Acknowledgments

Clean Production Action is committed to maintaining clear and transparent guidance for producing comprehensive GreenScreen assessments and accurate Benchmark scores. Due to the increasingly widespread implementation of GreenScreen for Safer Chemicals, guidance revisions are conducted on a regular basis to uphold the method's scientific rigor and alignment with other global programs. This is accomplished through in-depth technical discussions with GreenScreen advisory groups, who provide valuable feedback and recommendations for improving the guidance resources. We would like to extend distinguished acknowledgment to the scientists and industry professionals who have donated significant time and expertise toward the development and continued upkeep of GreenScreen for Safer Chemicals.

Key Contributors

Shari Franjevic, GreenScreen Program Manager, Clean Production Action
Mark Rossi, PhD, Executive Director, Clean Production Action
Amy Hunsicker, Technical Consultant to Clean Production Action
Michelle Wilhelm Turner, PhD, Technical Consultant to Clean Production Action

In producing the final guidance resources we thank Ellen Goldberg, Operations Manager, Clean Production Action for her detailed editorial review and David Gerratt of DG Communications for his creativity in design. In the end we as key contributors take responsibility for any flaws or errors contained herein.

Copyright © (2014–2018) by Clean Production Action, All rights reserved. No part of this publication is to be reproduced or utilized in any form or by any means, without prior written permission from Clean Production Action.

GreenScreen Advisory Groups

Licensed GreenScreen Profilers

ToxServices, Inc.
Bingxuan Wang, Ph.D., D.A.B.T., Toxicologist
Emily Golden, M.F.S., Toxicologist
Jennifer Rutkiewicz, Ph.D., Toxicologist
Margaret Whittaker, Ph.D., M.P.H., CBiol., F.S.B., E.R.T., D.A.B.T., Managing Director & Chief Toxicologist
Megan Boylan, M.S., Toxicologist
Mouna Zachary, Ph.D., Toxicologist
Sara Ciotti, Ph.D., Toxicologist
Zach Guerrette, Ph.D., D.A.B.T., Toxicologist

NSF International
Amber Dzikowicz, Business Unit Manager
Don Ward, Sr. Research Toxicologist
Annie Labut, Managing Toxicologist

SciVera, LLC
Patricia Beattie, PhD, DABT, Vice President, Scientific Development

Gradient
Ari S. Lewis, MS, Principal
Kim Reid, B.A., Principal Scientist
Tim Verslycke, PhD, Principal
Tom Lewandowski, Ph.D., DABT, ERT, ATS, Principal

Polymers Technical Peer Review Group

We would like to particularly acknowledge the support of Mouna Zachary, Ph.D., ToxServices and Paul Ashford, Managing Director, Anthesis-Caleb, for their significant contributions to the development of the updated GreenScreen guidance for evaluating polymer hazards.

Clean Production Action
Shari Franjevic, GreenScreen Program Manager
Amy Hunsicker, Technical Consultant
Michelle Wilhelm Turner, Ph.D., Technical Consultant

Other Contributors

Akos Kokai, UC Berkeley
Anne Levy-Barboua, Independent Contributor
Bingxuan Wang, ToxServices, Inc.
Colleen McLoughlin, SciVera, LLC
Don Ward, NSF International
Gillian Miller, Ecology Center
Jen Sass, NRDC
Jim Keen, Shaw Industries
Julie Schoenung, UC Irvine
Margaret Whittaker, ToxServices
Megan Schwarzman, UC Berkeley
Michel Dedeo, Healthy Building Network
Mouna Zachary, ToxServices, Inc.
Nancy Linde, Independent Contributor
Pat Beattie, SciVera, LLC
Paul Ashford, Anthesis-Caleb
Paul Baukema, Engineered Polymer Solutions Inc.
Roger McFadden, McFadden and Associates, LLC
Truus Tiemersma, DSM

GreenScreen Steering Committee

Clean Production Action
Mark Rossi, Ph.D., Executive Director
Shari Franjevic, GreenScreen Program Manager
Amy Hunsicker, Technical Consultant

