GreenScreen Certified®

CEH CENTER for ENVIRONMENTAL HEALTH

cpa Clean Production Action

Standard for Reusable Food Packaging, Food Service Ware, & Cookware

Version 1.0.1 • May 2024

Center for Environmental Health protects people from toxic chemicals by working with communities, consumers, workers, government, and the private sector to demand and support business practices that are safe for public health and the environment.

Clean Production Action designs and delivers strategic solutions for green chemicals, sustainable materials and environmentally preferable products.

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Version 1.0.1 Revision Summary

The Version 1.0.1 update introduces an additional compliance option to meet the reusability criteria for certain materials in Section 10. Products made from ceramic, porcelain, glass, or non-foil metal that are not coated with any polymeric coatings or finishes will continue to be exempt from the testing for 780 cycles in a cleaning and sanitizing process. All other materials, including those with polymeric coatings, must either undergo the wash cycle testing *or provide a one-year manufacturer's warranty to demonstrate reusability.*

Acknowledgments

The GreenScreen Certified Standard for Reusable Food Packaging, Food Service Ware, & Cookware provides the means for manufacturers to communicate their use of safer chemicals in products per the GreenScreen hazard assessment tools. GreenScreen Certified also provides a means for specifiers and purchasers to prefer, recommend, or require products made with safer chemistry.

Center for Environmental Health and Clean Production Action developed the GreenScreen Certified Standard for Reusable Food Packaging, Food Service Ware, & Cookware in consultation with a diverse group of stakeholders, including manufacturers, purchasers, and external scientific experts from non-profit organizations and industry groups.

This effort would not have been possible without the help of the technical peer reviewers who devoted their time and considerable expertise to the development of this standard. Providing advice and feedback during technical peer review shall in no way be construed as support for the final standard. Clean Production Action ultimately takes responsibility for all content and any flaws or errors contained herein. In producing the final standard, we thank Ellen Goldberg, Kayla Williams, and Beverly Thorpe of Clean Production Action for their efforts in developing legal terms of use and website resources necessary to implement and launch the certification program.

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OVERVIEW

1. PURPOSE

1.1 This guidance document outlines the requirements and process for the GreenScreen Certified Standard for Reusable Food Packaging, Food Service Ware, & Cookware (hereafter referred to as the "GreenScreen Certified Standard for Reusables") administered by Clean Production Action.

1.2 Clean Production Action awards a GreenScreen Certified Certification Mark via license to manufacturers and suppliers who have paid the required license fee and have demonstrated that their product(s) meet one of the levels of increasingly stringent certification requirements described herein.

2. SCOPE

2.1 The GreenScreen Certified Standard for Reusables includes the following product types for home, institutional, and commercial use:

2.1.1 Reusable food service ware, food storage, food packaging (i.e., primary and secondary packaging), and/or cookware made of one or more materials, including but not limited to:

1. Glass (e.g., soda lime, borosilicate, excludes flat glass),
2. Ceramic (e.g., bone china, stoneware, earthenware, and porcelain),
3. Metal (e.g., stainless steel, aluminum),
4. Plastic (e.g., virgin, bio-based, and recycled polymers and copolymers such as polypropylene, polyethylene, polyethylene terephthalate, acrylic, silicone, rubber, polylactic acid), and/or
5. Fiber or other biological materials (e.g., wood, bamboo, cork, or composites of these types of materials).

2.1.2 Materials used to make reusable food service ware, food storage, food packaging, or cookware including but not limited to substrates, coatings, films, liners, printing inks, adhesives, glues, waxes, and oils.

2.2 Product categories that are out of scope of this standard include but are not limited to:

2.2.1 Single use food service ware, food storage, or food packaging products;

2.2.2 Food processing equipment; and

2.2.3 Kitchen appliances.

2.3 The Applicant for certification should contact Clean Production Action (greenscreen@cleanproduction.org) if questions arise as to whether certain products are within the scope of this standard.

2.4 GreenScreen Certified Certification Marks do not guarantee adherence to any other external quality, performance, or regulatory requirements.

3. SERVICE OPTIONS FOR CERTIFICATION

The process for achieving certification involves both a review of the product against the criteria and issuance of the certification. The review of the product can be done by Clean Production Action or by a GreenScreen Certified Reviewer. The process steps vary for each of these options and are described in detail in Annex 1 and Annex 2, respectively. Issuance of the certification is by Clean Production Action.

Compiling necessary data for certification requires intensive supply chain engagement that is outside the scope of the certification process. These services are offered by GreenScreen Certified Reviewers and Clean Production Action for an additional fee. Contact a GreenScreen Certified Reviewer or Clean Production Action for more information.

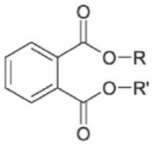
To learn more and to initiate the certification process, visit the following link: https://www.greenscreenchemicals.org/certified/get-certified.

4. TERMS AND DEFINITIONS

TERM	DEFINITION
Additive	A chemical compound, chemical substance, or mixture of chemical substances intentionally added to impart a desired characteristic to a product or serve a particular function in the product or homogeneous material (e.g., surfactant, solvent, stabilizer, colorant). Additives can be polymeric or non-polymeric in nature.
Alkylphenols (AP)	Chemical compounds that consist of one or more alkyl chains bound to a phenol. Phenol consists of an aromatic ring and a hydroxyl group. An alkyl chain is an acyclic saturated hydrocarbon (consisting of hydrogen and carbon atoms arranged in a tree structure in which all carbon-carbon bonds are single) with the general formula CnH_2n_{+1}.
Alkylphenol Ethoxylates (APEOs)	Derivatives of alkylphenols prepared by a chemical reaction between ethylene oxide and an alkylphenol, resulting in an ethoxylated chain with the general formula $-(OC_2H_4)_nOH$ replacing the hydroxyl group.
Applicant	An organization or entity that submits a product formulation or formulations for certification according to a specific GreenScreen Certified standard.
Authorized GreenScreen Assessment	A GreenScreen assessment completed by an Authorized GreenScreen Practitioner™ for his or her registered organization only. An Authorized assessment can be upgraded to a Certified assessment through Clean Production Action, and would then qualify for use in the GreenScreen Certified standard.
Authorized GreenScreen Practitioner™	An individual who has completed advanced training in the GreenScreen method, has demonstrated scientific expertise and capacity to perform a high-quality GreenScreen assessment, and is licensed by Clean Production Action to conduct GreenScreen assessments for their registered organization.
Biological Material	"A naturally occurring material containing genetic information and capable of reproducing itself or being produced within a biological system. Biological materials can be plant-based (e.g., beechwood, cotton), animal-based (e.g., leather, wool), microbial tissue-based, or a mixture." (Health Product Declaration Collaborative, https://www.hpd-collaborative.org/wp-content/uploads/2022/07/Biological-Materials-Update-7-14-22-FINAL.pdf, accessed 4/17/23)
CASRN	Chemical Abstracts Service Registry Number (also known as "CAS#").
Catalyst	Chemical compound or substance that causes or accelerates a chemical reaction without itself being affected.
Certification Level	One of the levels of requirements for safer chemicals in products specified in the GreenScreen Certified Standards.
Certified GreenScreen Assessment	A GreenScreen assessment completed by a Licensed GreenScreen Profiler or Clean Production Action Consulting Toxicologist (including an assessment performed by an Authorized GreenScreen Practitioner and upgraded to a Certified assessment through Clean Production Action). Note: The term "Certified GreenScreen Assessment" is distinct from a GreenScreen Certified product. The former refers to the assessment of an individual chemical using the GreenScreen method (see https://www.greenscreenchemicals.org/learn/guidance-and-method-documents-downloads). The latter refers to a product that Clean Production Action has verified to meet the GreenScreen Certified Standard for the relevant product category and the manufacturer has signed a license agreement with Clean Production Action.
Chemical	See Chemical Compound.
Chemical Compound	A molecule (or molecular entity) composed of atoms of more than one element held together by chemical bonds and typically identified by CASRN. Synonyms used in this guidance include "chemical" or "compound."
Chemical Mixture	"A mixture or a solution composed of two or more substances in which they do not react." (GHS Rev. 8; https://unece.org/ghs-rev8-2019, accessed 4/17/23)

TERM	DEFINITION
Chemical Substance (Substance)	"A chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition." (REACH Article 3(1); https://reachonline.eu/reach/en/title-i-chapter-2-article-3.html, accessed 6/27/23). A chemical substance is comprised of constituents (i.e., chemical compounds and/or chemical elements), and a chemical substance can be a component within a mixture.
Chemical/ Supplier Inventory	A comprehensive list of chemicals, substances, impurities, and residuals in a homogeneous material.
Compounds of Antimony	A chemical compound containing the element antimony (Sb).
Compounds of Arsenic	A chemical compound containing the element arsenic (As).
Compounds of Cadmium	A chemical compound containing the element cadmium (Cd).
Compounds of Chromium (VI)	A chemical compound containing hexavalent chromium (Cr(VI)).
Compounds of Lead	A chemical compound containing the element lead (Pb).
Compounds of Mercury	A chemical compound containing the element mercury (Hg).
Compounds of Nickel	A chemical compound containing the element nickel (Ni).
Cookware	Durable items that are used to prepare, dispense, or store food, foodstuffs, or beverages at greater than room temperature. Some examples include baking molds, baking sheets, bowls, grills, pans, pots, skillets, trays, and cooking utensils.
Fixed List	A Restricted Substances List (RSL) Reference List where chemical group membership is finite.
Flame Retardant	"Any chemical or chemical compound for which a functional use is to resist or inhibit the spread of fire. Flame retardant chemicals include, but are not limited to, halogenated, phosphorous-based, nitrogen-based, and nanoscale flame retardants, flame retardant chemicals listed as "designated chemicals" pursuant to Section 105440 of the Health and Safety Code, and any chemical or chemical compound for which "flame retardant" appears on the substance Safety Data Sheet (SDS) pursuant to Section 1910.1200(g) of Title 29 of the Code of Federal Regulations." (California Senate Bill 1019; https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB1019, accessed 4/17/23)
Food Packaging	Products "used to protect food and increase shelf life. It may also fulfill technical requirements and marketing needs (consumer information)." (Food Packaging Forum Glossary; https://www.foodpackagingforum.org/glossary, accessed 6/15/23)
Food Service Ware	Containers, bowls, plates, trays, cups, glasses, forks, spoons, knives, takeout containers, and other items including food service ware accessories used to contain and consume food, foodstuffs, and beverages.
Food Service Ware Accessory	Food service ware such as straws, stirrers, cup sleeves, utensils (including chopsticks), cocktail sticks/picks, toothpicks, napkins, and other similar accessory or accompanying food service ware used as part of food or beverage service or packaging. (Adapted from Brisbane Municipal Code Ordinance 660; https://mccmeetings.blob.core.usgovcloudapi.net/brisbaneca-pubu/MEET-Packet-0e91914508024cedaac49d485d27cd95.pdf, accessed 6/16/23)
Food Storage	Used to store food, foodstuff, and beverages and is intended to contact food for more than two hours at room temperature or below (for higher temperature applications, see Cookware).

TERM	DEFINITION
GreenScreen Assessment	The assessment of an individual chemical using the GreenScreen method (see https://www.greenscreenchemicals.org/learn/guidance-and-method-documents-downloads). An Authorized GreenScreen assessment and a Certified GreenScreen assessment are two types of GreenScreen assessments and reflect the type of assessor producing the assessment.
GreenScreen Benchmark™ Score	A score that is assigned to a chemical evaluated using the GreenScreen for Safer Chemicals method. GreenScreen Benchmark scores range from 1 to 4, with each increasing Benchmark score defining progressively less hazardous chemicals. (GreenScreen Guidance and Resources; https://www.greenscreenchemicals.org/learn/guidance-and-method-documents-downloads)
GreenScreen Certified® Certification Marks	The trademarked logos and phrase that may be licensed by Clean Production Action for use by a successful Applicant to describe the products that meet all of the requirements of a specified level of the GreenScreen Certified Standard for the relevant product category, as verified and approved by Clean Production Action.
GreenScreen Certified® Reviewer	An organization approved by Clean Production Action to review products against the GreenScreen Certified standards. Reviewers also offer supply chain engagement services. Reviewers may be Licensed GreenScreen Profilers or Licensed GreenScreen Consultants.
GreenScreen List Translator™	A streamlined chemical hazard assessment method developed by Clean Production Action that produces a GreenScreen List Translator score. (GreenScreen Guidance and Resources Section IV; https://www.greenscreenchemicals.org/assess/list-translator)
GreenScreen List Translator™ Score	A score that is assigned to a chemical screened against all GreenScreen Specified Lists (Annex 11) using GreenScreen List Translator guidance. List Translator scores include LT-1, LT-P1, LT-UNK and NoGSLT. (GreenScreen Guidance and Resources Section IV; https://www.greenscreenchemicals.org/assess/list-translator)
Homogeneous Material	"One material of uniform composition throughout or a material, consisting of a combination of materials, that cannot be disjointed or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes." (EU Directive 2008/98/EC; https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0098, accessed 4/17/23)
Impurity	"An unintended constituent present in a substance as manufactured. It may, for example, originate from the starting materials or be the result of secondary or incomplete reactions during the production process. While it is present in the final substance, it was not intentionally added. In most cases impurities constitute less than 10% of the substance." (ECHA; https://echa-term.echa.europa.eu/, accessed 4/17/23)
Intentionally Added	Included to serve a desired function; not an impurity or a residual.
Licensed GreenScreen Profiler	An organization with expertise in toxicology and comparative chemical hazard assessment that is licensed by Clean Production Action to provide GreenScreen assessments to clients for a fee. (https://www.greenscreenchemicals.org/assess/profilers)
Material Function	A general description of what a material is used for in a product. Examples include but are not limited to adhesive, backing, binder, and filler.
Material/ Manufacturer Inventory	A list of homogeneous materials intentionally added: 1) In the final product as placed on the market; or 2) During the final product manufacturing process.
Material Type	A broad classification of a material based on chemical makeup and atomic structure. Examples include but are not limited to biological material, polymeric material, or nanomaterial.
Monomer	"A substance which is capable of forming covalent bonds with a sequence of additional like or unlike molecules under the conditions of the relevant polymer forming reaction used for the particular process." (REACH Article 3(6); https://reachonline.eu/reach/en/title-i-chapter-2-article-3.html, accessed 6/27/23)

TERM	DEFINITION
Nanomaterial	"A natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50% or more of the particles in the number size distribution, one or more external dimensions is in the size range 1 nm-100 nm. In specific cases and where warranted by concerns for the environment, health, safety or competitiveness the number size distribution threshold of 50% may be replaced by a threshold between 1 and 50%. By derogation from the above, fullerenes, graphene flakes and single wall carbon nanotubes with one or more external dimensions below 1 nm should be considered as nanomaterials." (EU Commission (2011/696/EU); https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32011H0696&from=EN, accessed 4/17/23)
Non-Disclosure Agreement (NDA)	A legally binding agreement between organizations for the purpose of protecting confidential information shared during the certification process.
Organohalogen	A chemical containing one or more halogen atoms (typically chlorine, bromine, fluorine, or iodine) bound to a carbon atom.
Organotin Compound	Organotin compounds (organotins) are substances composed of tin directly bound to different organic groups.
Ortho-Phthalates	 Dialkyl ortho-phthalates (or phthalate esters) have the general chemical structure shown to the left, where each R group only contains hydrogen and carbon either in a linear or branched chain or cyclic chain. (Adapted from USEPA Phthalates Action Plan 2012; https://www.epa.gov/sites/production/files/2015-09/documents/phthalates_actionplan_revised_2012-03-14.pdf, accessed 4/17/23)
Package	"Packaging is used to protect food and increase shelf life. It may also fulfill technical requirements and marketing needs (consumer information)." (Food Packaging Forum Glossary; https://www.foodpackaging-forum.org/glossary (accessed 6/15/23)
Parabens	"Parabens are a family of alkyl esters of para-hydroxybenzoic acid. Different parabens differ in the chemical substitutions in the para position of the benzene ring." (Health Canada; https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/risk-management-scope-for-parabens-group-methylparaben-propylparaben-butylparaben-iso-butylparaben.html, accessed 4/17/23)
Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)	"A class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom." (SB 5135, Safer Products for WA ACT; http://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/Senate%20Passed%20Legislature/5135-S.PL.pdf?q=20210811124919, accessed 4/17/23)
Plastic	For the purposes of this standard, the term plastic is used as a synonym for polymeric material.
Polymer Mixture	A mixture comprised of a polymer substance and unreacted monomer(s).
Polymer Species	"Molecules characterized by the sequence of one or more types of monomer units. Such molecules must be distributed over a range of molecular weights wherein differences in the molecular weight are primarily attributable to differences in the number of monomer units. Polymer species comprise the following: (a) a simple weight majority (i.e., 50%) of molecules containing at least three monomer units which are covalently bound to at least one other monomer unit or other reactant; or (b) less than a simple weight majority of molecules of the same molecular weight." In the context of this definition a "monomer unit" means the reacted form of a monomer in a polymer." (REACH, Article 3(5); https://reachonline.eu/reach/en/title-i-chapter-2-article-3.html, accessed 6/27/23)
Polymer Substance	A substance comprised of constituents: polymer species, additives necessary to preserve stability, and impurities deriving from the manufacturing process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition. (Based on REACH Article 3(1); https://reachonline.eu/reach/en/title-i-chapter-2-article-3.html, accessed 6/27/23)
Polymeric Material	A mixture of one or more polymer substance(s) or polymer mixture(s), all other additives (i.e., intentionally added substances), and unintentional impurities.
Polymeric Material Impurities	Impurities imparted to the polymeric material from a source other than the intentionally added components.

