

Chapter 173-339 WAC (proposed)

Formaldehyde Releasers Technical Support



Relevant statute

The Toxic-Free Cosmetics Act ([Chapter 70A.560 RCW](#))¹ requires the Washington State Department of Ecology (Ecology) to identify a list of chemicals used in cosmetic products that release formaldehyde, also called “formaldehyde releasers.” The Toxic-Free Cosmetics Act also directs Ecology to consider the following criteria when establishing the list of formaldehyde releasers:²

- Estimated prevalence of use [RCW 70A.560.030(2)(a)(i)].
- Potential to reduce disproportionate exposure [RCW 70A.560.030(2)(a)(ii)].
- Other information deemed relevant by the department [RCW 70A.560.030(2)(a)(iii)].

This document describes our process for identifying and prioritizing formaldehyde releasers in cosmetic products.

Process description

Ecology and the Washington State Department of Health used the following process to identify and prioritize formaldehyde releasers:

1. Compiled a general list of formaldehyde releasers with chemical names and Chemical Abstract Services (CAS) numbers.
2. Prioritized the list of formaldehyde releasers based on:
 - a. Potential for disproportionate exposure.
 - b. Prevalence of use in cosmetic products.

Identifying formaldehyde releasers

Chemicals that release formaldehyde **don't** have a commonly used structural chemical definition, so we consulted many stakeholders and reviewed many resources to compile the initial list of formaldehyde releasers. We:

- Reviewed the scientific literature (see [Table 1](#) and [References](#)).
- Reviewed the following product databases:
 - California Safe Cosmetics Product Database.
 - EWG Skin Deep® Cosmetics Database (EWG Skin Deep®).

¹ [Chapter 70A.560 RCW](https://app.leg.wa.gov/RCW/default.aspx?cite=70A.560) (https://app.leg.wa.gov/RCW/default.aspx?cite=70A.560)

² [RCW 70A.560.030\(2\)\(a\)\(i\)–\(iii\)](https://app.leg.wa.gov/RCW/default.aspx?cite=70A.560.030) (https://app.leg.wa.gov/RCW/default.aspx?cite=70A.560.030)

- International Nomenclature Chemical Ingredients (INCI) Database.
- Mintel’s Global New Products (Mintel’s Global) Database.
- Mintel’s United States Database.
- National Institutes of Health PubChem (PubChem) Database.
- SpecialChem.
- Ultrus™ Prospector® from UL Solutions (Ultrus™ Prospector®).
- Worked with colleagues in the Safer Products for Washington program.
- Consulted other stakeholders, such as:
 - California Department of Health.
 - Environmental Working Group (EWG).
 - Breast Cancer Prevention Partners.
 - Toxic-Free Future.
 - The Good Face Project.
 - Underwriters Laboratory (UL).

We searched the PubChem database and INCI database using CAS numbers to remove duplicate chemicals. We identified 49 formaldehyde releasers used in many products and often used as preservatives. Of those 49, we found 26 formaldehyde releasers in the INCI database, indicating that they can be used in cosmetic products in the United States.

Prioritizing formaldehyde releasers

Disproportionate exposures

People who use cosmetic products that contain formaldehyde or formaldehyde releasers have the potential for exposure. But **not** everyone’s exposures are equal. Cosmetic products contain different formaldehyde-releasing chemicals. Also, people use cosmetic products differently, so one person may have daily exposure or may use a cosmetic product that others don’t. Some people, such as cosmetologists, are exposed to toxic chemicals at their job, particularly if they work with nail products and hair smoothers. The negative health impacts from these workplace exposures increase when added to other environmental and social risk factors (Morello-Frosch et al., 2011).

Our 2023 [Chemicals in Cosmetics Report to the Legislature](#) (Ecology, 2023) identified several cosmetic product categories that are more likely used by women of color. We determined these by reviewing scientific literature, talking to scientists in the cosmetics field, and asking people in Washington State what cosmetic products they use and where they buy them. Based on this report and our subsequent research, we identified makeup, hair straighteners and smoothers, facial cleansers, nail polish, and intimate hygiene products as products more likely used by workers and women of color.