Apple
Art Fong, Ph.D., Toxicology and Green Chemistry Program Manager

DSM
Truus Tiemersma, Manager Regulatory Affairs

Environmental Defense Fund
Jennifer McPartland, PhD, Senior Scientist

Hewlett-Packard Company
Cory Robertson, Environmental Chemist

Hewlett Packard Enterprise
Chosu Khin, Chemical Engineer

International Chemical Secretariat (ChemSec)
Anna Lennquist, Senior Toxicologist

McFadden and Associates, LLC
Roger McFadden, President, Chief Science Officer

University of California Berkeley
Akos Kokai, PhD candidate, Dept. of Environmental Science, Policy, and Management
Megan Schwarzman, MD, MPH, Research Scientist & Lecturer, School of Public Health

University of Massachusetts Lowell
Pam Eliason, Senior Associate Director and Training and Education Program Manager

Other Key Advisors

Eric Rosenblum, Consulting Toxicologist, Clean Production Action
Tom Lent, Policy Director, Healthy Building Network
Michel Dedeo, PhD, Staff Chemist, Healthy Building Network
Alex Stone, retired from WA Dept. of Ecology, Hazardous Waste & Toxics Reduction
Dr. Brian J. Penttila, Safer Alternatives Chemist, WA Dept. of Ecology

Preface

Clean Production Action developed GreenScreen® for Safer Chemicals (GreenScreen) as a publicly available and transparent chemical hazard assessment method to help move our society quickly and effectively toward the use of greener and safer chemicals. It is used by a wide range of professionals, governmental bodies, non-profits, businesses, formulators, and product developers—anybody interested in assessing the inherent hazards of chemicals and their potential effect on human health and the environment.

GreenScreen builds on the U.S. Environmental Protection Agency's Design for Environment (DfE) approach and other national and international precedents including but not limited to the Organisation for Economic Cooperation and Development (OECD), Canada Domestic Substances List Methodology, the International Joint Commission, the European Union's Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and Classification, Labeling and Packaging (CLP) Regulations, the Stockholm Convention on Persistent Organic Pollutants and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). It is freely and publicly accessible, transparent, and peer-reviewed.

The guidance provided in this publication clearly outlines every step for performing GreenScreen assessments, including how to assess and classify hazards, derive GreenScreen Benchmark™ scores and GreenScreen List Translator™ scores, and make informed decisions. In this latest version, the method for assessing polymers was extensively updated to address the complexities involved in their hazard evaluation. In addition, further clarification was provided for performing GreenScreen assessments of products.

Regulatory requirements and toxicology continue to evolve rapidly, and new hazard classifications, test data and science continue to emerge. This procedure will be regularly revised and updated, particularly as new versions of important foundational pieces, such as the GHS, are released.

Overview

1. INTRODUCTION

GreenScreen for Safer Chemicals® ("GreenScreen") is a chemical hazard assessment methodology. Since chemicals are the core of our materials economy and the building blocks of products, GreenScreen can be applied at every level of complexity and any stage along the supply chain. GreenScreen can also be used to assess hazards of chemicals used in manufacturing facilities or workplaces.

GreenScreen List Translator™ is a streamlined chemical hazard assessment methodology based on review of GreenScreen Specified Lists™ only, and can be very informative as a preliminary step to quickly identify known chemicals of high concern and to prioritize chemicals for further review or action.

This guidance document includes requirements for Licensed GreenScreen Profilers and Authorized GreenScreen Practitioners™. This document is also intended to serve as guidance for users seeking to generate comprehensive and high quality GreenScreen assessments.

Section I describes how to assess a single chemical using GreenScreen.

Section II describes how to assess a polymer using GreenScreen.

Section III provides guidance for assessing a product using GreenScreen and/or GreenScreen List Translator™. Products are identified by manufacturer and trade name and can include chemical substances, chemical mixtures, polymeric materials, homogeneous materials, or articles.

Section IV describes how to assess a chemical using GreenScreen List Translator.

Section V contains all the Annexes referenced in prior sections.

Section VI includes access to the GreenScreen Assessment Templates.