TERM	DEFINITION
Post-Consumer Recycled Content (Plastics)	Recycled content generated by secondary or tertiary recycling. Secondary recycling refers to physical reprocessing (such as grinding and melting) and reforming of post-consumer plastic packaging material. The basic polymer is not altered during the process. Tertiary recycling is chemical reprocessing such as depolymerization of the post-consumer packaging material with subsequent regeneration and purification of resulting monomers (or oligomers). Regenerated monomer, polymer, or both may be blended with virgin materials. The regeneration process may involve a variety of monomer/polymer purification steps in addition to washings, such as distillation, crystallization, and additional chemical reaction. (US FDA, "Guidance for Industry: Use of Recycled Plastics in Food Packaging (Chemistry Considerations), August 2006; https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-use-recycled-plastics-food-packaging-chemistry-considerations, accessed 4/17/23)
Post-Industrial Recycled Content	Recycled content generated by primary recycling. Primary recycling refers to the use of pre-consumer industrial scrap and salvage to form new products (US FDA, "Guidance for Industry: Use of Recycled Plastics in Food Packaging (Chemistry Considerations)," August 2006; https://www.fda.gov/regulatory-information/search-fda-guidance-documents/guidance-industry-use-recycled-plastics-food-packaging-chemistry-considerations, accessed 4/17/23)
Primary Packaging	The layer of packaging in direct contact with the product.
Product	A finished good composed of parts, homogeneous materials, and/or chemical substances. A product may function as part of another product. A product may be made of one or more homogeneous materials.
Product Inventory Form	A form for listing the product contents for each product being certified. See Section 6 for additional required information.
Product Review Report	The checklist and/or form used by Clean Production Action and/or GreenScreen Certified Reviewers to document evaluation of a product for compliance with all GreenScreen Certified standard requirements.
Proprietary Ingredient	An ingredient in a product that is confidential to the manufacturer or producer.
Publicly Available GreenScreen® Assessment	GreenScreen Benchmark score and the assessment report are publicly available with no fee (with terms of use agreement).
Publicly Available GreenScreen® Benchmark Score	GreenScreen Benchmark score is publicly available with no fee. The GreenScreen assessment report may be available for a fee.
Recycled Content	Refers to the portion of materials used in a product that have been diverted from the solid waste stream. If those materials are diverted *during* the manufacturing process, they are referred to as pre-consumer recycled content (sometimes referred to as post-industrial). If they are diverted *after* their intended use (e.g., by industry, retailer, or individual consumer), they are referred to as post-consumer recycled content. (Adapted from Building Green; https://www.buildinggreen.com/primer/defining-recycled-content, accessed 4/17/23)
Residual	Chemical or substance added upstream in the supply chain to serve a desired function: 1) In the additive or homogeneous material but not in the final product as placed on the market; or 2) In the production of the additive or homogeneous material. For example, this may refer to substances included in a manufacturing process to aid processing, as well as inputs to a reaction process such as reagents, catalysts, monomers, or preservatives for raw materials.
Residual Monomer	An unintended impurity in a polymer substance. (GreenScreen Guidance and Resources; https://www.greenscreenchemicals.org/learn/guidance-and-method-documents-downloads)
Restricted Substances List (RSL)	The list of chemicals and chemical classes, and their thresholds, that certified products shall not contain as defined in the standard.

TERM	DEFINITION
Restricted Substances List (RSL) Reference List	The list of chemical group members for restricted chemical groups in the standard.
Reusable	A product that meets the GreenScreen Certified Reusability Criteria in Section 10, which requires the product to be durable and suitable for repeated use over an extended period of time.
RSL Threshold	A "not to exceed" limit assigned to a chemical or chemical class in the RSL.
Secondary Packaging	Protects the product and the primary packaging. An example of secondary packaging is a corrugated cardboard box or plastic crate containing multiple products in primary packaging.
Siloxanes	"Siloxanes, often also described as silicones, are molecules with an oxygen–silicon backbone (Si–O–Si), where each silicon atom carries two organic groups, mostly methyl, ethyl, or phenyl groups. Depending on their molecular weight, siloxanes can be characterized as linear or cyclic volatile methylsiloxanes, polydimethylsiloxanes (PDMS), or polyethermethylsiloxanes (PEMS)." (Fromme, Hermann. Cyclic Volatile Methylsiloxanes: Occurrence and Exposure. Reference Module in Earth Systems and Environmental Sciences. 2018; https://www.researchgate.net/publication/326537143_Cyclic_Volatile_Methylsiloxanes_Occurrence_and_Exposure, accessed 6/27/23)
Single-Use	Does not meet the definition of reusable.
Specific Migration Limit (SML)	"The maximum permitted amount of a given substance released from a material or article into food or food simulants." (Council of Europe Resolution CM/Res(2020)9; https://search.coe.int/cm/pages/result_details.aspx?objectid=09000016809fe04a, accessed 4/17/23)
Substance Impurity	An impurity of a chemical substance or polymer substance, such as a residual catalyst. See also "Impurity."
Substance Role	The specific purpose that a chemical serves in a material, product, or process. (Adapted from Tickner, Joel A. et al, "Advancing Safer Alternatives Through Functional Substitution", DOI: 10.1021/es503328m, Environ. Sci. Technol. 2015, 49, 742–749; https://pubs.acs.org/doi/abs/10.1021/es503328m, accessed 4/17/23)
Superseded Assessment	A superseded assessment has been replaced by an updated assessment with a different Benchmark score. A superseded assessment is no longer valid.
United States Environmental Protection Agency Safer Chemical Ingredient List (USEPA SCIL)	A list of chemical ingredients, arranged by functional-use class, that the United States Environmental Protection Agency Safer Choice Program has evaluated and determined to be safer than traditional chemical ingredients. This list is designed to help manufacturers find safer chemical alternatives that meet the criteria of the Safer Choice Program. (See https://www.epa.gov/saferchoice/safer-ingredients#scil, accessed 4/17/23)
Unreacted Monomer	An intended component in a polymer mixture. (GreenScreen Guidance and Resources; https://www.greenscreenchemicals.org/learn/guidance-and-method-documents-downloads)
Valid GreenScreen Assessment	A GreenScreen Assessment report that is not expired or has not been superseded. See GreenScreen Terms of Use for details.

CERTIFICATION REQUIREMENTS

5. SUMMARY OF REQUIREMENTS

The certification requirements for each certification level are summarized in Table 1 below. Each product must meet all requirements for the specified certification level in order to be awarded certification. See Sections 6 through 15 for complete program requirements.

TABLE 1: **Summary of Certification Requirements**

Section	Requirement	Certification Levels		
		Silver	Gold	Platinum
6. Product Inventory	Product Inventory includes: 1) Material Inventory of all homogeneous materials; and 2) Chemical Inventory for all additives in all homogeneous materials including: a) Intentionally added chemical compounds and substances ≥ 0.0001% by mass (1 ppm) in the additive; and b) Impurities and residuals ≥ 0.01% by mass (100 ppm) in the additive.	√	√	√
7. GreenScreen Hazard Evaluation	Screening with GreenScreen List Translator: 1) Intentionally added chemical compounds ≥ 0.0001% by mass (1 ppm) in the homogeneous material; and 2) Impurities and residuals ≥ 0.01% by mass (100 ppm) in the homogeneous material.	√	√	√
	Assessment with GreenScreen for Safer Chemicals:[1,2] 1) Intentionally added chemical compounds ≥ 0.0001% by mass (1 ppm) in the homogeneous material; and 2) Impurities and residuals ≥ 0.01% by mass (100 ppm) in the homogeneous material.		√	√
	None of the chemical compounds screened have a GreenScreen List Translator score of LT-1.	√	√	√
	None of the substances assessed have a GreenScreen Benchmark-1.	If available[3]	√	√
	None of the substances assessed have a score of GreenScreen Benchmark-1 or Benchmark-2.			√

1 For the Gold level, GreenScreen assessments are not required for chemicals in the Product Inventory that are on the US Environmental Protection Agency Safer Chemical Ingredients List (SCIL).

2 Exception: the hazard evaluation requirements shall be waived for the base material in products made of ceramic, glass and/or metal alloys. The requirements shall still apply to any coatings and/or finishes.

3 For the Silver level, GreenScreen assessments are preferentially used if they are freely and publicly available.

Section	Requirement	Certification Levels		
		Silver	Gold	Platinum
9. Analytical Testing	Product meets material-specific analytical testing requirements.	√	√	√
10. Reusability Criteria	Product meets reusability requirements.	√	√	√
11. Recycled Content	Product meets recycled content requirements or does not contain recycled content.	√	√	√

6. PRODUCT INVENTORY

A Product Inventory meeting the specifications outlined in this Section is required for certification. The Product Inventory contains the following:

6.1 Material/Manufacturer Inventory

6.1.1 Identify 100% by mass of the homogeneous materials in the product;[4] and

6.1.2 List the following information for each homogeneous material in the product:

1. Material (trade name(s) and/or metal alloy grade/unified numbering system (UNS) # for each material in the product; include part number(s) for assemblies),[5]
2. Material supplier name,
3. Material type,[6]
4. Material function,
5. Material color or coating, and
6. Material percent by mass (%) in product.

6.2 Chemical/Supplier Inventory

6.2.1 Identify all additives in each homogeneous material;

6.2.2 Identify all intentionally added chemicals and substances present ≥ 0.0001% by mass (1 ppm) in each additive;

6.2.3 Identify impurities and residuals present ≥ 0.01% by mass (100 ppm) in each additive; and

6.2.3 List the following information for each chemical in additive:[7]

1. Additive trade name,
2. Additive supplier name,
3. Additive function,
4. Additive percent by mass (%) in homogeneous material,
5. Chemical name and CASRN,
6. Chemical percent by mass (%) in additive,
7. Chemical function in supply chain (intentionally added, impurity, or residual),
8. Substance role if intentionally added or residual, and
9. Description if impurity.

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4 Colorants, coatings, finishes, and metal plating used on any material type must be listed as separate homogeneous materials in the Material Inventory.

5 For products with multiple parts or assemblies, each homogeneous material in each part and/or each assembly must be included in the Material Inventory.

6 Biological and geological materials often contain treatments and/or additives such as binders, coatings, and finishes that must be inventoried separate from the biological or geological material. For biological materials, list the genus name and species name. For geological materials, list the series or group name and all other information known about the material.

7 For additives that are polymeric materials, each polymer species, monomer, and catalyst in a polymer substance or polymer mixture must be listed as a separate ingredient. Polymeric materials include one or more polymer substances and/or polymer mixtures and potentially one or more additives. (See Section II–Assessing Polymers in the GreenScreen for Safer Chemicals Hazard Assessment Guidance Version 1.4.)

7. GREENSCREEN HAZARD EVALUATION

The Product Inventory completed in Section 6 will be used to evaluate the product using GreenScreen List Translator screening and/or chemical hazard assessment using GreenScreen for Safer Chemicals, depending on the certification level.

All coatings, finishes, or other chemistries/materials added to a material must comply with the hazard evaluation requirements in this section. Exception: the hazard evaluation requirements in sections 7.1, 7.2, and 7.3 are waived for base materials of ceramic, glass, and/or metal alloys contained in the product.

7.1 Silver, Gold, and Platinum Screening Requirements

7.1.1 Each intentionally added chemical compound present ≥ 0.0001% by mass (1 ppm) and each impurity and each residual present ≥ 0.01% by mass (100 ppm) in each homogeneous material is screened with GreenScreen List Translator.

7.1.2 Each screened chemical compound in the Product Inventory has a GreenScreen List Translator score of LT-P1, LT-UNK, or NoGSLT.[8] No LT-1 scores are permitted in certified products. No GreenScreen Benchmark-1 scores are permitted in certified products when there is a Publicly Available GreenScreen Assessment and/or a Publicly Available GreenScreen Benchmark score.

7.2 Gold Assessment Requirements

7.2.1 Each intentionally added substance present ≥ 0.0001% by mass (1 ppm) and each impurity and each residual present ≥ 0.01% by mass (100 ppm) in the product are assessed with GreenScreen for Safer Chemicals, with the following exception and modification:

1. Exception: GreenScreen assessments are not required for substances listed on the US Environmental Protection Agency Safer Chemical Ingredients List (USEPA SCIL). Presence on the SCIL list is considered equivalent to "not GreenScreen Benchmark-1."
2. Modification: GreenScreen assessments of polymer substances for the Gold level of certification do not require a potential chemical of high concern analysis to be conducted (See Section 15.4 in the GreenScreen for Safer Chemicals Hazard Assessment Guidance). Instead, each residual monomer and each catalyst present ≥ 0.01% by mass (100 ppm) in the product must meet the requirement of 7.1.2.

7.2.2 Each assessed substance has a valid GreenScreen assessment and GreenScreen Benchmark score.[9] No Benchmark-1 or Benchmark-1_{TP} scores are permitted in certified products.[10]

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8 Clean Production Action or a third-party GreenScreen Certified Reviewer screens each entry in the Product Inventory using GreenScreen List Translator. An Applicant may wish to perform an optional pre-screen of chemicals in the product inventory to determine if any have a GreenScreen List Translator score of LT-1 before applying to the program. Online tools that provide automation for GreenScreen List Translator scoring include toxnot and Pharos Chemical and Materials Library.

9 An Applicant may use valid Certified GreenScreen assessment(s) obtained either through public databases or through commissioning an assessment. New Certified GreenScreen assessments are generated (typically by a Licensed GreenScreen Profiler) for all remaining substances. Authorized assessments generated by Authorized GreenScreen Practitioners and upgraded to Certified assessments through Clean Production Action qualify for use in the GreenScreen Certified Program.

10 For GreenScreen Benchmark-U, filling data gaps with the "worst-case" hazard level must result in a GreenScreen Benchmark score that fulfills the certification level requirements.

7.3 Platinum Assessment Requirements

7.3.1 Each intentionally added substance present ≥ 0.0001% by mass (1 ppm) and each impurity and each residual present ≥ 0.01% by mass (100 ppm) in the product are assessed with GreenScreen for Safer Chemicals.

1. Modification: GreenScreen assessments of polymer substances for the Platinum level of certification require a potential chemical of high concern analysis to be conducted (See Section 15.4 in the GreenScreen for Safer Chemicals Hazard Assessment Guidance Version 1.4). A separate GreenScreen assessment is not required for residual monomers and residual catalysts present in polymer substances.

7.3.2 Each assessed substance has a valid GreenScreen assessment and GreenScreen Benchmark score.[11] No Benchmark-1, Benchmark-1_{TP}, Benchmark-1_{CoHC}, Benchmark-2, Benchmark-2_{DG}, or Benchmark-2_{TP} scores are permitted in certified products.[12]

11 An Applicant may use valid Certified GreenScreen assessment(s) obtained either through public databases or through commissioning an assessment. New Certified GreenScreen assessments are generated (typically by a Licensed GreenScreen Profiler) for all remaining substances. Authorized assessments generated by Authorized GreenScreen Practitioners and upgraded to Certified assessments through Clean Production Action qualify for use in the GreenScreen Certified Program.

12 For GreenScreen Benchmark-U, filling data gaps with the "worst-case" hazard level must result in a GreenScreen Benchmark score that fulfills the certification level requirements.

8. RESTRICTED SUBSTANCES LIST (RSL)

All chemicals, impurities, and residuals in the Chemical Inventory are compared against the RSL and must meet all of the following requirements:[13]

- Products shall not contain RSL chemicals from chemical groups listed in Table 2 that are intentionally added ≥ 0.0001% by mass (1 ppm) in each homogeneous material.
- Products shall not contain RSL chemicals from chemical groups listed in Table 2 that are impurities or residuals ≥ 0.01% by mass (100 ppm) in each homogeneous material.

