



GreenScreen® for Safer Chemicals

Diseases of our modern age are increasingly linked to toxic chemicals in the environment. Chemicals are routinely used in consumer products and in the workplace where they escape into surrounding air, water and soil, posing direct exposure and risks and accumulating in the food chain.

Humans and wildlife are now internally contaminated with hundreds of synthetic chemicals, many of which are known to be hazardous. As awareness grows, individuals and companies increasingly want to know how to identify and use safer chemicals.

Clean Production Action developed GreenScreen® for Safer Chemicals as a publicly available and transparent chemical hazard screening method to help move our society quickly and effectively toward the use of greener and safer chemicals. GreenScreen allows users to evaluate chemicals based on their inherent hazards—for example, to determine if they are linked to cancer, are toxic to fish, or are persistent in the environment—and to promote continuous improvement toward safer chemicals. GreenScreen pulls together all the best information on chemical hazards to identify chemicals of high concern and assess safer alternatives to better inform:

- procurement,
- product design and development,
- standards, and
- policies.

How it Works

GreenScreen sets out four benchmarks on the path to safer chemicals, with each benchmark defining progressively safer chemicals (see Figure 1). It builds on the 12 Principles of Green Chemistry and the US EPA's Design for the Environment (DfE) alternatives assessment method, which consolidates the available data on a chemical's inherent characteristics—including human health effects, environmental fate and toxicity, and safety—into a table of hazard endpoints each ranked as high, moderate or low.

From there, the hazard evaluations are further consolidated into a single benchmark that provides an easy means for comparing chemicals. GreenScreen also addresses the hazards posed by a chemical when it breaks down in the environment. By using GreenScreen, companies can rank chemicals and understand why some alternatives are more or less preferable. This helps them make more informed decisions, reduce their business risk and promote innovation.

Identifying Chemicals of High Concern (Benchmark 1)

An important value of the GreenScreen is that Benchmark 1 clearly defines the criteria for chemicals of high concern to human health and the environment consistent with global regulations like

REACH. These include:

- carcinogens,
- reproductive, developmental and neurodevelopmental toxicants,
- mutagens,
- persistent, bioaccumulative and toxic chemicals (PBTs),
- very persistent and very bioaccumulative chemicals (vPvBs), and
- endocrine disruptors.

Many users first run their chemicals through the GreenScreen List Translator, via an online tool that checks if a chemical appears on any of the 650 internationally recognized lists and sub-lists of high hazard chemicals. This is a relatively quick and valuable first step in identifying a chemical of high concern and targeting a chemical for substitution. A full GreenScreen assessment is comprehensive and provides all the human health and environmental data that is known about a chemical based on 18 hazard endpoints. GreenScreen assessments also identify data gaps for a chemical. If a chemical has too many data gaps it is given a classification of Benchmark U—Undetermined. This allows companies to understand the business risk they are taking in using poorly characterized chemicals in their products and underscores why full information from their suppliers is necessary.

Businesses, certification bodies and governments are increasingly using GreenScreen.

- Walmart used GreenScreen to identify priority chemicals for substitution in its new chemicals policy.
- Hewlett Packard (HP) requires GreenScreen assessments for hazardous chemical replacements.
- Nike uses GreenScreen to assess chemical hazards and promote innovation in their supply chain.
- U.S. Green Building Council now offers credits for using GreenScreen in LEEDv4.
- Eight states recommend GreenScreen as a preferred hazard assessment method for alternatives assessment.
- Maine requires GreenScreen for assessing substitutes for toxic chemicals in children's products.



“The more you know about what you are putting into your products, the more likely you are to make better choices in product development.”

Jonathan Plisco, PolyOne

Screening Chemicals at HP

HP, the world’s biggest user of GreenScreen, uses it to assess alternatives when replacing a restricted substance. GreenScreen enables HP to identify better materials, not

just those that are minimally acceptable. As part of a larger integrated alternatives assessment, HP uses GreenScreen to do initial hazard screening and deselect certain options early in the process. HP began using GreenScreen as part of an initiative to make all of its power cords PVC-free. By requesting their suppliers to reformulate alternatives that score Benchmark 2 or higher, HP ensures that it has not substituted PVC for a more toxic material.

Integrating GreenScreen into U.S. Green Building Council LEED accreditation

To help minimize the impacts buildings have on human health, LEED credits are now being offered for products that have no Benchmark 1 chemicals after being screened through either the GreenScreen List Translator or a full GreenScreen. By integrating GreenScreen assessments into LEED, building materials containing safer products will increasingly become popular.

For more information on training opportunities, method documents, and case studies, visit www.greenscreenchemicals.org.

OCTOBER 2011 (v2)

GreenScreen® for Safer Chemicals v 1.2 Benchmarks

Start at Benchmark 1 (red) and progress to Benchmark 4 (green)



This chemical passes all of the criteria.

BENCHMARK 4

Low P* + Low B + Low T (Ecotoxicity, Group I, II and II* Human) + Low Physical Hazards (Flammability and Reactivity) + Low (additional ecotoxicity endpoints when available)

Prefer—Safer Chemical



BENCHMARK 3

- Moderate P or Moderate B
- Moderate Ecotoxicity
- Moderate T (Group II or II* Human)
- Moderate Flammability or Moderate Reactivity



If this chemical and its breakdown products pass all of these criteria, then move on to Benchmark 4.

Use but Still Opportunity for Improvement

BENCHMARK 2

- Moderate P + Moderate B + Moderate T (Ecotoxicity or Group I, II, or II* Human)
- High P + High B
- High P + Moderate T (Ecotoxicity or Group I, II, or II* Human)
- High B + Moderate T (Ecotoxicity or Group I, II, or II* Human)
- Moderate T (Group I Human)
- Very High T (Ecotoxicity or Group II Human) or High T (Group II* Human)
- High Flammability or High Reactivity



If this chemical and its breakdown products pass all of these criteria, then move on to Benchmark 3.

Use but Search for Safer Substitutes

BENCHMARK 1

- PBT = High P + High B + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]
- vPvB = very High P + very High B
- vPT = very High P + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]
- vBT = very High B + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]
- High T (Group I Human)



If this chemical and its breakdown products pass all of these criteria, then move on to Benchmark 2.

Avoid—Chemical of High Concern

BENCHMARK U

- Unspecified Due to Insufficient Data

ABBREVIATIONS

- P** Persistence
B Bioaccumulation
T Human Toxicity and Ecotoxicity

Group I Human

includes Carcinogenicity, Mutagenicity/Genotoxicity, Reproductive Toxicity, Developmental Toxicity (incl. Developmental Neurotoxicity), and Endocrine Activity.

Group II Human

includes Acute Mammalian Toxicity, Systemic Toxicity/Organ Effects-Single Exposure, Neurotoxicity-Single Exposure, Eye Irritation and Skin Irritation.

Group II* Human

includes Systemic Toxicity/Organ Effects-Repeated Exposure, Neurotoxicity-Repeated Exposure, Respiratory Sensitization, and Skin Sensitization. Immune System Effects are included in Systemic Toxicity/Organ Effects.

Ecotoxicity includes Acute Aquatic Toxicity and Chronic Aquatic Toxicity.

Note: The level of hazard indicated is the lowest hazard level at which a chemical would fail that criterion. However, if the chemical has a higher hazard level than what is listed (e.g. chemical is very High and the criterion is High), it would also fail that criterion.

* For inorganic chemicals with low chronic hazards, persistence alone will not be deemed problematic (see method documents).