2. NORMATIVE REFERENCES

2.1 Familiarity with the documents listed below is part of the competency requirements for Licensed GreenScreen Profilers and Authorized GreenScreen Practitioners.

2.1.1 Globally Harmonized System of Classification and Labelling of Chemicals (GHS), United Nations, New York and Geneva,[1] and

2.1.2 U.S. Environmental Protection Agency, Office of Pollution Prevention & Toxics, Safer Choice Master Criteria for Safer Chemical Ingredients.[2]

2.2 Use the most recent edition of each normative reference when conducting a GreenScreen assessment, unless otherwise specified in the Guidance.

1 http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html (accessed 9/20/17)

2 https://www.epa.gov/saferchoice/safer-choice-master-criteria-safer-chemical-ingredients (accessed 9/20/17)

3. GENERAL REQUIREMENTS

3.1 To ensure clarity regarding GreenScreen versions used and the extent to which assessments are current:

3.1.1 The version number of GreenScreen documentation used for an assessment must always be identified in the assessment report along with the date of the assessment; and

3.1.2 Results cannot be directly compared between different versions where changes are categorized as major according to the GreenScreen Version Control Policy. To compare assessments between 1.0 and 2.0 level changes, the older assessment must be revised to meet the criteria of the most recent version.

3.2 GreenScreen assessments must be revised at a minimum of every three (3) years to ensure that the hazard profiles remain up to date and valid.

3.3 Adhere to the GreenScreen Terms of Use.[3]

4. GENERAL REPORTING REQUIREMENTS

Licensed GreenScreen Profilers and Authorized GreenScreen Practitioners must use the most recent version of the GreenScreen Assessment Template or equivalent for the chemical, polymer, or product being assessed (See Templates 1 through 5 in Section VI), and be transparent in presenting assessment results, clearly communicating both data quality and data completeness. All assessment report templates must adhere to the following general guidelines:

4.1 The hazard classification summary provided for each GreenScreen hazard endpoint must include a summary of the toxicity data, discussion of use of data from suitable analogs or model results, and the rationale for the selected hazard level and confidence level;

4.2 The report must include a discussion of which environmental transformation products were considered and supporting rationale for why they were or were not considered feasible and/or relevant;

4.3 Benchmark scores that have been modified due to data gaps, environmental transformation products or chemicals of high concern must be presented with relevant subscripts (e.g., Benchmark-2_{DG}, Benchmark-1_{TP}, or Benchmark-1_{CoHC}); and

4.4 Where there are data gaps, include a worst-case scenario estimate to indicate what the lowest possible Benchmark score would be if the data gap were filled with the highest possible hazard level, unless expert judgment is deemed sufficiently strong to rule out certain hazards.

5. MAKING INFORMED DECISIONS

5.1 GreenScreen is intended for use as one tool in the sustainability toolbox. It is a method for comparative chemical hazard assessment and is not intended to address impacts from energy consumption, resource extraction, etc. that are typically addressed in life cycle assessment.

5.2 GreenScreen helps to inform decision making for the design and development of products and processes, for material or product procurement, and to support and enhance environmental management systems, environmental health and safety (EHS) programs, and global sustainability or environmental reporting. GreenScreen provides a clear and transparent format for presenting what is known and what is not known about the hazards associated with chemicals.

3 https://www.greenscreenchemicals.org/about/greenscreen-terms-of-use (accessed 9/20/17)

5.3 Chemicals may achieve the same Benchmark score but have very different hazard profiles. Therefore, GreenScreen Benchmark scores should be used in combination with the Hazard Summary Table™ and the GreenScreen assessment report. The GreenScreen assessment report includes information on transformation products and data quality and completeness, information that can assist in making an informed choice and avoiding a regrettable substitution.

5.4 One of the strengths of the GreenScreen methodology is its clear identification of data gaps regarding chemical hazards and a transparent distinction between low hazard and unknown hazard. Data gaps should always be considered in the context of how the lack of information relates to exposure through the entire life cycle (e.g., workers, users, end users, and the environment).