TABLE 2: **Restricted Substances List (RSL)**

Restricted Chemical Group	Chemicals Group Members
Alkylphenols and Alkylphenol Ethoxylates	• Chemicals meeting the definition of alkylphenol or alkylphenol ethoxylate (See Section 4) and containing one or more alkyl chains with a carbon chain length of six carbons or more; and • Includes but is not limited to chemicals in the RSL Reference List (See Section A3.1 in Annex 3).
Antimicrobials	• Chemicals from the fixed list in the RSL Reference List (See Section A3.7 in Annex 3).
Benzophenones	• Chemicals from the fixed list in the RSL Reference List (see Section A3.5 in Annex 3).
BPA Analogs	• Chemicals meeting the definition of BPA Analog (See Section 3.2 in Annex 3); and • Includes but is not limited to chemicals in the RSL Reference List (See Section A3.2 in Annex 3).
Compounds of Cadmium, Chromium VI, Lead, Mercury, Arsenic, Antimony, and Nickel	• Chemicals meeting the definition of compounds of cadmium, chromium (VI), lead, mercury, arsenic, antimony, and nickel (See Section 4).

Cyclic Volatile Methyl Siloxanes (VMS)	• Chemicals on the following fixed list:
	  • Dodecamethylcyclohexasiloxane (D6), CASRN 540-97-6,
	  • Decamethylcyclopentasiloxane (D5), CASRN 541-02-6, and
	  • Octamethylcyclotetrasiloxane (D4), CASRN 556-67-2.

Diglycidyl ethers of bisphenols	• Chemicals from the fixed list in the RSL Reference List (See Section A3.9 in Annex 3).
Food Packaging Forum Priority Substances List	• Chemicals from the fixed list in the Priority Substances List by the Food Packaging Forum.
Halogenated Flame Retardants	• Chemicals meeting the definition of organohalogen and flame retardant (See Section 4).

13 The RSL is intended to reflect best practices and thresholds listed may go beyond regulations. In cases where regulatory requirements are more stringent than the RSL requirements, the regulatory requirements must be met.

Restricted Chemical Group	Chemicals Group Members
Mineral Oil Saturated Hydrocarbons (MOSH) and Mineral Oil Aromatic Hydrocarbons (MOAH)	• Chemicals from the fixed list in the RSL Reference List (See Section A3.10 in Annex 3).
Nanomaterials	• Chemicals from the fixed list in the RSL Reference List (See Section A3.8 in Annex 3).
Organohalogens (including chlorinated plastic)	• Chemicals meeting the definition of organohalogen (See Section 4).
Organotin Compounds	• Chemicals meeting the definition of organotin compounds (See Section 4) and that are part of the one of the organotin sub-groups in the RSL Reference List (See Section A3.6 in Annex 3).
Ortho-Phthalates	• Chemicals from the fixed list in the RSL Reference List (see Section A3.3 in Annex).
Other Chemicals of Concern	• Chemicals from the fixed list in the RSL Reference List (See Section A3.12 in Annex 3).
Parabens	• Chemicals meeting the definition of parabens (See Section 4); • Includes but is not limited to chemicals in the RSL Reference List (See Section A3.4 in Annex 3).
Per- and Polyfluoroalkyl Substances (PFAS)	• Chemicals meeting the definition of PFAS (See Section 4); • Includes but is not limited to chemicals in the Comprehensive Global Database of PFAS by the Organisation for Economic Cooperation and Development (OECD)
Polycyclic Aromatic Amines	• Chemicals from the fixed list in the RSL Reference List (See Section A3.11 in Annex 3).

9. ANALYTICAL TESTING

Manufacturers shall submit documentation demonstrating that the product meets the testing requirements in Sections 9.1 – 9.3, as applicable for the material type(s) used in the product. Clean Production Action may, at any time, test the certified product to confirm it meets the relevant testing requirements.

- Testing must be from an independent, third-party laboratory that is ISO/IEC 17025 accredited and the accreditation scope includes the test method(s) being applied to meet the testing requirements in this standard.
- Testing must be performed no more than one year prior to the date of application for certification.

9.1 Product-level Content Testing for Polymeric Materials, Biological Materials, & Coatings

9.1.1 Each product containing polymeric materials and/or biological materials (including composites of both) shall meet the Product-level Threshold Limit for each chemical group in Table 3, with the following exceptions:

1. No testing is required for a substrate made of a single biological material with no additives (e.g., unfinished oak wood), and
2. For products that have a polymeric coating, only the coating shall be tested (e.g., a metal alloy product that is coated with a plastic coating).

TABLE 3: **Analytical Test Requirements for Polymeric Materials, Biological Materials, & Coatings**

Chemical Group (for all certification levels, except where indicated)	**Chemical**	**CASRN**	**Test Method**	**Product-level Threshold Limit**
Benzophenone (Gold and Platinum only)	Benzophenone	119-61-9	Analysis by GC/MS (EPA 8270) or equivalent	0.001% (10 ppm)
Bisphenols	Bisphenol A (BPA)	80-05-7	Organic solvent extraction followed by LC/MS/MS or GC/MS or equivalent	0.00001% (0.1 ppm)
	Bisphenol F (BPF)	620-92-8		
	Bisphenol S (BPS)	80-09-1		
	Bisphenol B (BPB)	77-40-7		
Cyclic Volatile Methyl Siloxanes (cVMS)	Octamethylcyclotetrasiloxane (D4)	556-67-2	Analysis by GC/MS (EPA 8270D) or equivalent	0.01% (100 ppm)
	Decamethylcyclopentasiloxane (D5)	541-02-6		0.01% (100 ppm)
	Dodecamethylcyclohexasiloxane (D6)	540-97-6		0.01% (100 ppm)

Chemical Group (for all certification levels, except where indicated)	Chemical	CASRN	Test Method	Product-level Threshold Limit
Heavy Metals	Mercury	7439-97-6	Acid digestion followed by ICP-OES or ICP-MS (CPSC-CH-E1002-0.83 or equivalent)	0.001% (10 ppm)
	Lead	7439-92-1s		
	Chromium (VI), as total Cr	18540-29-9		
	Cadmium	7440-43-9		
	Arsenic	7440-38-2		
Phthalates	Di(2-ethyhexyl) phthalate (DEHP)	117-81-7	Extraction with organic solvent followed by GC/MS analysis (CPSC-CH-C1001-09.4, EN 14719, EPA 3540 or 3550/EPA 8270, or equivalent)	0.01% (100 ppm)
	Dibutyl phthalate (DBP)	84-74-2		
	Butyl benzyl phthalate (BBP)	85-68-7		
	Diisononyl phthalate (DINP)	28553-12-0		
	Diisobutyl phthalate (DIBP)	84-69-5		
	Di-n-pentyl phthalate (DPENP)	131-18-0		
	Di-n-hexyl phthalate (DHEXP)	84-75-3		
	Dicyclohexyl phthalate (DCHP)	84-61-7		
	Dipropylheptyl phthalate (DPHP)	53306-54-0		
	Diethyl phthalate (DEP)	84-66-2		
	Diisodecyl phthalate (DIDP)	26761-40-0		
Solvents (for printed products and products with recycled content only)	Toluene	108-88-3	Residual solvents by GC/MS headspace (EPA 8260, EN 14479) or equivalent	2 mg/m^2
	Methyl glycol	109-86-4		
	N-Methyl-2-pyrrolidone (NMP)	872-50-4		
	Ethyl glycol	110-80-5		
Total Fluorine (See Section 9.2)	Organofluorine compounds	Various	Combustion Ion Chromatography or Combustion followed by Ion Selective Electrode	0.01% (100 ppm)

9.2 Total Fluorine Testing for Polymeric Materials & Coatings

9.2.1 If none of the assets (equipment) used to produce the product under review for certification have any contact with PFAS at any time (i.e., production uses completely dedicated assets only), applicant must meet Level 1 Total Fluorine Testing Requirements.

9.2.2 If one or more of the assets used to produce the product under review for certification have any contact with PFAS at any time, applicant must meet the Level 1 and Level 2 Total Florine Testing Requirements.

9.2.3 Product-level total fluorine testing of all required samples shall verify total fluorine content is < 0.01% by mass (100 ppm) of the product.

9.2.4 Total fluorine shall be determined by Combustion Ion Chromatography or Combustion followed by Ion Selective Electrode. Test method detection limit must be 0.005% by mass (50 ppm) or lower.

9.2.5 Testing laboratories are approved by Clean Production Action. Clean Production Action provides the applicants with information necessary to submit samples for testing. Threshold exceedances due to naturally occurring fluorine may be accepted if the applicant provides sufficient analytical testing data demonstrating the source is not from a fluorinated chemical.

9.2.6 Level 1 Total Fluorine Testing Requirements: During the certification process, product-level total fluorine testing is required on three product samples from three different production lots, runs, or batches. For applicants subject to both Level 1 and Level 2 Total Fluorine Testing Requirements, each of the three samples required for Level 1 shall be from the very start of a different run that was directly preceded by assets being used to produce PFAS-containing products.

9.2.7 Level 2 Total Fluorine Testing Requirements:

9.2.7.1 Applicant attests that all manufacturing facilities that make the product have robust procedures in place to minimize contamination from production of PFAS-containing products to ensure every product meets the requirement of < 100 ppm total fluorine. These procedures at a minimum must include cleaning protocols for changeovers from production of PFAS-containing products to PFAS-free products, validation, sampling and testing protocols, and corrective actions. Contamination may result from shared equipment, shared recycling of process chemicals, or use of recycled raw materials.

9.2.7.2 During the duration of a valid certification, product-level total fluorine testing is required on three samples per quarter (three-month period), from each manufacturing facility. Each of the samples shall be from the very start of a different run that was directly preceded by assets being used to produce PFAS-containing products. Analytical test results verifying the product contains < 100 ppm total fluorine shall be submitted to Clean Production Action once per year during annual renewal.

9.2.7.3 Through the duration of a valid certification, the certification holder shall notify Clean Production Action immediately if they become aware that any certified product contains ≥ 0.01% (100 ppm) total fluorine.

9.3 Migration Testing Requirements

Migration testing is required for each product for all material types.

9.3.1 Each product shall be tested according to the requirements outlined in Tables 4, 5, and/or 6.

9.3.2 To select the proper table, use the material that is in direct contact with the food (e.g., plastic coated metal would be tested per Table 4 and a glazed ceramic product would be tested per Table 6). If the product contains more than one material in contact with food (e.g., glass container with plastic lid), each material in contact with food must be tested.

9.3.3 Additional instructions for product testing:

1. For all products, one sample of the coated/finished product substrate with any/all coating materials (e.g., plastic coated metal bowl) is tested, and;
2. For cookware that has a coating or finish, an additional sample of the uncoated/unfinished product substrate (e.g., metal bowl before the coating is applied) is tested.
3. Migration tests shall be done three successive times per sample, with the results of the third test being compared to the Specific Migration Limits.[14]

14 The specific migration in the second test shall not exceed the level observed in the first test, and the specific migration in the third test shall not exceed the level observed in the second test. Tracking migration in succession mimics the repeat use of ceramics, metals, plastics, and polymeric materials. Please see Section 2.1.6 of the EU Commission Regulation 10/2011 on plastic materials and articles intended to come into contact with food, as well as the P-SC-EMB “Metals and alloys used in food contact materials and articles” guide for further information on testing of repeat use articles.

9.3.4 Each product sample tested shall not exceed the Specific Migration Limit in Tables 4, 5, and/or 6.

TABLE 4: **Migration Testing Requirements for Polymeric Materials and Coatings**

Chemical	CASRN	Test Methods for Repeated Use Articles		Specific Migration Limit (SML) [mg/kg food or food simulant][15]
		Non-Cookware	Cookware	
Aluminum	7429-90-5	**Migration Test Method**: EN13130-1:2004 **Test Conditions**: • Leach for 10 days at 40°C[16] • Food simulant: 3% acetic acid **Method of Analysis**: • ICP-MS	**Migration Test Method**: EN13130-1:2004 Note that cookware must be tested under both test conditions 1 and 2 below[17] **Test Conditions 1**: • Leach for 2 hours at 100°C or reflux • Food simulant: 3% acetic acid **Test Conditions 2**: • Leach for 2 hours at 100°C or reflux • Food simulant: vegetable oil **Method of Analysis:** • ICP-MS	1
Antimony	1309-64-4			0.04
Arsenic	7440-38-2			0.01
Barium	7440-39-3			1
Cadmium	7440-43-9			0.002
Chromium	7440-47-3			0.01
Cobalt	7440-48-4			0.05
Copper	7440-50-8			5
Europium	7440-53-1			0.05
Gadolinium	7440-54-2			0.05
Iron	7439-89-6			48
Lanthanum	7439-91-0			0.05
Lead	7439-92-1			0.01
Lithium	7439-93-2			0.6
Magnesium	7439-95-4			60
Manganese	7439-96-5			0.6
Mercury	7439-97-6			0.005
Nickel	7440-02-0			0.02
Potassium	7440-09-7			60
Sodium	7440-23-5			60
Sum of Lanthanides: europium, gadolinium, lanthanum, terbium	Multiple			0.05
Terbium	7440-27-9			0.05
Zinc	7440-66-6			5

15 SMLs are sourced from Table 1 in Regulation (EU) No. 2020/1245 amending and correcting Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food.

16 Test conditions were determined by EN13130-1:2004 (and EU Commission Regulation No 10/2011 Annex V) for products that have contact with food-stuffs "at room temperature or below for an unspecified period." If the applicant demonstrates that the product is not used for food storage as defined in Section 4, an alternate test with the food simulant at 70°C for 2 hours may be substituted. Other test conditions in compliance with EU No 10/2011 may be accepted on a case by case basis.

17 Specific migration test conditions for cookware were adapted from EU Commission Regulation No 10/2011 guidance for overall migration. If these prescribed tests cause physical or other changes to the article, migration tests may be conducted according to the OM4 and OM5 test conditions as follows. OM4 indicates 1 h at 100 °C or reflux with food simulant 3% acetic acid. OM5 indicates 2 h at 100 °C or reflux, or 1 h at 121 °C, with food simulant vegetable oil. Please see EU Commission Regulation No 10/2011 for plastics Section 3.1 of Annex V for further information.

TABLE 5: **Migration Testing Requirements for Metal Alloys**

Chemical	CASRN	Test Methods for Repeated Use Articles		Specific Migration Limit (SML) [mg/kg food or food simulant][18]
		Non-Cookware	Cookware	
Aluminum	7429-90-5	**Migration Test Method**: EN13130-1:2004 **Test Conditions**: • Leach for 10 days at 40°C[19] • Food simulant: 5 g/L citric acid in aqueous solution **Method of Analysis**: • ICP-MS	**Migration Test Method**: EN13130-1:2004 Note that cookware must be tested under both test conditions 1 and 2 below: **Test Conditions 1:** • Leach for 2 hours at 100C or reflux • Food simulant: 5 g/L citric acid in aqueous solution **Test Conditions 2:** • Leach for 2 hours at 100C or reflux • Food simulant: vegetable oil **Method of Analysis:** • ICP-MS	5
Antimony	1309-64-4			0.04
Arsenic	7440-38-2			0.002
Barium	7440-39-3			1.2
Beryllium	7440-41-7			0.01
Cadmium	7440-43-9			0.005
Chromium	18540-29-9			0.1
Cobalt	7440-48-4			0.02
Copper	7440-50-8			4
Iron	7439-89-6			40
Lead	7439-92-1			0.01
Lithium	7439-93-2			0.048
Manganese	7439-96-5			0.6
Mercury	7439-97-6			0.003
Molybdenum	7439-98-7			0.12
Nickel	7440-02-0			0.14
Silver	7440-22-4			0.08
Thalium	7440-28-0			0.0001
Tin	7440-31-5			100
Vanadium	7440-62-2			0.01
Zinc	7440-66-6			5

18 SMLs are sourced from Council of Europe Resolution CM/Res(2020)9. The SMLs are published in the Technical Guide titled "Metals and alloys used in food contact materials and articles. A practical guide for manufacturers and regulators. 1st edition, 2013." Note: A revised second edition, supplementing Council of Europe Resolution CM/Res(2020)9 is underway under the European Committee for Food Contact Materials and Articles (CD-P-MCA) work program. The limits will be updated in this standard when available.

19 Test conditions were determined by EN13130-1:2004 (and EU Commission Regulation No 10/2011 Annex V) for products that have contact with foodstuffs "at room temperature or below for an unspecified period." If the applicant demonstrates that the product is not used for food storage as defined in Section 4, an alternate test with the food simulant at 70°C for 2 hours may be substituted. Other test conditions in compliance with EU No 10/2011 may be accepted on a case by case basis.

