Draft Decision Tree and Supply Chain Resource for Electric and Electronic Product Manufacturers

Overview

Washington Department of Ecology collaborates with Washington Department of Health to implement the Safer Products for Washington program (Chapter 70A.350 Revised Code of Washington). Our team developed this draft resource in parallel with publishing the Preliminary Draft Rule Language[1] for the first cycle of implementing the program.

This resource will help manufacturers understand whether their product is in scope, meaning it would be included in the potential restriction or reporting requirement for plastic electric and electronic enclosures. It will also support manufacturers in knowing how to assess their supply chain and determine whether any relevant components of their product contain organohalogen flame retardants.

The steps involved in this draft resource include:

- Step 1. Determine if your product is included in the regulation
- Step 2. Determine if your product contains organohalogen flame retardants

Our questions for electric and electronic product manufacturers include:

- Do these resources help you understand the potential impacts of this regulation?
- Will you share those potential impacts or any concerns with us?
- What suggestions do you have?
- What else would this resource need to include to be useful for you?

Use our online comment form[2] (through August 23, 2022) or email the Safer Products for Washington team (SaferProductsWA@ecy.wa.gov) if you have questions, concerns, or feedback.

[1] https://www.ezview.wa.gov/Portals/_1962/Documents/saferproducts/PreliminaryDraftRuleLanguage_Cycle1_August2022.pdf

[2] https://hwtr.ecology.commentinput.com/?id=UuEMP

Step 1. Determine if your product is included in the regulation

Figure 1. Use this decision tree to determine whether your product is in scope, meaning it is included under the upcoming regulation.