When we prioritized formaldehyde releasers, we considered whether they are found in products more likely used by workers and women of color (products of concern). We also included formaldehyde releasers **not** used in products of concern in the proposed rule because they can still contribute to disproportionate exposures. If not restricted in the proposed rule, these formaldehyde releasers might become “regrettable substitutes” — that is, replacements for the formaldehyde releasers currently used, but resulting in similar negative health impacts as the original chemicals. Their use also contributes to cumulative exposures to formaldehyde.

Prevalence of use

First, we searched the Mintel United States database for the 49 chemicals identified as formaldehyde releasers to determine if they are used as ingredients in cosmetic products sold in the United States. To do this, we filtered by product type and only included chemicals used in products classified as “Beauty and Personal Care Products.” We also removed products classified as “Bar Soap,” because Chapter 70A.560 RCW and the proposed rule exclude bar soap from the definition of “cosmetic.”

We then searched for the 49 chemicals identified as formaldehyde releasers in other databases (EWG Skin Deep®, INCI database, Mintel’s Global database, SpecialChem, and Ultrus™ Prospector®) to ensure we had a complete list of formaldehyde releasers used in cosmetic products. Finally, we removed formaldehyde releasers with **no** evidence of use in cosmetic products.

Identified formaldehyde releasers

The proposed rule includes a list of 28 formaldehyde releasers used in cosmetic products. We prioritized those most frequently used in cosmetic products in the United States and those used in products of concern. The prioritized formaldehyde releasers are listed as items 1 through 10 in the proposed rule. Ninety-nine percent of cosmetic products that use formaldehyde releasers contain one of the chemicals listed as items 1 through 7 in the proposed rule.

Because the prevalence of use for these remaining chemicals was comparatively low or unknown, we also used the potential for disproportionate exposure to determine which formaldehyde releasers to include as items 8 through 10 in the proposed rule.

The following table contains the list of 28 formaldehyde releasers included in the proposed rule. The chemicals listed as items 1 through 10 are the formaldehyde releasers we prioritized based on prevalence of use and potential to reduce disproportionate exposure. We included the remaining chemicals because they might be used as substitutes for the most frequently used formaldehyde releasers, but they pose a similar health risk to Washington residents. Their use also contributes to cumulative exposures to formaldehyde.

Table 1: List of formaldehyde releasers.

Item [^]	Chemical name	Prevalence of use in U.S. products (%) [*]	Found in these products of concern ^{**}	References [†]
1	DMDM Hydantoin	43.59	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
2	Diazolidinyl Urea	32.27	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
3	Imidazolidinyl Urea	13.59	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
4	Quaternium-15	3.63	Color cosmetic, hair styling/treatment facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
5	Tosylamide/ Formaldehyde Resin (PTSAF)	2.18	Nail polish	UL Solutions, pers. comm. (2024)
6	2-Bromo-2-Nitropropane-1,3-Diol (Bronopol)	1.81	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); UL Solutions, pers. comm. (2024)
7	Sodium Hydroxymethyl-glycinate	1.72	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); UL Solutions, pers. comm. (2024)
8	Polyoxymethylene Urea (POM)	0.37	Color cosmetic, intimate hygiene	de Groot et al. (2009); UL Solutions, pers. comm. (2024)
9	Glyoxal	0.24	Color cosmetic, hair styling/treatment	UL Solutions, pers. comm. (2024)
10	Polyoxymethylene Melamine	0.042	Nail polish	ECHA (2017); UL Solutions, pers. comm. (2024)