TABLE 6: **Migration Testing Requirements for Ceramics & Glass**

Chemical	CASRN	Test Methods for Repeated Use Articles		Specific Migration Limit (SML) [mg/kg food or food simulant] [20]
		Non-Cookware	Cookware	
Aluminum	7429-90-5	**Migration Test Method**: FDA Elemental Analysis Manual (EAM) method 4.6 **Test Conditions**: • Leach for 24 hours at 22°C • Food simulant: 4% acetic acid **Method of Analysis**: • ICP-OES		5
Antimony	1309-64-4			0.04
Arsenic	7440-38-2			0.002
Barium	7440-39-3			1.2
Beryllium	7440-41-7			0.01
Cadmium	7440-43-9			0.005
Chromium	18540-29-9			0.1
Cobalt	7440-48-4			0.02
Copper	7440-50-8			4
Iron	7439-89-6			40
Lead	7439-92-1			0.01
Lithium	7439-93-2			0.048
Manganese	7439-96-5			0.6
Mercury	7439-97-6			0.003
Molybdenum	7439-98-7			0.12
Nickel	7440-02-0			0.14
Silver	7440-22-4			0.08
Thalium	7440-28-0			0.0001
Tin	7440-31-5			100
Vanadium	7440-62-2			0.01
Zinc	7440-66-6			5

20 SMLs are sourced from Council of Europe Resolution CM/Res(2020)9. The SML's are published in the Technical Guide titled "Metals and alloys used in food contact materials and articles. A practical guide for manufacturers and regulators. 1st edition, 2013." Note: A revised second edition, supplementing Council of Europe Resolution CM/Res(2020)9 is underway under the European Committee for Food Contact Materials and Articles (CD-P-MCA) work program. The limits will be updated in this standard when available.

10. REUSABILITY CRITERIA

Products made of only ceramic, porcelain, glass, or non-foil metal and not coated with any polymeric coating or finish do not need to be tested as defined in the criteria in Section 10.1 to demonstrate reusability.[21] Products made with any other material(s), including the above material(s) with a coating, must meet the criteria in Section 10.1.

10.1 Products made of any other material—beyond only ceramic, porcelain, glass, or non-foil metal (and without a coating or finish)—including any polymeric materials and products made with a polymeric coating or finish, regardless of the base material type, must meet the criteria in either Section 10.1.1 or Section 10.1.2.[21]

10.1.1 The product must maintain its shape, structure, and function after 780 cycles in a cleaning and sanitizing process as defined in California Health and Safety Code Section 114101 and 114099.7, respectively, as demonstrated by test results from an ISO/IEC 17025:2017 accredited laboratory;[22] or

10.1.2 The product manufacturer must provide an express, written warranty to purchasers of the item that it will remain reusable for its intended purpose for a minimum of one year or the manufacturer will take back and replace the product at the manufacturer's expense.[21]

11. RECYCLED CONTENT

This section includes additional requirements or restrictions for products made using post-industrial or post-consumer recycled content for all homogeneous material types in scope of this standard:

11.1 Post-Industrial Recycled Content (Pre-Consumer)

11.1.1 All materials: allowed in certified products if the materials are well-defined, fully characterized (i.e., inventory and disclosure requirements in Section 6 are met), and meet all other certification requirements.

11.2 Post-Consumer Recycled Content

11.2.1 Polymeric Materials & Biological Materials: materials are evaluated on a case-by-case basis. Use of post-consumer recycled content in products is not preferred in food contact applications, but may be allowed if the material is well-defined, fully characterized (i.e., inventory and disclosure requirements in Section 6 are met), and meet all other certification requirements.

11.2.2 Glass: any amount is allowed in certified products. For glass, recycling processes typically occur at temperatures that volatize contaminants.

11.2.3 Metal: any amount is allowed in certified products. For metal, recycling processes typically occur at temperatures that volatize contaminants, and metal alloys are engineered to meet specific composition standards (i.e., metal grades).

11.2.4 Ceramic: not applicable to ceramic because there is currently lack of recycling infrastructure for ceramics.

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21 GreenScreen Certified criteria for reusability are based on California Code §17989.3 Reusable Food Service Packaging Criteria), but exclude Cal. Code Regs. Tit. 14, § 17989.2–Public Health and Litter Impacts Criteria.

22 Example test method: BS EN 12875-1:2005 "Mechanical dishwashing resistance of utensils reference test method for domestic articles."

12. CERTIFICATION AMENDMENTS

12.1 Specified Chemicals with Form-Specific Hazards [applies to all certification levels]

12.1.1 Scope

The form-specific hazard amendment applies to the substances listed in Table 7, where the hazard is specific to unbound particles of respirable size (<10 micrometers). The toxicity of chemicals with form-specific hazards is defined as adverse effects limited to the respiratory tract, characterized as the nasal and oral cavities, pharynx, larynx, trachea, bronchi, and lungs, following inhalation exposure.[23]

TABLE 7: **Substances with Known Form-Specific Hazards**

Chemical Name	CASRN
Titanium dioxide	13463-67-7
Quartz	14808-60-7
Cristobalite	14464-46-1
Tridymite	15468-32-3
Tripoli	1317-95-9

12.1.2 Amendment

Chemicals in Table 7 are restricted in certified products if they are present as airborne, unbound particles of respirable size (i.e., < 10 micrometers in diameter) at ≥ 0.01% by mass (100 ppm) of the material.

This RSL amendment allows the use of the chemicals in Table 7 in certified products provided the following requirements are met.

12.1.2.1 For materials sold in powder form, a certificate of analysis from a qualified laboratory must be submitted and show the material's particle size distribution is >10 micrometers.[24]

12.1.2.2 For materials sold as liquids or non-powder solids (e.g., paints, joint compounds, abrasives, and fillers) the chemicals in Table 7 are acceptable for use in certified products provided that the substance does not volatilize, leach, emit, or abrade from the liquid or bulk material in the particle size and physical form of concern in normal use for the lifetime of the product.

12.1.2.3 All certified products that meet the amendment requirements shall bear the following warning statement (either on the product label or manufacturer's instructions):

"This product contains a form-specific hazard. The hazard is related to particulate inhalation, which is expected to occur only during manufacture or activities that result in destruction such as cutting, tearing, smashing, and disposal."

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23 Adapted from Health Product Declaration Collaborative *Best Practices for Special Conditions* for form-specific hazards, accessed 6/27/23.

24 This requirement can be demonstrated in a sieving assessment report or certification of analysis or technical data sheet presenting the sieving distribution for the product. The particle size distribution (D0.01, D10, D50, D90) must be reported. This measure refers to the diameter sizes for which 0.01%, 10%, 50%, and 90% of particles, respectively, have diameters less than 10 micrometers. The D0.01 must be less than 10 micrometers for products or materials sold in powdered form to qualify for certification (i.e., 0.01% of the particulates have diameters less than 10 micrometers). Health Product Declaration Collaborative *Best Practices for Special Conditions* for form-specific hazards, accessed 6/27/23.

12.2 Talc [applies to Silver and Gold certification levels]

12.2.1 Scope

This amendment applies to talc (CASRN 14807-96-6) grades free of asbestiform fibers and used in certified products.

12.2.2 Background

Talc (CASRN 14807-96-6) is an inorganic mineral used in numerous industrial applications. Talc is non-reactive, non-flammable, and ubiquitous in the environment. While a primary concern with use of talc is asbestos contamination, this amendment is related to talc grades free of asbestiform fibers (e.g., some medical, food, or cosmetic grades).

Talc free of asbestiform fibers was assigned a GreenScreen score of Benchmark-1. Benchmark-1 chemicals are not allowed in GreenScreen Certified products (see Section 7 for detailed requirements). The Benchmark-1 score was assigned due to the combination of very high persistence and high systemic toxicity from repeated exposure. Talc is classified as high hazard for systemic toxicity based on reported adverse effects following repeated, occupational exposure via inhalation and evidence from animal studies. Since talc is an inorganic mineral, it is recalcitrant (i.e., naturally very persistent in the environment).

12.2.3 Amendment

This amendment allows products containing asbestiform-free talc used in reusable food packaging, service ware, and cookware to be eligible for the Silver or Gold levels of certification. This is a temporary amendment that will be removed once talc-free alternatives are readily available on the market.

12.2.4 Rationale

Given the current use of talc in reusable food packaging, service ware, and cookware, talc-free products are not a primary differentiating factor among products in this category. In addition, talc is unlikely to persist in the environment in inhalable form, making the combination of persistence and chronic toxicity of less concern, particularly for this product category since exposure to talc in reusable products is expected to be low. However, this does not apply to the Platinum level of certification because inhalation of talc is a concern for worker health and safety in the supply chain and thus should be phased out.

12.2.5 Requirements

To be eligible for the Silver or Gold certification levels, manufacturers shall submit documentation demonstrating talc used in the product manufacturing process is free of asbestiform fibers. Specifically, documentation shall demonstrate that talc meets the U.S. Pharmacopeia (USP) definition of "Absence of Asbestos."[25,26]

Analytical testing must be from an independent, third-party laboratory that is ISO/IEC 17025 accredited.

Documentation shall be for tests performed no more than one year prior to the date of application for certification.

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25 U.S. Pharmacopeial Convention. Official USP 5/1/09-7/31/09 Monographs: Talc, "Absence of Asbestos," 2009.

26 CPA is aware of current limitations with the USP methodology (XRD/PLM) as discussed in the U.S. Food and Drug Administration's Executive Summary, January 2020, "Preliminary Recommendations on Testing Methods for Asbestos in Talc and Consumer Products Containing Talc;" accessed 8/12/2021. Improved, standardized methods for asbestos testing are still in development. This Standard will be revised to incorporate standardized methods once available.

12.3 Wood Flour/Wood Dust [applies to Silver and Gold certification levels]

12.3.1 Scope

This amendment applies to Wood Flour (CASRN for cellulose 9004-34-6) used as a filler/reinforcement additive in materials used to make reusable food packaging, service ware, and cookware (e.g., filler/reinforcement in polymer composites). A synonym term common in current literature is wood dust.

12.3.2 Background

Wood Flour is assigned a GreenScreen score of Benchmark-1 because it causes cancer. It is listed on California Prop 65 as a chemical known to the state to cause cancer, and is classified by IARC as Group I known human carcinogen. GreenScreen BM-1 chemicals are not allowed in GreenScreen Certified products (see Section 7 for detailed requirements). These hazard classifications are based on data that have shown wood dust causes cancer in the upper respiratory tract when inhaled (an exposure route specific hazard), which may be due to a variety of physical and toxicological mechanisms. Contaminants in the wood may play a role, but there is no direct evidence. The particle size distribution of wood flour is not currently characterized in the literature; however, the Forest Service reports that wood flour usually refers to wood particles that are approximately 850 microns (i.e., small enough to pass through a 20 US standard mesh).[27]

12.3.3 Amendment

This amendment allows products containing wood flour to be eligible for the Silver and Gold levels of certification. This is a temporary amendment that will be removed once alternative filler materials that are safer for human health are readily available on the market. This amendment does not apply to the Platinum level of certification because inhalation of wood flour/wood dust is a concern for worker health and safety in the supply chain and thus should be phased out.

12.3.4 Rationale

Safer alternatives for fillers are not currently readily available on the market. Thus, the toxicity profile of the filler is not a key differentiator between products on the market and other hazard considerations should be prioritized to support product selection. Wood flour in the final product(s) undergoing certification is in a form that cannot be inhaled (i.e., it is bound within the matrix of the substrate). In addition, wood flour, once incorporated into the final product, is unlikely to persist in the environment in an inhalable form and also does not pose a hazard for oral or dermal exposure routes.

27 Forest Service https://www.fs.usda.gov/treesearch/pubs/23122, accessed 9/6/22.

12.4 Metal Alloys [applies to all certification levels]

12.4.1 Scope

This amendment applies to specific alloy elements in products made of metal alloys. The metals listed below are present on the Silver-Gold Restricted Substances List or have been assessed and have been assigned a score of Benchmark-1 or LT-1 in the elemental form:

- Aluminum (Al)
- Antimony (Sb)
- Beryllium (Be)
- Cobalt (Co)
- Nickel (Ni)
- Silver (Ag)
- Vanadium (V)

12.4.2 Amendment

Al, Sb, Be, Co, Ni, Ag, and V metals are allowed in certified products for all levels of certification when the metals are a part of the alloy crystallites in a true alloy such as steel. In a true alloy, substances present in the alloy are integral parts of the alloy (i.e., part of the alloy crystallites as opposed to being present between the crystallites).

12.4.3 Rationale

This amendment is included to address the fact that heavy metals are commonly found in the ores used to produce metal alloys and because they are embedded into the metal alloy are likely to have very low exposure rates in use. To ensure that the problematic metals in this amendment do not leach from the material, if present in the alloy, this GreenScreen standard requires migration testing with strict threshold limits for metal alloys (with and without any coatings or finishes) against a wide range of alloy elements, including those in this amendment (See Table 5).

13. DOCUMENTATION REQUIREMENTS

Clean Production Action performs a certification review of the following required documents against the certification requirements. All documentation is submitted by the Applicant.

1. Product Inventory
    a. Additive Inventories
    b. Chemical Inventories
2. Safety Data Sheets (SDSs)
3. GreenScreen List Translator scores[28]
4. GreenScreen assessments and Benchmark scores (Gold and Platinum only)
5. Signed attestation forms including:[29]
    a. Product-Level PFAS in Manufacturing Declaration
6. Results from analytical testing (i.e., content and/or migration, as applicable for the material type(s) in the product)
7. Form-specific warning labels, if applicable
8. For polymeric materials and products made with a polymeric material, polymeric coating or polymeric finish only, test results for Reusability Criteria from an ISO 17065 accredited lab, including attestation from the lab that the chosen method complies with California Health and Safety Code Section 114101 and 114099.7.

14. CERTIFICATION AND LICENSING

The Applicant must submit all required documentation as applicable to the certification level to Clean Production Action and sign a license agreement with Clean Production Action in order to be awarded certification. A license agreement is required to use the GreenScreen Certified Certification Mark on products and marketing materials.

A certificate for a certified product (or products) is issued by Clean Production Action after the certification review is complete and a License Agreement is executed.

28 GreenScreen List Translator scores are generated by a GreenScreen Certified Reviewer or Clean Production Action.
29 The forms must be signed by the CEO or a senior manager with decision-making authority at the organization.

15. CERTIFICATION, LABELING, AND DURATION

15.1 Disclaimer of Liability

Clean Production Action, as the developer of this standard, shall not incur any obligations or liability for any loss or damages, including, without limitation, indirect, consequential, special, or incidental damages, arising out of or in connection with the interpretation or adoption of, reliance upon, or any other use of this standard by any party. Clean Production Action makes no express or implied warranty of merchantability or fitness for a particular purpose, nor any other express or implied warranty with respect to this standard.

15.2 Certification Mark

The appropriate GreenScreen Certified Mark may appear on the product, packaging, secondary documents, and promotional materials, only in conjunction with the certified product, and only the design Mark with the corresponding level which the product has achieved may be used in conjunction with that certified product. All of the Applicant's use of the GreenScreen Certified Mark(s) shall be in accordance with the terms of the executed license agreement. No sub-licensing of the Mark(s) is allowed.

The GreenScreen Certified Mark shall not be used in conjunction with any modifying terms, phrases, or graphic images that might mislead customers as to the extent or nature of the certification. Clean Production Action may review all uses of the GreenScreen Certified Mark prior to printing or publishing.

15.3 Use with Other Claims

The GreenScreen Certified Mark shall not appear in conjunction with any human health or environmental claims, unless done so in accordance with the Trademark Use Guidelines.

15.4 Duration of Certification

Certificates for Version 1.0 of this standard are valid through August 31, 2028, and require annual renewal. Any changes to the product during the valid certification period (e.g., changes to chemical composition) must be reported to Clean Production Action immediately and may invalidate the certificate.

After the first year of the certificate, and each subsequent year during the valid duration, the licensee must renew the certificate by: 1) paying an annual renewal fee; 2) reporting any product changes; 3) submitting analytical testing results if required; and 4) signing a statement by the CEO or a senior manager that no changes have been made to the product's chemical composition. At the time of annual renewal, recertification will be required if changes have occurred that may affect the product inventory and hazard assessment.

Clean Production Action reserves the right to perform product testing on a certified product at any time. Results of the product testing could invalidate the certificate.

Certificate holders may choose to recertify the product(s) upon expiration of the certificate.

ANNEX 1 – CERTIFICATION PROCESS STEPS WITH CLEAN PRODUCTION ACTION

1. Applicant registers on the GreenScreen Certified website.
2. Applicant contacts Clean Production Action to begin the certification process.
3. Clean Production Action determines whether product(s) are within scope.
4. Clean Production Action sends the following Application materials:
   a. Non-disclosure agreement (NDA); and
   b. Application Form.
5. Applicant signs NDA and completes Application Form. Applicant sends signed NDA and signed Application Form to Clean Production Action.
6. Clean Production Action countersigns NDA and sends executed NDA to Applicant.
7. Clean Production Action sends Applicant an invoice.
8. Applicant pays the invoice.
9. Clean Production Action sends Applicant the following materials:
   a. Product Inventory Form;
   b. Product-level declaration form(s); and
   c. Instructions for analytical testing.
10. Applicant submits the completed Product Inventory form, Safety Data Sheets, signed product-level declaration form(s), and GreenScreen assessment reports (for Gold and Platinum only) for all inputs including mixtures and polymers purchased from suppliers, and analytical testing results.
11. Clean Production Action performs product and certification reviews. Clean Production Action requests additional information from Applicant as needed.
12. Clean Production Action informs Applicant of the results of the product and certification reviews.
13. Applicant informs Clean Production Action whether they will proceed with a License Agreement for products that meet the certification requirements.
14. Clean Production Action sends Applicant a License Agreement.
15. Applicant signs and returns the License Agreement.
16. Clean Production Action countersigns the License Agreement and sends an executed copy to the Applicant.
17. Clean Production Action lists certified product(s) on the Clean Production Action website and sends Applicant certificate(s) for certified product(s).