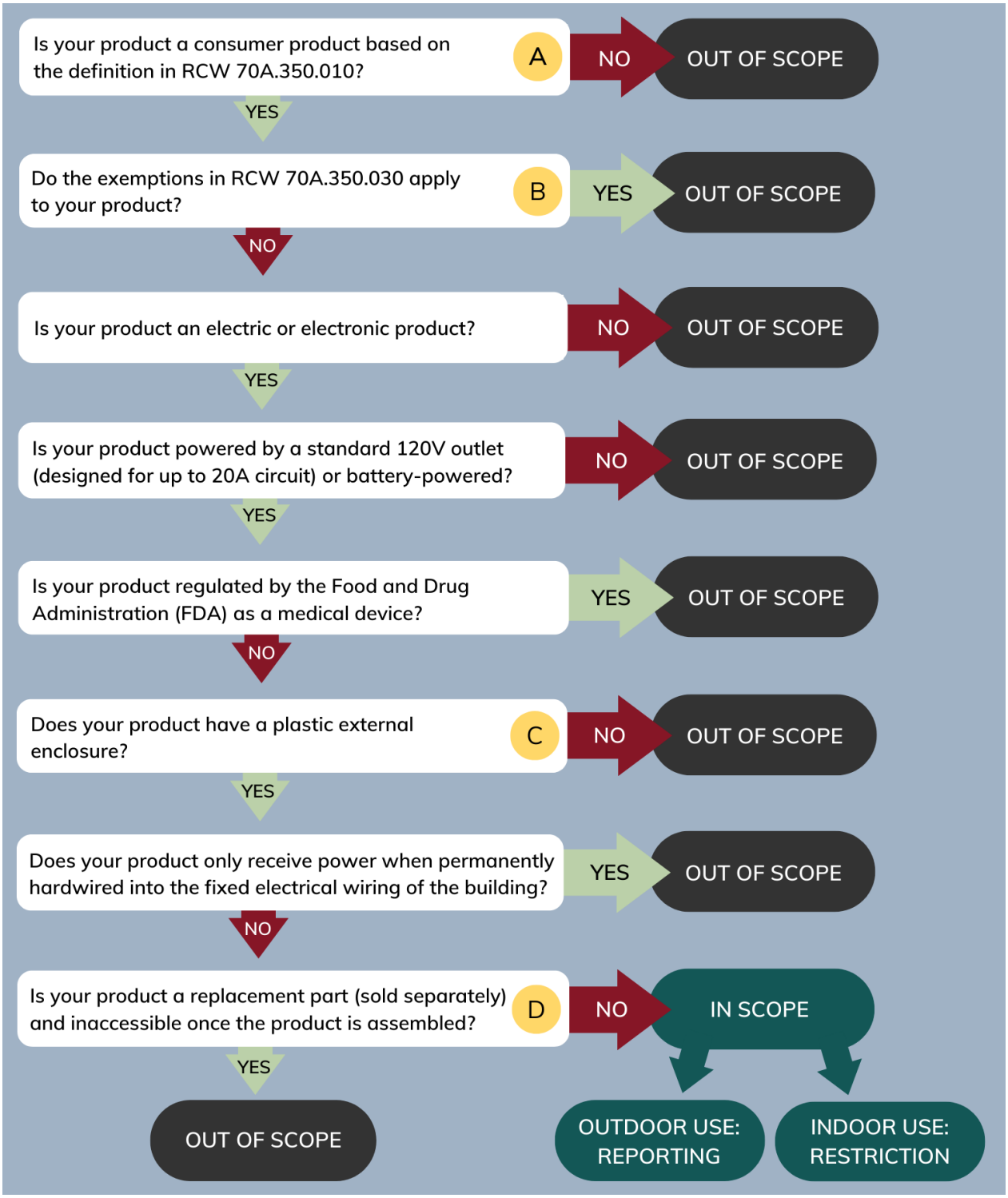

Figure 2. Definitions and details related to the decision tree above.

A Consumer product means any item, including any component parts and packaging, sold for residential or commercial use.

B Exemptions include:

- (i) Plastic shipping pallets manufactured prior to 2012
- (ii) Food or beverages
- (iii) Tobacco products
- (iv) Drug or biological products regulated by the United States Food and Drug Administration
- (v) Finished products certified or regulated by the Federal Aviation Administration or the Department of Defense, or both, when used in a manner that was certified or regulated by such agencies, including parts, materials, and processes when used to manufacture or maintain such regulated or certified finished products
- (vi) Motorized vehicles, including on and off-highway vehicles, such as all-terrain vehicles, motorcycles, side-by-side vehicles, farm equipment, and personal assistive mobility devices
- (vii) Chemical products used to produce an agricultural commodity, as defined in RCW 17.21.020

C External plastic enclosures are also called device casing. This regulation includes external plastic enclosure components that weigh more than 0.5 grams. Other components of the product including printed circuit boards, internal fans, wires, cords, cables, switches, light bulbs, connectors, and screens are not in scope.

D Replacement parts sold separately are excluded from scope because they function inside the products and may have different performance requirements.

Step 2. Determine if your product contains organohalogen flame retardants

Introduction

If you are unsure whether your products contain organohalogen flame retardants, use the information below. This resource is not prescriptive, but intends to provide options for identifying whether product components will need to be reformulated under the restriction.

In order to narrow down the components you will need to assess, develop a list of plastic components exceeding 0.5 grams that are part of the plastic external enclosure. For each of these components, ask the suppliers to provide information documenting that the component does not contain intentionally added organohalogen flame retardants. There are two main pathways to identify whether product components are free of intentionally added organohalogen flame retardants—disclosure and analytical testing. We discuss these options in more detail below.

Disclosure

Transparency is the most effective way to identify whether a product complies with current or future regulations. In order to determine whether a component contains organohalogen flame retardants, we suggest four options:

1. **Full material disclosure:** If possible, ask for full material disclosure, which is a list of all the materials and substances in the component. Many platforms and third-party assessors can help you gather this information. This will help you not only identify any flame retardants being used but also provide you additional information to assess compliance with regulations.
    - **What to look for:** Review the list of chemicals provided for "bromo-," "chloro-," and "fluoro-." If you notice any have these prefixes, ask what the function of the chemical(s) is and if the concentration is greater than 1,000 ppm.
    - **Timeline:** Look for information reviewing the current material dated less than two years old.
2. **Disclosure of the chemicals that serve a flame retardant function:** If you can't get full material disclosure, ask what chemicals are added that serve the function of flame retardants. Review the chemicals provided for "bromo-," "chloro-," and "fluoro-." If you notice any of these prefixes, ask if the concentration is greater than 1,000 ppm. While not an exhaustive list,[3] examples of organohalogen flame retardants that can be used in electronic enclosures are:
    - **CAS RN 1163-19-5** — Decabromodiphenyl ether
    - **CAS RN 25713-60-4** — 2,4,6-tris (2,4,6-tribromophenoxy)-1,3,5-triazine (TTBP-TAZ)

[3] For additional examples, visit https://www.epa.gov/sites/default/files/2014-05/documents/decabde_final.pdf