5.5 When making informed decisions based on assessment results, the acceptability of data gaps should be considered on a case-by-case basis depending on known chemical or product use or exposure scenarios. For example, while lack of data on Skin Irritation may be sufficient to achieve a Benchmark-3 for a chemical, it is not an acceptable data gap when selecting a chemical for use in a skin lotion. Similarly, if there is a data gap for Systemic Toxicity via the inhalation exposure route for a perfume additive, an informed decision cannot be made about the safety of this chemical for workers at the factory or consumers.

5.6 The GreenScreen reporting frameworks for chemicals, polymers, and products, provide maximum transparency to decision-makers. Using GreenScreen, organizations may integrate their own policies and priorities with GreenScreen assessment results to guide informed choices. These choices may be in product design, manufacturing, product specifications, or purchasing. For example, an organization may set a sustainability goal to eliminate all Benchmark-1 chemicals regardless of concentration. Another organization may set the goal to reduce the mass or weight percent of Benchmark-1 chemicals used. A third organization may set a goal to increase the mass or weight percent of Benchmark-3 and Benchmark-4 chemicals. These goals can be scoped at the product, product group, process, facility, or company level.

6. RECORDS

Licensed GreenScreen Profilers and Authorized GreenScreen Practitioners must keep all documents generated as a result of the implementation of this Guidance on file for the duration of the Licensing period and five years thereafter.

7. TERMS AND DEFINITIONS

TERM	DEFINITION
100 ppm	One hundred parts per million (ppm) is equivalent to 0.01% by weight.
1,000 ppm	One thousand parts per million (ppm) is equivalent to 0.1% by weight.
Acute Aquatic Toxicity (AA)	"The intrinsic property of a substance to be injurious to an organism in a short-term, aquatic exposure to that substance." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Acute Mammalian Toxicity (AT)	"The adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Additivity	An approach for hazard classification when data are available on the ingredients, but not on the mixture as a whole. The theory of additivity assumes each ingredient contributes to the overall toxicity of the mixture in proportion to its potency and concentration. However, this additivity principle does not apply to non-additive hazard classes. (Adapted from GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Analog	See Suitable Analog.
Article	"An object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition." (REACH Article 3(3); http://www.reachonline.eu/REACH/EN/REACH_EN/article3.html, accessed 9/20/17)
Assessment Report Template	A report template used to document all findings gathered during a GreenScreen assessment.
Authoritative Secondary Sources	A compilation of research studies that have been reviewed and analyzed by a group that is not the author of the original study(ies) but that is a group of recognized authorities such as health profession organizations, accredited institutions and universities, and governmental entities.
Authoritative Toxicology Databases	Database information that is reviewed, approved, and regularly updated by a group of recognized authorities such as health profession organizations, accredited institutions and universities, and governmental entities.
Authorized GreenScreen Practitioner™	An individual who has completed advanced GreenScreen training, has demonstrated scientific expertise and capacity to perform high quality GreenScreen assessments, and is licensed by Clean Production Action to conduct GreenScreen assessments for his or her registered organization.
Bioaccumulation (B)	"A process in which a chemical substance is absorbed in an organism by all routes of exposure as occurs in the natural environment (e.g., dietary and ambient environment sources). Bioaccumulation is the net result of competing processes of chemical uptake into the organism at the respiratory surface and from the diet and chemical elimination from the organism including respiratory exchange, fecal egestion, metabolic biotransformation of the parent compound and growth dilution." (Arnot, J.A. and F.A. Gobas, A review of bioconcentration factor (BCF) and bioaccumulation factor (BAF) assessments for organic chemicals in aquatic organisms. Environmental Reviews, 2006. 14: p. 257–297; http://www.nrcresearchpress.com/doi/abs/10.1139/a06-005, accessed 9/20/17)