ANNEX 2 – CERTIFICATION PROCESS STEPS WITH GREENSCREEN CERTIFIED REVIEWER

A2.1 Product Review Process using a GreenScreen Certified Reviewer

1. Applicant registers on the GreenScreen Certified website.
2. Applicant contacts Clean Production Action-approved GreenScreen Certified Reviewer to begin the product review process (Access Reviewer list).
3. GreenScreen Certified Reviewer confirms with Clean Production Action that Applicant is registered for GreenScreen Certified and determines whether product(s) are within scope.
4. Applicant hires GreenScreen Certified Reviewer to complete the product review.
5. GreenScreen Certified Reviewer informs Applicant of the results of the product review and provides Applicant a completed Product Review Report.

A2.2 Certification Process with CPA

1. Applicant submits completed Product Review Report to Clean Production Action to initiate certification review and licensing services.
2. Clean Production Action sends Applicant an invoice.
3. Applicant pays the invoice.
4. Clean Production Action performs certification review. Clean Production Action requests additional information from Applicant or GreenScreen Certified Reviewer, as needed.
5. Clean Production Action informs Applicant of the results.
6. Applicant informs Clean Production Action whether they will proceed with a License Agreement for products that meet the certification requirements.
7. Clean Production Action sends Applicant a License Agreement.
8. Applicant signs and returns the License Agreement.
9. Clean Production Action countersigns the License Agreement and sends an executed copy to the Applicant.
10. Clean Production Action lists certified product(s) on the Clean Production Action website and sends Applicant certificate(s) for certified product(s).

ANNEX 3 – FOOD SERVICE WARE: REUSABLE RSL REFERENCE LISTS

This Annex contains RSL Reference Lists for use in identifying chemical group members of restricted chemical groups listed in Section 8.

A3.1 Alkylphenols and Alkylphenol Ethoxylates

[Back to RSL Summary Table]

Chemical group members belonging to the Alkylphenols and Alkylphenol Ethoxylates group include but are not limited to those listed in the following table:

TABLE A1: **RSL Reference List for Alkylphenols and Alkylphenol Ethoxylates**

Chemical Name	CASRN
Phenol, 4-(1- ethyl-1,2- dimethylpropyl)-	30784-27-1
Phenol, 4-(1- ethyl-2,2- dimethylpropyl)-	861010-65-3
Phenol, 4-(1- ethyl-3- methylbutyl)-	854904-92-0
Phenol, 4-(1- ethylpentyl)-	6465-74-3
Phenol, 4-(1- methylhexyl)-	6863-24-7
Phenol, 4-(1- propylbutyl)-	6465-71-0
Phenol, 4-(1,1- diethylpropyl)-	37872-24-5
Phenol, 4-(1,1- dimethylpentyl)-	30784-31-7
Phenol, 4-(1,1,2- trimethylbutyl)-	861011-60-1
Phenol, 4-(1,1,2,2-tetramethylpropyl)-	72861-06-4
Phenol, 4-(1,1,3- trimethylbutyl)-	33104-11-9
Phenol, 4-(1,2-dimethylpentyl)-	854904-93-1
Phenol, 4-(1,2,2-trimethylbutyl)-	911371-06-7
Phenol, 4-(1,3-dimethylpentyl)-	71945-81-8
Phenol, 4-(1,3,3-trimethylbutyl)-	911371-07-8
Phenol, 4-(1,4-dimethylpentyl)-	857629-71-1
Phenol, 4-(3-ethylpentyl)-	911370-98-4
Phenol, 4-(3-methylhexyl)-	102570-52-5
Phenol, 4-(4-methylhexyl)-	1139800-98-8
Phenol, 4-(5-methylhexyl)-	100532-36-3
Phenol, 4-[2methyl-1-(1- methylethyl)propyl]-	1824346-00-0
Phenol, 4-heptyl-	1987-50-4
Phenol, 4-tert-heptyl-	288864-02-8
Phenol, heptyl derivs.	72624-02-3

TABLE A1: **RSL Reference List for Alkylphenols and Alkylphenol Ethoxylates**

Chemical Name	CASRN
2-Ethylhexylphenol	1331-54-0
2-n-Octylphenol	949-13-3
2-tert-Octylphenol	67554-50-1
4-n-Octylphenol	1806-26-4
4-Octylphenol	71902-25-5
4-Octylphenol polyethoxylate	26636-32-8
4-tert-Octylphenol	140-66-9
4-tert-Octylphenol diethoxylate	68310-57-6
C8 Branched alkyl phenol ethoxylate	68987-90-6
Ethanol, 2-(2-(4-(1,1,3,3-tetramethylbutyl)phenoxy)ethoxy)-	2315-61-9
Ethanol, 2-(octylphenoxy)- = Octylphenolethoxylate	1322-97-0
Isooctylphenol	11081-15-5
Octoxynol-1	2315-67-5
Octoxynol-9	9002-93-1
Octylphenoxy polyethoxyethanol	9036-19-5
Phenol, (1-methylheptyl)-	27985-70-2
Phenol, 2-(1,1,3,3-tetramethylbutyl)-	3884-95-5
Phenol, 2-(1-ethylhexyl)-	17404-44-3
Phenol, 2-(1-methylheptyl)-	18626-98-7
Phenol, 2-(1-propylpentyl)-	37631-10-0
Phenol, 2-sec-octyl-	26401-75-2
Phenol, 4-(1-ethylhexyl)-	3307-00-4
Phenol, 4-(1-methylheptyl)-	1818-08-2
Phenol, 4-(1-propylpentyl)-	3307-01-5
Phenol, 4-octyl-, branched	99561-03-2
Phenol, 4-sec-octyl-	27214-47-7
p-1 sooctylphenol	27013-89-4
Poly(oxy-1,2-ethanediyl), -(octylphenyl)- -hydroxy-	9063-89-2
Poly(oxy-1,2-ethanediyl), -[(1,1,3,3-tetramethylbutyl) phenyl]- -hydroxy-, phosphate	52623-95-7
Poly(oxy-1,2-ethanediyl), -sulfo–(octylphenoxy)-, branched, sodium salt	69011-84-3
Poly(oxy-1,2-ethanediyl), -sulfo–{(1, 1,3,3-tetramethylbutyl)phenoxy]-, sodium salt	55348-40-8
Poly(oxy-1,2-ethanediyl), alpha-((1,1,3,3-tetramethylbutyl)phenyl)-omega-h ydroxy-, phosphate	52276-83-2

TABLE A1: **RSL Reference List for Alkylphenols and Alkylphenol Ethoxylates**

Chemical Name	CASRN
Poly(oxy-1,2-ethanediyl), alpha-(3-octylphenyl)-omega-hydroxy	81642-15-1
Poly(oxy-1,2-ethanediyl), alpha-(4-isooctylphenyl)-omega-hydroxy-	51651-58-2
Poly(oxy-1,2-ethanediyl), alpha-(isooctylphenyl)-omega-hydroxy	9004-87-9
Polyethylene glycol benzyl (1,1,3,3-tetramethylbutyl)phenyl ether	60864-33-7
sec-Octylphenol	93891-78-2
tert-Octylphenol	27193-28-8
Triton® X-405	2497-59-8
(C9)Aikylated phenol	68081-86-7
14-(Nonylphenoxy)-3,6,9,12-tetraoxatetetradecan-1-ol	26264-02-8
2,6-di-tert-b utyl-4-nonylphenol	4306-88-1
2-[2-[2-(4-Nonylphenoxy)ethoxy]ethoxy]ethanol	51437-95-7
20-(4-No nylphenoxy)-3,6,9,12,15,18-hexaoxaico san-1-ol	27942-27-4
20-(Nonylphenoxy)-3,6,9,12,15,18-hexaoxaicosan-1-ol	27177-03-3
26-(4-No nylphenoxy)-3,6,9,12,15,18,21,24-octaoxahexaco san-1-ol	14409-72-4
26-(Nonylphenoxy)-3,6,9,12,15,18,21,24-octaoxahexacosan-1-ol	42173-90-0
2-Nonylphenol	136-83-4
3-(1,1-Dimethylheptyl)phenol	70120-12-6
3,6,3-Nonylphenoi-13C6	1173020-38-6
3,6,3-Nonylphenol-d2	1173020-19-3
3E2-Nonylphenol isomer	186825-39-8
3-Nonylphenol	139-84-4
4-(1,1,2-Trimethylhexyl)phenol	497103-56-7
4-(1,1,4-Trimethylhexyl)phenol	1988-28-9
4-(1,1,5-Trimethylhexyl)phenol	521947-27-3
4-(1,3,5-Trimethylhexyl)phenol	64114-43-8
4-(1-Ethyl-1,3-dimethylpentyl)phenol	186825-36-5
4-(1-Ethyl-1,4-dimethylpentyl)phenol	142731-63-3
4-(1-Ethyl-1-methylhexyl)phenol	52427-13-1
4-(2,4-Dimethylheptane-3-yl)phenol	1158978-65-4
4-(2,6-Dimethylheptyl)phenol	63085-63-2
4-(2-Ethyl-1,1-dimethylpentyl)phenol	478243-86-6
4-(Nonan-3-yl)phenol	17404-67-0

TABLE A1: **RSL Reference List for Alkylphenols and Alkylphenol Ethoxylates**

Chemical Name	CASRN
4-[2-Methyl-1-(1-methylethyl-d6)pentyl]phenol	1285987-04-3
4-N-Nonylphenoi-2,3,5,6-D4,0D	358730-95-7
4-n-Nonylphenol-d4	1173019-62-9
4-Nonylphenol monoethoxylate	104-35-8
4-Nonylphenol	29832-11-9
4-Nonylphenol (branched)	84852-15-3
4-Nonylphenol (linear)	104-40-5
4-Nonylphenol diethoxylate	20427-84-3
4-t-Nonylphenol diethoxylate	156609-10-8
Barium Nonylphenolate, carbon dioxide, overbased	68515-89-9
Barium, carbonate 4-nonylphenol complexes	68442-67-1
Bariumbis(Nonylphenolate)	28987-17-9
C9-Aikylstrf phenol sulfides	68515-93-5
Calcium bis(nonylphenolate)	30977-64-1
Decaethylene glycol, isononylphenyl ether	65455-72-3
Dinonyl phenol	1323-65-5
Dinonylphenol ethoxylates, branched	68891-21-4
Dinonylphenol, branched	84962-08-3
Ethanol, 2-(2-(2-(2-(4-nonylphenoxy)ethoxy)ethoxy)ethoxy)-	7311-27-5
Ethanol, 2-(2-(nonylphenoxy)ethoxy)-	27176-93-8
Ethanol, 2-(4-nonylphenoxy)-	104-35-8
Ethanol, 2-(nonylphenoxy)-	27986-36-3
Ethoxylated Nonylphenol Phosphate	51811-79-1
Ethoxynonyl-benzene	28679-13-2
Isononylphenol	11066-49-2
Isononylphenol ethoxylate	37205-87-1
Nonoxynol-8	27177-05-5
Nonoxynol-9	26571-11-9
Nonylphenol (mixed isomers)	25154-52-3
Nonylphenol ethoxylate	37340-60-6
Nonylphenol phosphite (3:1)	26523-78-4
Nonylphenol polyethylene glycol ether	20636-48-0

TABLE A1: **RSL Reference List for Alkylphenols and Alkylphenol Ethoxylates**

Chemical Name	CASRN
Nonylphenol polyethylene glycol ether	27177-01-1
Nonylphenol polyethylene glycol ether	27177-08-8
Nonylphenol, branched	90481-04-2
Nonylphenol, branched, ethoxylated	68412-54-4; 37205-87-1
Nonylphenol, ethoxylated, monoether with sulfuric acid, sodium salt	9014-90-8
Nonylphenylpolyoxyethylene sulfosuccinate	54612-36-1
o-1 sononylphenol	27938-31-4
p-(1,1-Dimethylheptyl)phenol	30784-30-6
p-(1-Methyloctyl)phenol	17404-66-9
Pentaoxaheptadecan-1-ol,17-(4-nonylphenoxy)-	34166-38-6
Phenol, 2-nonyl-, branched	91672-41-2
Phenol, 4-(1,1,2,4-tetramethylpentyl)-	851401-44-0
Phenol, 4-(1,1,3-trimethylhexyl)-	174305-83-0
Phenol, 4-(1,2,5-trimethylhexyl)-	142731-55-3
Phenol, 4-(1,2-dimethyl-1-propylbutyl)-	866790-13-8
Phenol, 4-(1,2-dimethylheptyl)-	142731-58-6
Phenol, 4-(1,3-dimethyl-1-propylbutyl)-	142731-65-5
Phenol, 4-(1,3-dimethylheptyl)-	122961-18-6
Phenol, 4-(1-ethyl-1,2-dimethylpentyl)-	866790-14-9
Phenol, 4-(1-ethyl-2,4-dimethylpentyl)-	66519-71-9
Phenol, 4-(2,4-dimethylheptyl)-	91000-35-0
Phenol, 4-(3-ethyl-1,3-dimethylpentyl)-	881201-77-0
p-isononylphenol	24518-48-7
p-isononylphenol	26543-97-5
p-Nonylphenoi-13C6	211947-56-7
Poly(oxy(methyl-1,2-ethanediyl)), alpha-(nonylphenyl)-omega-hydroxy-	9064-15-7
Poly(oxy-1,2-ethanediyl), alpha-(1-oxo-2-propenyl)- omega-(nonylphenoxy)-	50974-47-5
Poly(oxy-1,2-ethanediyl), alpha-(2-nonylphenyl)-omega-hydroxy-	51938-25-1
Poly(oxy-1,2-ethanediyl), -sulfo–(nonylphenoxy)-, ammonium salt	9051-57-4
Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy	27942-26-3
Poly(oxy-1,2-ethanediyl), alpha-(nonylphenyl)-omega-hydroxy-, branched, phosphates	68412-53-3

TABLE A1: **RSL Reference List for Alkylphenols and Alkylphenol Ethoxylates**

Chemical Name	CASRN
Poly(oxy-1,2-ethanediyl), alpha-sulfo-omega-(nonylphenoxy)-, branched, ammonium salt	68649-55-8
Polyethylene glycol mono(branched p-nonylphenyl) ether	127087-87-0
Polyethylene glycol nonylphenyl ether	9016-45-9
Polyoxyethylene nonylphenyl ether	26027-38-3
Soprophor	37251-69-7
Zinc bis(nonylphenolate)	77194-15-1
Zinc bis(p-nonylphenolate)	74230-03-8
2-Dodecylphenol	5284-29-7
3-Dodecylphenol	29665-57-4
Dodecyl phenol	27193-86-8
Phenol, dodecyl-, branched	121158-58-5
Phenol, dodecyl-, branched [1]phenol, 2-dodecyl-, branched [2]phenol, 3-dodecyl-, branched [3]phenol, 4-dodecyl-, branched [4]phenol, (tetrapropenyl) derivatives [5]	210555-94-5
Phenol, dodecyl-, manuf. of, by-products from, high-boiling	90480-99-2
4-Dodecylphenol	104-43-8
Isododecylphenol	11067-80-4

A3.2 BPA Analogs

[Back to RSL Summary Table]

Chemical group members belonging to the BPA Analogs group include but are not limited to those listed in Table A2 or are defined as follows:

Homogeneous materials in the certified products shall not contain BPA or one or more BPA Analogs (intentionally added, impurity, or residual) ≥ 0.01% by mass (100 ppm) of the material as defined below:

Structural analogs to be avoided include any compound with the following characteristics:

1. All compounds with a Tanimoto Coefficient of 0.9-1.0 (compared to Bisphenol-A CASRN 80-05-7) are restricted. [Note: Tanimoto Coefficient as calculated using EPA's CompTox Dashboard].
2. Any compound with a Tanimoto Coefficient of 0.8-0.9 is restricted until there are publicly-available, valid in vitro or in vivo hazard data that enable evaluation of estrogen and androgen receptor agonism and antagonism. If a compound does not have significant endocrine disrupting potential, it would not be restricted.
3. Chemicals with a Tanimoto Coefficient <0.8 shall be considered restricted if the compound:
   a. Has demonstrated endocrine disrupting potential (estrogen and/or androgen receptor agonism and/or antagonism) and is used as a functional substitute for BPA, or
   b. Is detected in environmental media or human biomonitoring studies and it is used as a functional substitute for BPA and publicly available hazard data to evaluate endocrine disrupting potential (estrogen and/or androgen receptor agonism and/or antagonism) are lacking.