- **CAS RN 29420-49-3** — Potassium nonafluorobutanesulfonate (PFBS)
- **CAS RN 36483-57-5 or 1522-92-5 —** 2,2-dimethylpropan-1-ol, tribromo derivative; 3-bromo-2,2-bis(bromomethyl)propan-1-ol (TBNPA)
- **CAS RN 37853-59-1** — 1,2 Bis (2,4,6-tribromophenoxy)ethane (BTBPE)
- **CAS RN 68928-70-1** — Brominated epoxy
- **CAS RN 71342-77-3** — Phenoxy-terminated carbonate oligomer of tetrabromobisphenol A
- **CAS RN 79-94-7** — Tetrabromobisphenol A (TBBPA)
- **CAS RN 84852-53-9** — Decabromodiphenyl ethane
- **CAS RN 88497-56-7 —** Brominated polystyrene (BPS)

3. **Disclosure of the flame retardant code:** Some resins marketed to meet flammability standards have two digit codes to voluntarily identify the materials used. The term FR, in capital letters without spaces, is followed by a two-digit code that discloses the type of flame retardant used, such as FR(18). In Table 1, we list those that include halogenated compounds in their grouping.

Table 1. Flame retardant (FR) codes that include halogenated compounds in their grouping.

FR code	Flame retardants used
10	Aliphatic/alicyclic chlorinated compounds
11	Aliphatic/alicyclic chlorinated compounds in combination with antimony compounds
12	Aromatic chlorinated compounds
13	Aromatic chlorinated compounds in combination with antimony compounds
14	Aliphatic/alicyclic brominated compounds
15	Aliphatic/alicyclic brominated compounds in combination with antimony compounds
16	Aromatic brominated compounds (excluding brominated diphenyl ether and biphenyls)
17	Aromatic brominated compounds (excluding brominated diphenyl ether and biphenyls) in combination with antimony compounds
18	Polybrominated diphenyl ether
19	Polybrominated diphenyl ether in combination with antimony compounds
20	Polybrominated biphenyls
21	Polybrominated biphenyls in combination with antimony compounds
22	Aliphatic/alicyclic chlorinated and brominated compounds
25	Aliphatic fluorinated compounds
41	Chlorinated organic phosphorus compounds
42	Brominated organic phosphorus compounds

Note: FR codes 23 and 24 and 26 through 29 are unallocated.

4. **Statement documenting the supplier used safer flame retardants**: Another way to confirm your components are not using organohalogen flame retardants is to ask your supplier if the component or resin fulfills the requirements for materials used in the manufacture of TCO Certified products.
    - Request they provide a statement stating the components only use flame retardants on the TCO Certified Accepted Substance list.[4]

Analytical testing

If your suppliers do not provide the information you request, another way to confirm your components do not contain organohalogen flame retardants is by gathering test data.

Before you test, however, it is beneficial to first ask your supplier whether they have test data analyzing the current material (preferably less than two years old). They might have already assessed the material.

- **Certification ratings**: Ask your supplier or look at the relevant UL Yellow Card to determine whether the material in the component was tested and meets certain certifications.
    - **UL 746H Non-Halogenated Material certification** confirms that the material has been evaluated and is less than 900 ppm for bromine, chlorine, and fluorine individually and less than 1,500 ppm for their sum.
    - **UL Non-Chlorine and Non-Bromine** also likely indicates that organohalogen flame retardants are not intentionally used. However, you would need to ask about the use of fluorinated flame retardants (though these are less common).
- **XRF**: XRF analyzers are commonly used to inspect components for chemicals the EU Restriction of Hazardous Substances (RoHS) addresses. If your product was assessed using an XRF analyzer and screened for bromine greater than 1,000 ppm, it likely contains organohalogen flame retardants.
    - It is also worth asking if the XRF used can accurately screen for chlorine. Further, you would need to ask about the use of fluorinated flame retardants (though these are less common).
- **Lab data**: You or your supplier can test the components for total halogens (total bromine, total chlorine, and total fluorine). If the results are less than 1,000 ppm

[4] https://tcocertified.com/industry/accepted-substance-list/

individually or 1,500 ppm combined, your product would comply with the potential restriction outlined in the Preliminary Draft Rule Language.[5]

If you need to change your flame retardants or materials, we encourage you to go beyond compliance and seek out alternatives that are safer. If you need technical assistance or resources to find safer alternatives, contact us at SaferProductsWA@ecy.wa.gov.

[5] https://www.ezview.wa.gov/Portals/_1962/Documents/saferproducts/PreliminaryDraftRuleLanguage_Cycle1_August2022.pdf