Item [^]	Chemical name	Prevalence of use in U.S. products (%) [*]	Found in these products of concern ^{**}	References [†]
11	5-Bromo-5-Nitro-1,3-Dioxane [‡] (Bronidox)	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
12	7-Ethylbicyclo-oxazolidine (Bioban CS1246) [‡]	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
13	Benzylhemiformal [‡]	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
14	Dimethylhydantoin formaldehyde (DMHF) [‡]	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
15	Dimethylol Glycol	0.006	—	ECHA (2017)
16	Dimethylol urea	0.012	Hair treatments	de Groot et al. (2009); ECHA (2017)
17	Dimethyl Oxazolidine [‡]	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
18	Glyoxylic Acid (when used in heat-activated hair straighteners)	0.0001	Hair styling/treatment	Flyvholm & Andersen (1993)
19	Glyoxyl Carbocysteine (when used in heat-activated hair straighteners)	0.000004	Hair treatment	Flyvholm & Andersen (1993)
20	MDM Hydantoin	0.042	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
21	Methenamine	0.048	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
22	Methylal	0.024	Hair styling	de Groot et al. (2009); ECHA (2017)

Item [^]	Chemical name	Prevalence of use in U.S. products (%) [*]	Found in these products of concern ^{**}	References [†]
23	Paraformaldehyde [‡]	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
24	Polymethylene [‡]	0	—	UL Solutions, pers. comm. (2024)
25	Tetramethylol-glycoluril [‡]	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
26	Timonacil [‡] (when used in heat-activated hair straighteners)	0	—	Flyvholm & Andersen (1993); UL Solutions, pers. comm. (2024)
27	Tris (hydroxymethyl) nitromethane	0.024	—	de Groot et al. (2009); ECHA (2017)
28	Urea, polymer with formaldehyde, isobutylated	0.006	—	UL Solutions, pers. comm. (2024)

Table notes:

[^] Item numbers correspond to the item numbers in the [proposed rule](#).³

^{*} We used Mintel usage data to determine the prevalence of use of cosmetics products sold in the United States. We calculated the percentage by dividing the number of products containing the formaldehyde releaser by the total number of beauty and personal care products (less bar soap) containing any formaldehyde releaser sold in the United States.

^{**} Our 2023 [Chemicals in Cosmetics Report to the Legislature](#)⁴ and subsequent research identified cosmetic products more likely to be used by people of color or people with a heightened risk for occupational exposure.

[†] Source indicating why we believe the chemical to be a formaldehyde releaser.

[‡] These chemicals are either used in the United States but were identified with other sources than Mintel, or they are still found in foreign markets and may constitute regrettable substitutes.

³ <https://ecology.wa.gov/rulemaking-proposed-language-wac-173-339-01-30-25>

⁴ <https://apps.ecology.wa.gov/publications/summarypages/2304007.html>

References

- de Groot, A.C., Flyvholm, M.-A., Lensen, G., Menné, T., Coenraads, P.-J. 2009. [Formaldehyde-releasers: Relationship to formaldehyde contact allergy. Contact allergy to formaldehyde and inventory of formaldehyde-releasers](#). *Contact Dermatitis*, 61(2), 63-85. <http://doi.org/10.1111/j.1600-0536.2009.01582.x>
- ECHA (European Chemicals Agency). 2017. . https://echa.europa.eu/documents/10162/13641/annex_xv_report_formaldehyde_en.pdf/58be2f0a-7ca7-264d-a594-da5051a1c74b
- Ecology (Washington State Department of Ecology). 2023. [Chemicals in Cosmetics Used by Washington Residents: Report to the Legislature Pursuant to ESSB 5693 \(2022\) Section 302 \(56\)](#). Publication 23-04-007. Olympia. <https://apps.ecology.wa.gov/publications/summarypages/2304007.html>
- Flyvholm, M.A., & Andersen, P. 1993. [Identification of formaldehyde releasers and occurrence of formaldehyde and formaldehyde releasers in registered chemical products](#). *American Journal of Industrial Medicine*, 24(5), 533-552. <http://doi.org/10.1002/ajim.4700240505>.
- Morello-Frosch, R., Zuk, M., Jerrett, M., Shamasunder, B., & Kyle, A.D. 2011. [Understanding the cumulative impacts of inequalities in environmental health: Implications for policy](#). *Health Affairs (Millwood)*, 30(5), 879-887. <http://doi.org/10.1377/hlthaff.2011.0153>
- UL Solutions, personal communication, 12 March 2024.

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⁵ ecology.wa.gov/contact

⁶ ecology.wa.gov/TFCA