TERM	DEFINITION
Bioavailability	"The rate and extent to which a substance can be taken up by an organism and is available for metabolism or interaction with biologically significant receptors. Bioavailability (biological availability) involves both release from a medium (if present) and absorption by an organism." (CLP; https://echa.europa.eu/documents/10162/23036412/clp_en.pdf/58b5dc6d-ac2a-4910-9702-e9e1f5051cc5, accessed 9/20/17)
Carcinogenicity (C)	"Capable of increasing the incidence of malignant neoplasms, reducing their latency, or increasing their severity or multiplicity." (IARC; http://monographs.iarc.fr/ENG/Preamble/currenta2objective0706.php, accessed 9/20/17)
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.
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 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); http://www.reachonline.eu/REACH/EN/REACH_EN/article3.html, accessed 9/20/17) For the purposes of this guidance, 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.
Chronic Aquatic Toxicity (CA)	"The intrinsic property of a substance to cause adverse effects to aquatic organisms during aquatic exposures that are determined in relation to the life-cycle of the organism." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Component	"Substance intentionally added to form a mixture." (https://echa-term.echa.europa.eu/; accessed 10/11/17)
Constituent	"Any single species present in a substance that can be characterised by its unique chemical identity." (https://echa-term.echa.europa.eu/; accessed 10/11/17)
Dalton (Da)	"Precisely 1.0000 atomic mass unit or 1/12 the mass of a carbon atom of mass 12. Hence, a polymer with a molecular weight of 10,000 atomic mass units has a mass of 10,000 daltons." (USEPA Polymer Exemption Guidance Manual; https://www.epa.gov/sites/production/files/2015-03/documents/polyguid.pdf, accessed 9/20/17)
Data Gap (DG)	GreenScreen nomenclature that indicates that measured data and authoritative and screening lists have been reviewed, and expert judgment and estimation such as modeling and analog data have been applied, and there is still insufficient information to assign a hazard level to an endpoint for a GreenScreen assessment.
Developmental Toxicity (D)	"Adverse effects in the developing organism that may result from exposure prior to conception (either parent), during prenatal development, or postnatally to the time of sexual maturation. Adverse developmental effects may be detected at any point in the lifespan of the organism. The major manifestations of developmental toxicity include: (1) death of the developing organism, (2) structural abnormality, (3) altered growth, and (4) functional deficiency." (USEPA, Guidelines for Developmental Toxicity Risk Assessment. Federal Register, 1991. 56(234): p. 63798–63826; https://ntp.niehs.nih.gov/iccvam/SuppDocs/FedDocs/EPA/EPA-devtox.pdf, accessed 9/20/17)

4 For complete details on GreenScreen method see http://www.greenscreenchemicals.org/method/method-documents.

5 See http://www.greenscreenchemicals.org/method/method-documents.

TERM	DEFINITION
Endocrine Activity (E) (Endocrine Active Substance)	"An endocrine active substance is a substance having the inherent ability to interact or interfere with one or more components of the endocrine system resulting in a biological effect, but need not necessarily cause adverse effects. Endocrine activity is considered as a collection of modes of action, potentially leading to adverse outcomes, rather than a (eco)toxicological hazard in itself." (EFSA; http://www.efsa.europa.eu/en/efsajournal/pub/3132.htm, accessed 9/20/17)
Endocrine Disruption (Endocrine Disruptor)	"An exogenous substance or mixture that alters function(s) of the endocrine system and consequently causes adverse health effects in an intact organism, or its progeny, or (sub)populations." (European Commission; http://ec.europa.eu/environment/chemicals/endocrine/definitions/endodis_en.htm, accessed 9/20/17)
Eye Irritation (IrE)	"The production of changes in the eye following the application of a test substance to the anterior surface of the eye, which are fully reversible within 21 days of application." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Feasible Environmental Transformation Product (TP)	An environmental transformation product that is likely to form/occur because the chemical structure of the parent chemical allows for certain types of transformations (e.g., hydrolysis) and because those transformations are likely to occur based on the functional use of the chemical across its life cycle (e.g., discharged to water).
Functional 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 (e.g., stabilizer, colorant, plasticizer). Functional additives can be polymeric or non-polymeric in nature.
GHS	Globally Harmonized System of Classification and Labelling of Chemicals.
GreenScreen Assessment	A comprehensive chemical hazard assessment that results in one GreenScreen Benchmark score (e.g., Benchmark-1, -2, -3, -4, or -U).
GreenScreen Benchmark™ Criteria	A set of algorithms or decision logic used to assign a GreenScreen Benchmark score to a chemical compound or polymer based on the hazard profile. The Benchmark criteria include a combination or combinations of GreenScreen Hazard Endpoints and hazard levels.
GreenScreen Hazard Endpoint	A specific type of adverse health outcome or physical property that can cause harm. GreenScreen guidance specifies 18 Hazard Endpoints that must be evaluated and are listed in Annex 2. Examples include: Carcinogenicity, Acute Aquatic Toxicity, Bioaccumulation, and Flammability.
GreenScreen Hazard Summary Table™	The table in a GreenScreen Assessment Report Template used to document and present the hazard levels for all 18 Hazard Endpoints. Templates are provided in Section VI of this document.
GreenScreen List Translator™ (LT)	A streamlined chemical hazard assessment method developed by Clean Production Action that produces a GreenScreen List Translator score.
GreenScreen List Translator (LT) scores	Scores based on screening chemical compounds against GreenScreen Specified Lists (Annex 11) using GreenScreen List Translator guidance (see Section IV). Possible scores include LT-1, LT-P1, LT-UNK and NoGSLT.
GreenScreen Specified Lists™	Lists generated by state, national, or international governments, authoritative bodies, and expert organizations. These lists are required to be searched for a GreenScreen assessment. GreenScreen List Translator relies on these lists to generate a List Translator score.
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; http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0065&from=EN, accessed 10/26/17)