   Note: If the compound is detected in environmental media or human biomonitoring studies and it is used as a functional substitute for BPA, but has sufficient publicly available hazard data to demonstrate that it does not have endocrine disrupting potential (estrogen and/or androgen receptor agonism and/or antagonism), it is not restricted.

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
4-{2-[4-(4-Hydroxyphenyl)-4-methylcyclohexyl]propan-2-yl}phenol	1965-08-8
Bisphenol E (1,1-bis(4-hydroxyphenyl)ethane (BPE))	2081-08-5
Bisphenol F diglycidyl ether (BFDGE)	2095-03-6
bis(2-hydroxydiphenyl)methane (BPF (2,2)	2467-02-9
Phenol, 3-methyl-5-(1-methylethyl)-	3228-03-3
bis(4-hydroxyphenyl)phenylmethane	4081-02-1
1,3-Benzenediol, 4,6-bis(1,1-dimethylethyl)-	5374-06-1
Phenol, 2,6-bis(1,1-dimethylethyl)-4-(1-methylethyl)-	5427-03-2
5-tert-Butyl-o-cresol	5781-02-2
Phenol, 4,4'-(1,1,3-trimethyl-1,3-propanediyl)bis-	7530-06-5

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
4-Benzylphenol	101-53-1
3,3'-Methylenediphenol	10193-50-7
Phenol, 4-(1,1-diphenylpropyl)-	102319-34-6
4,4'-(Nonane-1,1-diyl)diphenol	102445-18-1
4-[1-(4-Hydroxyphenyl)ethyl]-2,6-dimethylphenol	102567-41-9
4-cyclopropylphenol	10292-61-2
4-[(4-Hydroxy-3,5-dimethylphenyl)methyl]-2,6-di(propan-2-yl)phenol	105421-73-6
Benzene, 1,1'-ethylidenebis(4-methoxy)-	10543-21-2
4,4'-[(4-Hydroxyphenyl)methylene]bis(2,6-dimethylphenol)	106743-89-9
4,4',4",4"'-{Propane-2,2-diylbis[(2-hydroxybenzene-5,1,3-triyl) bis(methylene)]} tetraphenol	107375-96-2
6-tert-butyl-2-naphthol	1081-32-9
Phenol, 4,4'-(3-methylcyclohexylidene)bis-	110047-22-8
Phenol, 4,4'-[1-[4-[1-(4-hydroxyphenyl)-1-methylethyl]phenyl]ethylidene]bis-	110726-28-8
4,4'-[1-(Naphthalen-2-yl)ethane-1,1-diyl]diphenol	111053-12-4
4,4'-[1-([1,1'-Biphenyl]-4-yl)ethane-1,1-diyl]diphenol	111203-78-2
4-[2-(3-Aminophenyl)propan-2-yl]phenol	111780-38-2
4-(2-Phenylpropan-2-yl)-2,6-di(propan-2-yl)phenol	113278-14-1
4,4'-[1-(4-Hydroxyphenyl)ethane-1,1-diyl]bis(2,6-dimethylphenol)	113447-58-8
2-[(4-Hydroxyphenyl)(diphenyl)methyl]phenol	113714-12-8
3,5-Di-tert-butylphenol	1138-52-9
4,4'-[1-([1,1'-Biphenyl]-4-yl)ethane-1,1-diyl]bis(2-methylphenol)	114626-08-3
4,4'-[(2-Hydroxyphenyl)methylene]bis(2-methylphenol)	114626-68-5
6-tert-Butylnaphthalene-2,3-diol	116310-13-5
4-(3,6-Dimethylheptan-3-yi)(3,5- 2 H_2_)phenol	1173020-19-3
4-(2,4,4-Trimethylpentan-2-yi)(13 C_6_)phenol	1173020-24-0
4-(3,6-Dimethylheptan-3-yi)(13 C_6_)phenol	1173020-38-6
4-(2,4,4-Trimethylpentan-2-yi)(3,5- 2 H_2_)phenol	1173021-20-9
4,4'-Methylenebis(2,6-di-t-butylphenol)	118-82-1
2,2'-Methylenebis(4-methyl-6-tert-butylphenol)	119-47-1
3,5-Diethylphenol	1197-34-8
4-Ethylphenol	123-07-9
p,p'-Octylidenebisphenol	1233-26-7

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
2,2',2"-(Ethane-1,1,1-triyl)triphenol	125457-87-6
4'-tert-Butyl-5-methyl[1,1'-biphenyl]-3-ol	1261967-85-4
2,2-bis(4-hydroxy-3-isopropyl-phenyl)propane (BPG)	127-54-8
Butylated hydroxytoluene	128-37-0
2,6-Di-tert-butylphenol	128-39-2
1,1-bis(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane (BPTMC)	129188-99-4
4,4'-[(2-Hydroxyphenyl)methylene]bis(2,6-dimethylphenol)	129348-98-7
4,4'-(1-Phenylethane-1,1-diyl)bis[2-(propan-2-yl)phenol]	129477-78-7
2~3~,2~3~Dimethyl-2~3~,2~4~,2~5~,2~6~-tetrahydro-2~2~H[1~1~,2~1~:2~1~,3~1~-terphenyl]-1~4~,3~4~-diol	129510-09-4
4-Benzhydryl-2,6-di-tert-butylphenol	13145-54-5
Phenol, 2,6-bis(1-methyl-1-phenylethyl)-	13205-36-2
2,2'-Methylenebis(6-tert-butylphenol)	133-63-1
4-(diphenylmethyl)-2,6-dimethylphenol	13391-79-2
Phenol, 4,4'-(1,3-phenylenebis(1-methylethylidene))bis- (BPM)	13595-25-0
Phenol, 4,4'-(1-methylethylidene)bis[2,6-bis(1,1-dimethylethyl)-	13676-82-9
4,4'-{[2-Hydroxy-5-(2-phenylpropan-2-yl)-1,3-phenylene]bis(methylene)} diphenol	137999-27-0
4-[1-(4-hydroxy-3,5-dimethylphenyl)-1-phenylethyl]-2,6-dimethylphenol	138194-61-3
1-(diphenylmethyl)-4-methoxybenzene	13865-56-0
4-[1,1-Bis(4-hydroxyphenyl)ethyl]benzene-1,3-diol	138689-10-8
4-(1,1,3,3-Tetramethylbutyl)phenol	140-66-9
4-[2-(4-Hydroxyphenyl)propan-2-yl]-2-methylphenol	14151-63-4
PUBCHEM_19817883	141550-80-3
2,2',2",2"'-Methanetetrayltetraphenol	141870-17-9
4,4',4"-(Propane-1,1,1-triyl)triphenol	141888-09-7
2,2-Bis(4-hydroxyphenyl)-1-propanol	142648-65-5
Phenol, 2,2'-methylenebis[4,6-bis(1,1-dimethylethyl)-	14362-12-0
2,2'-(Propane-2,2-diyl)di(benzene-1,4-diol)	144425-91-2
4,6-Bis[2-(4-hydroxyphenyl)propan-2-yl]benzene-1,3-diol	147504-92-5
4,4'-(hexafluoroisopropylidene)diphenol (BPAF)	1478-61-1
4,4'-(dichlorovinylidene)diphenol (BPCl)	14868-03-2
4-(1-Methylcyclohexyl)phenol	14962-20-0
4-(1-Methylcyclopentyl)phenol	1562-25-0

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
2,2-bis(4-methoxyphenyl)propane	1568-83-8
4,4'-(1-Phenylethylidene)bisphenol (BPAP)	1571-75-1
4,4'-Propane-1,1-diyldiphenol	1576-13-2
Phenol, 2,6-bis[[5-(1,1-dimethylethyl)-2-hydroxyphenyl]methyl]-4-methyl-	161775-67-3
4-(Bis{4-hydroxy-3,5-bis[(2-hydroxyphenyl)methyl]phenyl}methyl)-2,6-bis[(2- hydroxy-phenyl)methyl]phenol	163090-02-6
Phenol, 4,4'-[1-methyl-4-(1-methylethyl)-1,3-cyclohexanediyl]bis-	163748-41-2
4-[1-(4-Methoxyphenyl)-1-methylethyl]phenol	16530-58-8
1-Naphthalenol, 7-(1,1-dimethylethyl)-	169311-90-4
4,4'-(Pentane-1,1-diyl)diphenol	17181-62-3
4-Isopropyl-o-cresol	1740-97-2
2,6-Di-tert-butyl-4-(1-phenylethyl) phenol	17540-76-0
ST033391	17619-06-6
1-tert-Butylanthracene-9,10-diol	178922-91-3
2-tert-Butyl-6-(1-phenylethyl)phenol	17959-02-3
Phenol, o-(alpha,alpha-dimethylbenzyl)-	18168-40-6
2,6-Bis(1-phenylethyl)-4-methylphenol	1817-68-1
Phenol, 2,4,6-tris(1-phenylethyl)-	18254-13-2
4,4'-(2-Methylpropylidene)bisphenol	1844-00-4
4,4'-Dihydroxytetraphenylmethane (BPBP)	1844-01-5
Topanol A	1879-09-0
4,4'-(Propane-2,2-diyl)di(benzene-1,2-diol)	18811-78-4
4-{1-[4-(1-Phenylethyl)phenyl]ethyl}phenol	188753-63-1
Phenol, 2,6-bis(1,1-dimethylethyl)-4-[(4-methylphenyl)methyl]-	189748-82-1
4,4'-(Propane-2,2-diyl)bis(2-tert-butyl-6-methylphenol)	19072-72-1
Phenol, 4-ethyl-, sodium salt	19277-91-9
Phenol, 2-[(4-hydroxy-3-methylphenyl)phenylmethyl]-4-methyl-	193478-36-3
4,4'-(Propane-2,2-diyl)bis(3-methylphenol)	1940-37-0
Phenol, 4,4'-bicyclo[2.2.1]hept-2-ylidenebis-	1943-96-0
4,4'-Octahydro-1H-4,7-methanoindene-5,5-diyldiphenol	1943-97-1
tert-Butylhydroquinone	1948-33-0
2-tert-Butyl-4-[2-(4-hydroxyphenyl)propan-2-yl]phenol	19546-14-6
[1,1'-Biphenyl]-4-ol, 4'-(1,1-dimethylethyl)-	19812-92-1

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
4-(3-Methylheptan-3-yl)phenol	1988-35-8
Phenol, 4-(1-phenylethyl)-	1988-89-2
Phosphorous acid–4-(2-phenylpropan-2-yl)phenol (1/3)	20056-46-6
4-Methyl-2,6-bis(2-phenylpropan-2-yl)phenol	20223-22-7
4,4'-[(2 H_6_)Propane-2,2-diyl]bis(2,6-dimethylphenol)	203578-30-7
5-tert-Butylpyrogallol	20481-17-8
4-[(3,5-ditert-butyl-4-hydroxyphenyl)methyl]-2,6-dimethylphenol	20690-84-0
4,4'-[(Naphthalen-1-yl)methylene]bis(2,6-dimethylphenol)	207409-14-1
4,4'-(3-Methylbutane-1,1-diyl)diphenol	2081-32-5
4-Isopropylcatechol	2138-43-4
Bisphenol P (4,4r8-(1,4-phenylenediisopropylidene)bisphenol (BPP))	2167-51-3
3,3'-(Propane-2,2-diyl)diphenol	21825-05-8
tetrabromobisphenol A bis (2,3-dibromopropyl) ether	21850-44-2
Resorcinol, 4-tert-butyl-	2206-50-0
4-(tert-Butyl)-m-cresol	2219-72-9
2-tert-Butyl-6-methylphenol	2219-82-1
4'-Isopropyl-4-biphenylol	22239-54-9
3-Benzylphenol	22272-48-6
2,4-Di-tert-butyl-6-(propan-2-yl) phenol	22354-52-5
2-Isopropyl-6-tert-butylphenol	22791-95-3
Phenol, 2,4-bis[1-(4-hydroxyphenyl)-1-methylethyl]-	2300-15-4
Phenol, 4-(2,2-dimethylpropyl)-	2316-92-9
3-((((4-Methylphenyl)sulfonyl)carbamoyl)amino)phenyl 4-methylbenzenesulfonate (Pergafast 201)	232938-43-1
2-tert-butyl-5-(propan-2-yl)benzene-1,4-diol	2349-78-2
4-[2-(4-Hydroxyphenyl)propan-2-yl]-2-(propan-2-yl)phenol	23950-80-3
Bisphenol PH (aka bis-OPPA (BPPH))	24038-68-4
2-tert-Butyl-4-methylphenol	2409-55-4
1,4-Benzenediol, 2,6-bis(1,1-dimethylethyl)-	2444-28-2
Phenol, 4,4'-(1-methylethylidene)bis-, disodium salt	2444-90-8
Phenol, 2,6-bis(1,1-dimethylethyl)-, potassium salt	24676-69-5
4,4'-Methylenebis[2,6-di(propan-2-yl)phenol]	24742-46-9
4,4'-(Propane-2,2-diyl)bis[2-(1-phenylethyl)phenol]	24929-59-7

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
Phenol, 4,4'-(1-methylethylidene)bis-, polymer with 2,2'-[(1-methylethyli- dene) bis(4,1-phenyleneoxymethylene)]bis[oxirane]	25036-25-3
4-tert-Butylphenol formaldehyde resin	25085-50-1
4,4'-(Phenylmethylene)bis(3-methylphenol)	2510-19-2
Benzene, 1,1'-(1-methylethylidene) bis[3,5-dibromo-4-(2-propenyloxy)-	25327-89-3
Carbonic acid-4-tert-butylphenol (1/2)	2561-97-9
1-methoxy-4-(1-phenylethyl)benzene	2605-18-7
4,4'-[(1,3- 13C_2_)Propane-2,2-diyl]diphenol	263261-64-9
4,4'-(Propane-2,2-diyl)di(13C_6_)phenol	263261-65-0
4,4'-[1-(4-Aminophenyl)ethane-1,1-diyl]diphenol	266001-57-4
4-(4-tert-Butylcyclohexyl)phenol	266338-16-3
4,4'-Thiodiphenol (TOP)	2664-63-3
m-Cymen-4-ol, 8-phenyl-	2675-76-5
Phosphorous acid-4-(1-phenylethyl)phenol (1/3)	2677-30-7
Phenol, 3,5-bis(1-methylethyl)-	26886-05-5
Phenol, 2,4-bis(1-phenylethyl)-	2769-94-0
4'-Isopropyl-4-biphenylol	22239-54-9
3-Benzylphenol	22272-48-6
2,4-Di-tert-butyl-6-(propan-2-yl) phenol	22354-52-5
2-Isopropyl-6-tert-butylphenol	22791-95-3
Phenol, 2,4-bis[1-(4-hydroxyphenyl)-1-methylethyl]-	2300-15-4
Phenol, 4-(2,2-dimethylpropyl)-	2316-92-9
3-((((4-Methylphenyl)sulfonyl)carbamoyl)amino)phenyl 4-methylbenzenesulfo- nate (Pergafast 201)	232938-43-1
2-tert-butyl-5-(propan-2-yl)benzene-1,4-diol	2349-78-2
4-[2-(4-Hydroxyphenyl)propan-2-yl]-2-(propan-2-yl)phenol	23950-80-3
Bisphenol PH (aka bis-OPP A (BPPH))	24038-68-4
2-tert-Butyl-4-methylphenol	2409-55-4
1,4-Benzenediol, 2,6-bis(1,1-dimethylethyl)-	2444-28-2
Phenol, 4,4'-(1-methylethylidene)bis-, disodium salt	2444-90-8
Phenol, 2,6-bis(1,1-dimethylethyl)-, potassium salt	24676-69-5
4,4'-Methylenebis[2,6-di(propan-2-yl)phenol]	24742-46-9
4,4'-(Propane-2,2-diyl)bis[2-(1-phenylethyl)phenol]	24929-59-7

