
Fax: 819-938-5212
Email: substances@ec.gc.ca

Companies that have a business interest in melamine are encouraged to identify themselves as stakeholders. Stakeholders will be informed of future decisions regarding melamine and may be contacted for further information. Stakeholders and members of the public who are interested in being notified of CMP publications are invited to subscribe for the latest news on the CMP. Stakeholders and members of the public who would like to receive CMP Publication Plans on a quarterly basis by email, can contact: substances@ec.gc.ca.

8.2 Timing of actions

Electronic consultation on the Updated Human Health Risk Characterization Document and Revised Risk Management Scope: January 25, 2025 to March 26, 2025. This should include the submission of public comments, additional studies or information on melamine.

Publication of responses to public comments on the draft screening assessment, Updated Human Health Risk Characterization Document, and Revised Risk Management Scope: Concurrent to the publication of the final assessment and, if required, the Risk Management Approach document.

Publication of responses to public comments on the Risk Management Approach, if applicable and if required, the proposed instruments: At the latest, 24 months from the date on which the Ministers recommended that melamine be added to Part 2 of Schedule 1 of CEPA.

Consultation on the proposed instruments, if required: 60-day public comment period starting upon publication of the proposed instrument.

Publication of the final instruments, if required: At the latest, 18 months from the publication of the proposed instrument.

These are planned timelines and are subject to change.

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