TERM	DEFINITION
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 10/11/17)
Intentionally Added Substance	See Functional Additive.
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 for a fee for clients. (https://www.greenscreenchemicals.org/professionals/profilers)
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); http://www.reachonline.eu/REACH/EN/REACH_EN/article3.html, accessed 9/20/17)
Mutagenicity & Genotoxicity (M)	"The more general terms genotoxic and genotoxicity apply to agents or processes which alter the structure, information content, or segregation of DNA, including those which cause DNA damage by interfering with normal replication." (USEPA; https://www.epa.gov/sites/production/files/2014-01/documents/aa_criteria_v2.pdf, accessed 9/20/17)
Neurotoxicity (N)	"An adverse change in the structure or function of the central and/or peripheral nervous system following exposure to a chemical, or a physical or biological agent." (USEPA, Guidelines for Neurotoxicity Risk Assessment. Federal Register, 1998. 63(93): p. 26926–26954; https://www.epa.gov/sites/production/files/2014-11/documents/neuro_tox.pdf, accessed 9/20/17)
Number Average Molecular Weight (Mn)	"The arithmetic average (mean) of the molecular weights of all molecules in a polymer. (This value should not take into account unreacted monomers and other reactants, but must include oligomers.)." (USEPA Polymer Exemption Guidance Manual; https://www.epa.gov/sites/production/files/2015-03/documents/polyguid.pdf, accessed 9/20/17)
Oligomer	A molecule of intermediate relative molecular mass, the structure of which essentially comprises a small plurality of units derived, actually or conceptually, from molecules of lower relative molecular mass. (IUPAC)
Parent chemical	For the purposes of this guidance, a parent chemical is the chemical of interest that is being assessed.
Persistence (P)	"The length of time the chemical can exist in the environment before being destroyed (i.e., transformed) by natural processes." (USEPA, https://www.epa.gov/sites/production/files/2014-01/documents/aa_criteria_v2.pdf, accessed 9/20/17)
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); http://www.reachonline.eu/REACH/EN/REACH_EN/article3.html, accessed 10/14/17)
Polymeric Material	A mixture of one or more polymer substance(s) or polymer mixture(s), all other functional additives (i.e., intentionally added substances), and unintentional impurities.