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
Phenol, 4,4'-(1-methylethylidene)bis-, polymer with 2,2'-[(1-methylethyli- dene) bis(4,1-phenyleneoxymethylene)]bis[oxirane]	25036-25-3
4-tert-Butylphenol formaldehyde resin	25085-50-1
4,4'-(Phenylmethylene)bis(3-methylphenol)	2510-19-2
Benzene, 1,1'-(1-methylethylidene) bis[3,5-dibromo-4-(2-propenyloxy)-	25327-89-3
Carbonic acid-4-tert-butylphenol (1/2)	2561-97-9
1-methoxy-4-(1-phenylethyl)benzene	2605-18-7
4,4'-[(1,3- 13C_2_)Propane-2,2-diyl]diphenol	263261-64-9
4,4'-(Propane-2,2-diyl)di(13C_6_)phenol	263261-65-0
4,4'-[1-(4-Aminophenyl)ethane-1,1-diyl]diphenol	266001-57-4
4-(4-tert-Butylcyclohexyl)phenol	266338-16-3
4,4'-Thiodiphenol (TOP)	2664-63-3
m-Cymen-4-ol, 8-phenyl-	2675-76-5
Phosphorous acid-4-(1-phenylethyl)phenol (1/3)	2677-30-7
Phenol, 3,5-bis(1-methylethyl)-	26886-05-5
Phenol, 2,4-bis(1-phenylethyl)-	2769-94-0
Potassium 2,4-di-tert-butylphenolate	37408-22-3
4,4'-(1,3-Adamantanediyl)diphenol	37677-93-3
Phenol, 2,2'-ethylidenebis[4,6-dimethyl-	3772-19-8
4,4'-(1,3-Dimethylcyclobutane-1,3-diyl)diphenol	3788-29-2
5-tert-Butylresorcinol	3790-90-7
1,4-Bis(alpha ,alpha-bis(4-hydroxyphenyl)benzyl)benzene	38050-97-4
3,6-di-t-butyl-2-naphthol	39093-07-7
4,4'-(Heptacosane-14,14-diyl)diphenol	400784-71-6
4,4'-(Henicosane-11,11-diyl)diphenol	400784-72-7
2,6-Di-tert-butyl-4-ethylphenol	4130-42-1
Phenol, 4,4'-sulfonylbis(2-(2-propen-1-yl)- (TGSA)	41481-66-7
Phenol, 2-(1,1-dimethylethyl)-5-(1-methylethyl)-	4151-60-4
2,2'-Methylenebis[6-(propan-2-yl)phenol]	41514-15-2
2,2' ,2"-Methanetriyltris(4-tert-butylphenol)	41567-36-6
Ethanol, 2,2'-[(1-methylethylidene) bis[(2,6-dibromo-4,1-phenylene)oxy]]bis-	4162-45-2
Potassium o-tert-butylphenolate	41769-06-6

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
4,4'-(Pentane-2,2-diyl)diphenol	4204-58-4
Phosphorous acid-4-tert-butylphenol (1/3)	4235-89-6
Phosphorous acid-4,4'-(propane-2,2-diyl)diphenol (1/3)	4235-90-9
Phenol, 2-(1,1-dimethylethyl)-5-ethyl-	4237-25-6
2,6-bis(1-phenylethyl)phenol	4237-28-9
Phenol, 2-(1-phenylethyl)-	4237-44-9
SBB057183	46765-25-7
phenol, 4,4'-butylidenebis-	4731-84-4
4,4'-(1-Phenylethane-1,1-diyl)bis(2-methylphenol)	4754-63-6
2,2'-methylenebis(4-isopropylphenol)	4773-38-0
ST029253	4773-40-4
ST029264	4809-85-2
5-tert-Butyl-m-cresol	4892-31-3
Phenol, 2,6-bis(1,1-dimethylethyl)-4-(phenylmethyl)-	4973-27-7
4,4'-Methylenebis(3,5-di-tert-butylphenol)	50483-28-8
4-tert-Butylnaphthalen-1-ol	50483-32-4
Bis(4-hydroxyphenyl)propanedinitrile	50778-50-2
2,2'-(Ethane-1,1-diyl)diphenol	50851-80-4
4,4'-(2,2-Dimethylpropane-1,1-diyl)diphenol	52173-65-6
4-(2,6-Dimethylheptan-2-yl)phenol	521947-27-3
Acetic acid-4,4',4"-(ethane-1,1,1-triyl)triphenol (3/1)	52205-74-0
4-[2-(4-hydroxyphenyl)-2-adamantyl]phenol	52211-74-2
3-tert-Butyl-5-methylanisole	52328-49-1
4-(1-Ethyl-1-methylhexyl)phenol	52427-13-1
2-(Diphenylmethyl)-4-methylphenol	52449-10-2
4-[2-(4-Bromophenyl)propan-2-yl]phenol	52687-47-5
Phenol, 4-(1,1-dimethylethyl)-2-(1-methyl-1-phenylethyl)-	52938-75-7
4,4',4",4"'-Methanetetrayltetraphenol	53184-78-4
1-tert-Butyl-4-phenoxybenzene	5331-28-2
4,4'-(Bicyclo[3.3.1]nonane-9,9-diyl)diphenol	533930-99-3
Potassium 4-(2-methylbutan-2-yl)phenolate	53404-18-5
Benzene, 1-(1,1-dimethylethyl)-4-methoxy-	5396-38-3

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
2,4'-Dihydroxydiphenyl sulfone (2,4 BPS)	5397-34-2
2,2'-propane-2,2-diylbis(5-methylphenol)	5419-54-5
2,2'-Methylenebis(5-tert-butylbenzene-1,4-diol)	54636-99-6
2-Naphthalenol, 3-(1,1-dimethylethyl)-	54646-67-2
4-Benzyl-2-tert-butylphenol	54976-35-1
2-(4-Hydroxyphenyl)-2-methylpropanenitrile	55770-61-1
4,4'-Propane-2,2-diylbis(2,6-dimethylphenol)	5613-46-7
Phenol, 4,4'-(1-methylethylidene)bis(2,6-dimethyl- (TMBPA)	5613-46-7
2-(1,1-Dimethylethyl)-4-(1-methyl-1-phenylethyl)phenol	56187-92-9
4-tert-Butyl-2,6-diisopropylphenol	57354-65-1
2,2'-(Propane-2,2-diyl)bis(4,6-dimethylphenol)	5769-92-6
4-tert-Butylphenol sodium salt	5787-50-8
3-tert-Butylphenol	585-34-2
4,4'-[(4-Methylcyclohexyl)methylene]diphenol	586390-78-5
Phenol, 2,5-bis(1,1-dimethylethyl)-	5875-45-6
Bisphenol A tetraphenyl diphosphate	5945-33-5
4-cumylphenol (HPP)	599-64-4
4-(1-methyl-1-phenylethyl)phenol (AKA 4-cumylphenol; 4-CP or HPP)	599-64-4
2-tert-Butyl-4-(triphenylmethyl)phenol	60043-12-1
2,4,6-Tri(3,5-di-tert-butyl-4-hydroxybenzyl)phenol	6010-34-0
1,3-Dimethoxy-5-(2-phenylpropan-2-yl)benzene	60526-82-1
5-(2-Phenylpropan-2-yl)benzene-1,3-diol	60526-87-6
5-(2-Phenyloctan-2-yl)benzene-1,3-diol	60526-89-8
5,11,17,23-Tetratert-butylpentacyclo(19.3.1.1(3,7).1(9,13).1(15,19))octacosa-1(25),3(28),4,6,9(27),10,12,15(26),16,18,21,23-dodecaene-25,26,27,28-tetrol	60705-62-6
4-[2-(4-Hydroxyphenyl)propan-2-yl]-2-(1-phenylethyl)phenol	60788-27-4
4,4'-(Undecane-1,1-diyl)diphenol	6104-94-5
4-(Diphenylmethyl)-2,6-diethylphenol	61175-87-9
4,4'-(Butane-2,2-diyl)bis(2,6-dimethylphenol)	61260-10-4
Phenol, 4-(1-methylethyl)-, sodium salt	61260-32-0
3,7-Di-tert-butylnaphthalene-1,5-diol	61357-48-0
2-Benzyl-4-tert-butylphenol	61516-22-1
2,2'-(Ethane-1,1-diyl)bis[4-(propan-2-yl)phenol]	61550-99-0

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
Phenol, 2,6-bis(1-methylethyl)-4-(phenylmethyl)-	61563-91-5
4,4'-Decylidenebisphenol	61593-21-3
Phenol, 2,4-bis(1,1-dimethylethyl)-6-methyl-	616-55-7
2,2'-(1,3-Phenylenediisopropylidene)bis(4,6-xylenol)	61660-45-5
3-Isopropylphenol	618-45-1
Benzene, 1,3-bis[1-(4-methoxyphenyl)-1-methylethyl]-	61907-77-5
Benzene, 1,4-bis[1-(4-methoxyphenyl)-1-methylethyl]-	61907-80-0
3-Ethylphenol	620-17-7
Bis(4-hydroxyphenyl)methane (BPF (4,4))	620-92-8
4,4',4"-Methanetriyltris(2,6-dimethylphenol)	6204-16-6
2,2'-(Ethane-1,1-diyl)bis[4,6-di(propan-2-yl)phenol]	620963-24-8
2-[1-(4-Hydroxyphenyl)ethyl]phenol	62153-80-4
PUBCHEM_24208743	62611-29-4
4,4'-(phenylmethanediyl)dibenzene-1,3-diol	6271-15-4
2-tert-Butyl-4-(1-phenylethyl)phenol	62737-76-2
4-(diphenylmethyl)naphthalen-1-ol	6274-86-8
Phenol, 4,4'-(1-methylethylidene)bis[2-(1-methyl-1-phenylethyl)-	62764-03-8
2,4-Di-tert-butyl-6-ethylphenol	6287-47-4
4-[4-(propan-2-yl)benzyl]phenol	6295-82-5
2-[(4-Hydroxyphenyl)(4-methylphenyl)methyl]phenol	63074-85-1
Phenol, 4-((4-(phenylmethoxy) phenyl)sulfonyl)- (BPS-MPE)	63134-33-8
4-tritylbenzene-1,2-diol	6331-97-1
Phenol, 2,4-bis(1,1-dimethylethyl)-6-(1-phenylethyl)-	63428-98-8
Phenol, 4-(1,1-dimethylethyl)-2-ethyl-	63452-61-9
4,4'-[(5-tert-Butyl-2-hydroxy-1,3-phenylene)bis(methylene)]diphenol	63538-51-2
2-tert-Butyl-6-ethylphenol	63551-41-7
2,2'-(Phenylmethylene)bis(4,6-di-tert-butylphenol)	64000-78-8
4,4'-(1-Methylpropylidene)bis(o-cresol)	6420-65-1
2-tert-Butylanthracene-9,10-diol	64487-90-7
4-Methyl-2,6-bis[2-(2 H_3_)methyl(2 H_6_)propan-2-yi](0-2 H_3_)phenol	64502-99-4
4,4'-(Propane-2,2-diyl)bis(3,5-di-te rt-butylphenol)	65192-07-6
C-Methylcalix[4]resorcinarene	65338-98-9

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
Phenol, 2,2',2"-methylidynetris[4,6-dimethyl-	6538-36-9
1,4-Benzenediol, 2-(1-phenylethyl)-	65565-58-4
2-tert-Butylbenzene-1,3-diol	65567-10-4
4-(9-Methylbicyclo[3.3.1]nonan-9-yl)phenol	656800-89-4
2,2'-(Etha ne-1,1-diyl)bis(6-tert-butyl-4-propylphenol)	659725-24-3
1-Methoxy-4-(2-phenylpropan-2-yl)benzene	6623-93-4
2-tert-Butyl-5-(2-phenylpropan-2-yl)benzene-1,4-diol	66604-75-9
2-Methyl-5-(2-phenylpropa n-2-yl)benzene-1,4-diol	66604-76-0
4,4'-(Phenylmethylene)bis(2-ethylphenol)	669065-94-5
4,4'-(Phenylmethylene)bis(5-te rt-butylbenzene-1,2-diol)	669065-95-6
2-(1-Phenylethyl)benzene-1,3-diol	67223-09-0
4,4'-(1-Methyldecylidene)bisphenol	67380-31-8
Benzene, 1,3-bis(1,1-dimethylethyl)-5-methoxy-	68039-43-0
4,4'-(4-Methylpentane-2,2-diyl)diphenol	6807-17-6
2~3~,2~4~,2~5~,2~6~-Tetrahydro-2~2~H-[1~1~,2~1~:2~1~,3~1~-terphenyl]-1~4~,3~4~-diol–water (1/1)	688035-61-2
4-(2-Methylpentan-2-yl)phenol	6885-70-7
4-tert-Butylcalix[8]arene	68971-82-4
4-(1,1-diphenylethyl)phenol	6938-97-2
3-Ethyl-5-methylphenol	698-71-5
3-(2-Methyloctan-2-yl)phenol	70120-12-6
Phenol, 2,2'-methylenebis[4-(1-methyl-1-phenylethyl)-	71113-22-9
Phenol, 2,2'-methylenebis[4,6-bis(1-methyl-1-phenylethyl)-	71113-23-0
4,4'-(Cycloheptane-1,1-diyl)diphenol	73008-79-4
2,4,6-Tris(tert-butyl)phenol	732-26-3
CHEBI:79724	7425-79-8
2,5-Bis(1-phenylethyl)benzene-1,4-diol	743-83-9
1,1,2,2-Tetra methyl-1,2-bis(4'-hydroxyphenyl)ethane	74385-27-6
1-tert-Butyl-4-(4-methylphenoxy)benzene	74448-90-1
4,4'-(2-Ethylhexane-1,1-diyl)diphenol	74462-02-5
4,4'-(2-Methylpentane-1,1-diyl)diphenol	74462-03-6
4,4'-Dodecylidenebisphenol	74462-04-7
4,4'-Dimethoxytrityl cation	7500-76-7

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
4,4'-(10,10-Diphenyl-9,10-dihydroanthracene-9,9-diyl)diphenol	7505-38-6
1,1',1"-Methanetriyltris(4-methoxybenzene)	7511-68-4
2,2-Bis(2-hydroxyphenyl)propane (2,2-BPA)	7559-72-0
Sodium p-benzylphenol	7563-63-5
2-[bis(2-hydroxy-5-methylphenyl)methyl]-4-methylphenol	7573-17-3
Phenol, 2-te rt-butyl-4-isopropyl-	7597-97-9
7-(Propan-2-yl)na phtha len-2-ol	760179-65-5
Bisphenol B (2,2-bis(4-hydroxyphenyl)butane (BPB))	77-40-7
Phenol, 4,4',4",4"'-(1,2-ethanediylidene)tetrakis-	7727-33-5
4,4'-[(4-Hydroxyphenyl)methylene]bis(3,5-di-te rt-butylphenol)	77621-67-1
4-tert-Butylcalix[6]arene	78092-53-2
4-(2-Phenylpropan-2-yl)benzene-1,2-diol	783-80-2
Phenol, 4,4'-cyclopentylidenedi-	788-57-8
2,2',6,6'-tetrabromo-4,4'-isopropylidenediphenol (TBBPA)	79-94-7
4,4'-Propa ne-2,2-diylbis(2-tert-butylphenol)	79-96-9
3,3'-Dimethylbisphenol A (BPC)	79-97-0
4-(Diphenylmethyl)phenol	791-92-4
5-Hydroxybisphenol	79371-66-7
2,2'-methylenebis(4-t-butylphenol)	799-13-3
2,2-bis(4-hydroxyphenyl)propane (BPA or 4,4-BPA)	80-05-7
bis(4-hydroxyphenyl) sulfone (4,4 BPS)	80-09-1
4-(2-Methylbutan-2-yl)phenol	80-46-6
4-tert-Butylcalix[5]arene	81475-22-1
4,4'-[(4-Hydroxyphenyl)methylene]bis(2-tert-butylphenol)	831222-57-2
Phenol, 2-[1-(4-hydroxyphenyl)-1-methylethyl]- (2,4-BPA)	837-08-1
2-Methyl-4-(2-phenylpropa n-2-yl)phenol	837-09-2
Phenol, 4-[1-(4-aminophenyl)-1-methylethyl]-	837-11-6
Bisphenol Z (1,1-bis(4-hydroxyphenyl)cyclohexane (BPZ))	843-55-0
Phenol, 4,4'-[1-methyl-3-(2,2,6-trimethylcyclohexyl)propylidene]bis-	847 502-74-3
3-benzhydrylphenol	84868-54-2
4-(2,3,5-Trimethylhexan-2-yl)phenol	851401-44-0
Potassium p-benzylphenolate	85712-11-4