TERM	DEFINITION
Polymeric Material Impurities	Impurities imparted to the polymeric material from a source other than the intentionally added components.
Polymer Mixture	A mixture comprised of a polymer substance and unreacted monomer(s).
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); http://www.reachonline.eu/REACH/EN/REACH_EN/article3.html, accessed 9/20/17)
Processing Aid	A product that is used to provide a technical effect in processing but no technical or functional effect in the product and may remain in small amounts in finished product (e.g., lubricants, mold release agents).
Product	A chemical substance, chemical mixture, polymeric material, homogeneous material, or article identified by a manufacturer and trade name.
Reactive Functional Group (RFG)	"An atom or associated group of atoms in a chemical substance that is intended or can be reasonably anticipated to undergo facile chemical reaction." (USEPA Polymer Exemption Guidance Manual; https://www.epa.gov/sites/production/files/2015-03/documents/polyguid.pdf, accessed 9/20/17)
Relevant Environmental Transformation Product	An environmental transformation product that is: 1) persistent enough to be encountered after use or release of the parent chemical and 2) NOT a substance necessary for life or commonly formed in the ambient environment.
Reproductive Toxicity (R)	"The occurrence of biologically adverse effects on the reproductive systems of females or males that may result from exposure to environmental agents. The toxicity may be expressed as alterations to the female or male reproductive organs, the related endocrine system, or pregnancy outcomes. The manifestation of such toxicity may include, but is not limited to, adverse effects on onset of puberty, gamete production and transport, reproductive cycle normality, sexual behavior, fertility, gestation, parturition, lactation, developmental toxicity, premature reproductive senescence, or modifications in other functions that are dependent on the integrity of the reproductive systems." (USEPA, Guidelines for Reproductive Toxicity Risk Assessment. Federal Register, 1996. 61(212): p. 56274-56322; https://www.epa.gov/sites/production/files/2014-11/documents/guidelines_repro_toxicity.pdf, accessed 9/20/17)
Residual Monomer	An unintended impurity in a polymer substance.
Respiratory Sensitization (SnR)	"Hypersensitivity of the airways following inhalation of a substance or mixture." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Skin Irritation (IrS)	"The production of reversible damage to the skin following the application of a test substance or mixture for up to four hours." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Skin Sensitization (SnS)	"A skin sensitizer is a substance that will lead to an allergic response following skin contact." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Special Case Impurity	Chemicals of high concern typically found in a product and identified based on life cycle knowledge, particularly of feedstock or upstream manufacturing processes.
Stabilizer	A chemical or substance that is used to prevent degradation. Biocides and preservatives are not stabilizers, but rather considered as other types of functional additives.

TERM	DEFINITION
Strength of Evidence	A qualitative evaluation that considers the results of a clinical trial or research study. The strength of the evidence will take into consideration how well a study was designed, conducted, and analyzed, and evaluate the overall strength of that body of evidence.
Substance Impurity	An impurity of a chemical substance or polymer substance, such as a residual catalyst. See also "Impurity."
Suitable Analog	A chemical that can be used to estimate the hazard of the chemical of interest when data on the chemical of interest are not available. A suitable analog is chemically (e.g., based on chemical structure) and/or biologically (e.g., based on metabolic breakdown, or likely mechanistic/mode of action considerations) similar to the chemical of interest. Guidance for identifying a suitable analog can be found in OECD Series on Testing and Assessment No. 80 Guidance on Grouping of Chemicals. The suitable analog used must be appropriate for the attribute being evaluated. (based on OECD; http://www.oecd.org/chemicalsafety/testing/series-testing-assessment-publications-number.htm, accessed 9/20/17)
Systemic Toxicity & Organ Effects (including Immunotoxicity) (ST)	Includes all significant non-lethal effects in a single organ that can impair function, both reversible and irreversible, immediate and/or delayed, not otherwise covered by any other endpoint; or generalized changes of a less severe nature involving several organs.
Thermoplastic polymer	Polymers that soften when heated and can be remolded. (http://ec.europa.eu/environment/chemicals/reach/pdf/studies_review2012/annexe1_study10.pdf, accessed 9/20/17)
Thermoset polymer	Cross-linked polymers. They do not readily soften and cannot be remolded. (http://ec.europa.eu/environment/chemicals/reach/pdf/studies_review2012/annexe1_study10.pdf, accessed 9/20/17)
Transient Transformation Products	A transformation product that has a very short half-life and is typically an intermediate along a degradation pathway.
Unreacted Monomer	An intended component in a polymer mixture.
Valid GreenScreen Assessment	A GreenScreen assessment report completed less than three years from the current date and that has not been marked as superseded.