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
2-(2-Phenylpropan-2-yl)benzene-1,4-diol	85797-61-1
4,4'-(1-Phenylethane-1,1-diyl)bis(2-te rt-butylphenol)	85914-48-3
4-(2,3-Dimethylhexa n-2-yl)phenol	861011-61-2
4,4'-[(2 H_6_)Propane-2,2-diyl]diphenol	86588-58-1
3-(1-Methyl-1-phenylethyl)phenol	87852-47-9
Phenol, 4-(1,1-dimethylethyl)-2,6-dimethyl-	879-97-0
2-tert-Butylphenol	88-18-6
2,2'-Methylenebis(ethyl-6-tert-butylphenol)	88-24-4
2,5-Di-tert-butylbenzene-1,4-diol	88-58-4
2-Tert-Butyl-5-methylphenol	88-60-8
4-(4-Ethyl-4-methylhexan-2-yl)phenol	881201-77-0
2-Ethyl-4-(2-phenylpropa n-2-yl)phenol	88384-19-4
Phenol, 4-(1,1-dimethylethyl)-2-[(2-hydroxy-5-methylphenyl)methyl]-	88606-09-1
2,4-Dimethyl-6-(2-phenylpropan-2-yl)phenol	88882-03-5
4-(4-Pentylbicyclo[2.2.2]octan-1-yl)phenol	89027-55-4
4-(4-Propylbicyclo[2.2.2]octan-1-yl)phenol	89027-56-5
4-(4-Hexylbicyclo[2.2.2]octan-1-yl)phenol	89027-57-6
4-(4-Heptylbicyclo[2.2.2]octan-1-yl)phenol	89027-58-7
4,4'-(2-Butyloctane-1,1-diyl)diphenol	89202-48-2
3-(4-tert-butylphenyl)phenol	893737-20-7
2,2'-[(2-Hydroxy-1,3-phenylene)di(ethane-1,1-diyl)]diphenol	89550-59-4
Phenol, 2,6-bis[[3-(1,1-dimethylethyl)-2-hydroxy-5-methylphenyl]methyl]-4-methyl-	90-68-6
4,4'-[(2-Hydroxy-1,3-phenylene)bis(methylene)]bis(2-tert-butyl-6- methylphenol)	90179-52-5
2,2'-[(2-Hydroxy-1,3-phenylene)bis(methylene)]bis(4-tert-butyl-6- methylphenol)	90179-53-6
Phenol, 2,6-bis(1,1-dimethylethyl)-4-[(2-hydroxy-5-methylphenyl)methyl]-	90297-43-1
4,4'-(4-Methylpentane-1,1-diyl)diphenol	90729-99-0
4,4'-(5-Methylhexane-2,2-diyl)diphenol	90859-45-3
2~3~,2~4~,2~5~,2~6~-Tetrahydro-2~2~H-[1~1~,2~1~:2~1~,3~1~-terphenyl]-1~4~,3~4~-diol–benzene (1/1)	91100-95-7
4-(1-Methylcyclobutyl)phenol	91876-30-1
2-Naphthalenol, 6-(1-methylethyl)-	91909-30-7
4-Phenylphenol	92-69-3
4,4'-[(4-Hydroxyphenyl) methylene]bis(2,6-di-tert-butylphenol)	923287-27-8

TABLE A2: **RSL Reference List for BPA Analogs**

Chemical Name	CASRN
NSC-57537	92569-29-4
4,4'-(Propane-2,2-diyl)di(2 H_4_)phenol	92739-58-7
4-{2-[3-(4-Hydroxyphenyl)-3-methylcyclohexyl]propan-2-yl}phenol	92758-80-0
3-(2,4,4-Trimethylpentan-2-yl)phenol	928715-89-3
Phenol, 2,2'-methylenebis(6-tert-butyl-4-isopropyl-	93840-39-2
Benzoic acid, 4-hydroxy-, phenylmethyl ester (PHBB)	94-18-8
Barium(2+) 4,4'-isopropylidenebisphenolate	94006-29-8
Phenol, 4-((4-(1-methylethoxy)phenyl)sulfonyl)- (D-8)	95235-30-6
6,6'-Di-tert-butyl-4,4'-methylenedi-o-cresol	96-65-1
2-tert-Butyl-4-ethylphenol	96-70-8
2,4-Di-tert-butylphenol	96-76-4
4,4'-[(2 H_6_)Propane-2,2-diyl]di(2 H_5_)phenol	96210-87-6
4-(4-Allyloxy-benzenesulfonyl)-phenol (BPS-MAE)	97042-18-7
4-(Triphenylmethyl)phenol	978-86-9
4-Isopropylcalix[4]arene	97998-55-5
Phenol, 4-(1,1-dimethylethyl)-2-methyl-	98-27-1
4-tert-Butylcatechol	98-29-3
4-te rt-Butylphenol	98-54-4
4-(Butan-2-yl)phenol	99-71-8
4-Isopropylphenol	99-89-8
2,2'-Methylenebis(6-tert-butyl-4-propylphenol)	99484-61-4

A3.3 Ortho-Phthalates

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Chemical group members belonging to the Ortho-Phthalates group in the fixed list in the following table:

TABLE A3: **RSL Reference List for Ortho-Phthalates**

Chemical Name	CASRN
Di(2-ethylhexyl) phthalate	117-81-7
Di(butoxyethyl) phthalate	117-83-9
Di-n-octyl phthalate	117-84-0
n-octyl n-decyl phthalate	119-07-3
Dimethyl phthalate	131-11-3
Diallyl phthalate	131-17-9
Dimethylcyclohexyl phthalate	1322-94-7
Diphenylguanidine phthalate	17573-13-6
Dodecyl phthalate	21577-80-0
Dihydroabietyl phthalate	26760-71-4
Diisodecyl phthalate	26761-40-0
Diisooctyl phthalate	27554-26-3
Diisononyl phthalate	28553-12-0
Di(2-propylheptyl) phthalate	53306-54-0
Castor oil phthalate with adipic acid and fumaric acid-diethylene glycol	68650-73-7
n-amyl n-decyl phthalate	7493-81-4
Dicyclohexyl phthalate	84-61-7
Diphenyl phthalate	84-62-8
Diethyl phthalate	84-66-2
Diisobutyl phthalate	84-69-5
Di(2-ethylhexyl) hexahydro-phthalate	84-71-9
Ethyl phthalyl ethyl glycolate	84-72-0
Di-n-butyl phthalate	84-74-2
Di-n-hexyl phthalate	84-75-3
Di-n-decyl phthalate	84-77-5
n-butyl n-octyl phthalate	84-78-6
Methyl phthalyl ethyl glycolate	85- 71-2
Butyl benzyl phthalate	85-68-7
Butyl phthalyl butyl glycolate	85-70-1

TABLE A3: **RSL Reference List for Ortho-Phthalates**

Chemical Name	CASRN
ortho-Phthalic acid	88-99-3
n-butyl n-decyl phthalate	89-19-0
Castor oil phthalate, hydrogenated	no CASRN

A3.4 Parabens

[Back to RSL Summary Table]

Chemical group members belonging to the Parabens group include but are not limited to those listed in the following table:

TABLE A4: **RSL Reference List for Parabens**

Chemical Name	CASRN
Methylparaben (primary CASRN is 99-76-3)	1000398-37-7
Ethyl paraben	120-47-8
Butylparaben (primary CASRN is 94-26-8)	1350551-41-5
Methylparaben (primary CASRN is 99-76-3)	156291-94-0
Methylparaben (primary CASRN is 99-76-3)	58339-84-7
Propylparaben (primary CASRN is 94-13-3)	58339-85-8
Propyl 4-hydroxybenzoate	59593-07-6
Butyl 4-hydroxybenzoate	8068-49-3
Propylparaben, propyl 4-hydroxybenzoate	94-13-3
Benzyl paraben	94-18-8
Butylparaben	94-26-8
Methyl p-hydroxybenzoate	99-76-3

A3.5 Benzophenones

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Chemical group members belonging to the Benzophenones group from the fixed list in the following table:

TABLE A5: **RSL Reference List for Benzophenones**

Chemical Name	CASRN
Benzophenone	119-61-9
Benzophenone-3; Oxybenzone	131-57-7
2,4-Dihydroxybenzophenone	131-56-6
4,4'-Dihydroxy-benzophenone	611-99-4
4,4'-difluorobenzophenone	345-92-6
2,2'-dihydroxy-4-methoxybenzophenone	131-53-3
2-hydroxy-4-n-octyloxybenzophenone	1843-05-6
2-hydroxy-4-n-hexyloxybenzophenone	3293-97-8

A3.6 Organotin Compounds

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Chemical group members belonging to the Organotin Compound sub-groups listed in the following table:

TABLE A6: **RSL Reference List for Organotin Compounds**

Chemical Name	CASRN
Dibutyltin compounds	Chemicals belonging to these organotin subgroups are identified by chemical structure.
Dimethyltin derivatives	
Dioctyltin compounds	
Diphenyltin derivatives	
Monobutyltin compounds	
Monomethyltin derivatives	
Monooctyltin compounds	
Monophenyltin derivatives	
Tributyltin compounds	
Trimethyltin compounds	
Trioctyltin compounds	
Triphenyltin compounds	

A3.7 Antimicrobials

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Chemical group members belonging to the Antimicrobials group include the fixed list in the following table:

TABLE A7: **RSL Reference List for Antimicrobials**

Chemical Name	CASRN
Didecyl Dimethyl Ammonium Chloride (DDAC)	7173-51-5
Diiodomethyl p-tolyl sulfone	20018-09-1
Hexamethylenetetramine	100-97-0
Kathon 886 (CIT/MIT mixture)	55965-84-9
Methylchloroisothiazolinone (CIT,CMIT)	26172-55-4
Methylisothiazolinone (MIT)	2682-20-4
N-octadecyldimethyl ammonium chloride	1613-17-8
Silver sodium hydrogen zirconium phosphate	265647-11-8
Silver zinc zeolites	130328-20-0
Triclosan	3380-34-5
Zinc Pyrithione	13463-41-7
Benzisothiazolin 3-one (BIT)	2634-33-5
2,3-Epoxypropyl-trimethylammonium chloride	3033-77-0
Sodium fluoride	7681-49-4
tert-Butyl- hydroxyanisole (BHA)	25013-16-5
Boric acid	11113-50-1
Butylated hydroxytoluene (BHT)	128-37-0
Silver	7440-22-4
Silver (nano)	7440-22-4
Pentachlorophenol	87-86-5

A3.8 Nanomaterials

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Chemical group members belonging to the Nanomaterials group include the fixed list in the following table:

TABLE A8: **RSL Reference List for Nanomaterials**

Chemical Name	CASRN
Titanium nitride	25583-20-4
Carbon black	1333-86-4
Silicon dioxide	7631-86-9
Aluminum	7429-90-5
Silver	7440-22-4
Nanoclay (bentonite)	1302-78-9
Zinc oxide	1314-13-2

Note: The same CASRN is used for both the nanomaterial form of a chemical and other forms of the same chemical. Additional information must be gathered from the supplier to determine whether the form of the chemical meets the definition of nanomaterial (See Section 4).

A3.9 Diglycidyl ethers of bisphenols

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Chemical group members belonging to the Diglycidyl ethers of bisphenols group include the fixed list in the following table:

TABLE A9: **RSL Reference List for Diglycidyl ethers of bisphenols**

Chemical Name	CASRN
Bisphenol A diglycidyl ether (BADGE)	1675-54-3
Bisphenol F diglycidyl ether (BFDGE)	39817-09-9
Novolac glycidyl ethers (NOGE)[30]	Various

30 For more information on NOGE, see https://efsa.onlinelibrary.wiley.com/doi/pdf/10.2903/j.efsa.2005.274 (accessed 10/3/22).

A3.10 Mineral Oil Saturated Hydrocarbons (MOSH) and Mineral Oil Aromatic Hydrocarbons (MOAH)

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Chemical group members belonging to the Mineral Oil Saturated Hydrocarbons (MOSH) and Mineral Oil Aromatic Hydrocarbons (MOAH) group include but are not limited to those in the following table:

TABLE A10: **RSL Reference List for Mineral Oil Saturated Hydrocarbons (MOSH) and Mineral Oil Aromatic Hydrocarbons (MOAH)**

Chemical Group Name	Sub-group	Chemical Name	CASRN
Mineral oil saturated hydrocarbons (MOSH): Open-chain, mostly branched hydrocarbons (Paraffins)	Alkanes	N-Octane	111-65-9
	Alkanes	2-methyl-heptane	592-27-8
	Alkanes	2,2,3-trimethyl-pentane	564-02-3
Mineral oil saturated hydrocarbons (MOSH): Cyclic saturated hydrocarbons (Naphthenes)	Naphthenes	Mono-napthenes	Various
	Naphthenes	Di-naphthenes	Various
	Naphthenes	Tri-naphthenes	Various
Mineral oil aromatic hydrocarbons (MOAH): Highly alkylated mono-, di- and higher ring systems	Aromatics	Mono-aromatics	Various
	Aromatics	Di-aromatics	Various
	Aromatics	Tri-aromatics	Various
	Aromatics	Tetra-aromatics	Various
	Aromatics	Penta-aromatics	Various

A3.11 Polycyclic Aromatic Amines

[Back to RSL Summary Table]

Chemical group members belonging to the Polycyclic Aromatic Amines group include but are not limited to those in the following table:

TABLE A11: **RSL Reference List for Polycyclic Aromatic Amines**

Chemical Name	CASRN
2,2'-dichloro-4,4'-methylenedianiline (MOCA)	101-14-4
2,4,5-trimethylaniline	137-17-7
2-Methoxyaniline,o-Anisidine	90-04-0
2-naphthylamine	91-59-8
3,3'-dichlorobenzidine 3,3'-dichlorobiphenyl-4,4'-ylenediamine	91-94-1
3,3'-dimethoxybenzidine o-dianisidine	119-90-4
3,3'-dimethylbenzidine 4,4'-bi-o-toluidine	119-93-7
4,4'-methylenedi-o-toluidine	838-88-0
4,4'-oxydianiline	101-80-4
4,4'-thiodianiline	139-65-1
4,4'- Diaminodiphenylmethane (MDA)	101-77-9
4-Aminoazobenzene	60-09-3
4-chloro-o-toluidine	95-69-2
4-chloroaniline	106-47-8
4-methoxy-m-phenylenediamine	615-05-4
4-methyl-m-phenylenediamine (toluene-2,4-diamine)	95-80-7
5-nitro-o-toluidine	99-55-8
6-methoxy-m-toluidine (p-cresidine)	120-71-8
Benzidine	92-87-5
Biphenyl-4-ylamine,4-aminobiphenyl xenylamine	92-67-1
o-aminoazotoluene,4-amino-2',3-dimethylazobenzene,4-o-tolylazo- a-toluidine	97-56-3
o-toluidine,2-aminotoluene	95-53-4

A3.12 Other Restricted Chemicals of Concern

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Chemical group members belonging to the Other Chemicals of Concern group include the fixed list in the following table:

TABLE A12: **RSL Reference List for Other Chemicals of Concern**

Chemical Name	CASRN
Polyvinyl Chloride (PVC)	9002-86-2
Polyvinylidene dichloride (PVDC)	9002-85-1
Vinyl chloride	75-01-4
Vinyl acetate	108-05-4
Polycarbonate (PC)	25037-45-0
Polystyrene & expanded polystyrene	9003-53-6
Styrene	100-42-5
Styrene oxide	96-09-3
Melamine	108-78-1
Formaldehyde	50-00-0
Acrylonitrile butadiene styrene (ABS)	9003-56-9
Styrene butadiene rubber (SBR)	9003-55-8
Polysulfones PSU	25135-51-3
Polyethersulfones (PES)	25667-42-9
2,3-Epoxypropyl phenyl ether	122-60-1
4-Methyl-m-phenylenediamine	95-80-7
Diphenyl-p-phenylenediamine	74-31-7
Acrylamide	79-06-1
4,4'-Methylenedianiline (MDA)	101-77-9
Buta-1,3-diene	106-99-0
2,3-epoxypropyl methacrylate; glycidyl methacrylate	106-91-2
4-tert-Butylpyrochatechol	98-29-3
4-tert-Butylphenol	98-54-4
p-Cresol	106-44-5
Diethyl sulphate	64-67-5
Dimethyl sulphate	77-78-1
Ethylene oxide	75-21-8
1-Chloro-2,3- epoxypropane	106-89-8

Chemical Name	CASRN
1,3-Dihydroxy- benzene	108-46-3
2-ethylhexyl 10-ethyl-4,4- dioctyl-7-oxo-8-oxa-3,5- dithia-4- stannatetradecanoate	15571-58-1
Isoprene	78-79-5
2-Ethylhexanoic acid	149-57-5
Aniline	62-53-3
Chlorinated paraffins (CPs)	63449-39-8
Triphenyl Phosphate	115-86-6
Tris(2-Chloroethyl)-phosphate (TCEP)	115-96-8
2-Octyl-(4-dimethyl-amino) benzoic acid	58817-05-3
Di(2-ethylhexyl)adipate	103-23-1
4,4'-Methylenebis[2-chloroaniline]	101-14-4
Resorcinol monobenzoate	136-36-7
Phenyl salicylate	118-55-8
UV-327	3864-99-1
1,3-Dihydroxybenzene	108-46-3
Ethyleneimine	151-56-4
4-Benzyloxyphenol	103-16-2
4-Octylphenol	1806-26-4
Toluene	108-88-3
Methyl Glycol	109-86-4
N-Methyl-2-pyrrolidone (NMP)	872-50-4
Ethyl Glycol	110-80-5

Standard for Reusable Food Packaging, Food Service Ware, & Cookware

The GreenScreen Certified Standard for Reusables is for evaluating reusable food packaging, food service ware, cookware, as well as materials used in these types of products. This standard provides the means for manufacturers to communicate their use of safer chemicals per the GreenScreen for Safer Chemicals hazard assessment method. GreenScreen Certified ensures value, usability, and relevance for industry professionals wanting to excel in offering safer chemical formulations used in product manufacturing.

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