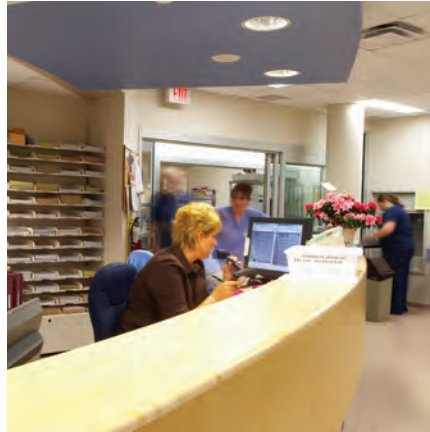




# How to Use GreenScreen<sup>®</sup> for LEED v4







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Lauren Heine • Annie Bevan • Amy Hunsicker • Mark S. Rossi

**Version 1.0 • October 21, 2015**



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

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# Acknowledgements

The How to Use GreenScreen® for USGBC® LEED v4 guidance document is the result of in-depth discussions and input from a diverse group of stakeholders in the building community, including manufacturers, standard-setting organizations, consultancies, and environmental groups. All of these stakeholders shared a common commitment to creating clear guidance on how to achieve the LEED v4 points for “Building product disclosure and optimization—material ingredients” and how GreenScreen for Safer Chemicals can help meet these credits.

This guidance was developed by Clean Production Action, with key content contributions and development of a certification option in collaboration with Green Circle Certified, LLC. The consensus-based development process undertaken by Clean Production Action and Green Circle Certified, LLC involved a balanced collaboration of manufacturers, consultancies, and non-governmental organizations. Our intention is to ensure value, usability and relevance for industry and building professionals wanting to meet LEED green building requirements and ultimately choose safer materials and products.

This effort would not have been possible without the help of the following key contributors and GreenScreen Consensus Group members who devoted their time and considerable expertise to the strategic development of this guidance:

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Together, as a group, we created the guidance document. Yet providing advice and feedback is in no way construed as support for the final product. In producing the final report we thank Mariel Wolfson of Clean Production Action for her detailed copy editing and to 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.

## Preface

The U.S. Green Building Council® (USGBC) set a new course for health considerations in buildings with the release of its new LEED v4 standard in November of 2013. For the first time, the LEED standard takes a holistic approach to addressing chemicals in building products. Health experts have long recognized the risks of individual and groups of toxic chemicals in building products, beginning with lead and asbestos and expanding to include formaldehyde, volatile organic compounds (VOCs), mercury, arsenic, and certain phthalates and flame retardants. These chemicals, among many others, are associated with a range of adverse health and environmental effects including asbestosis, cancer, ecotoxicity, endocrine disruption, and neurotoxicity. LEED v4 establishes a systematic approach through which the building community can address chemicals of high concern to people and the environment.

The two new LEED v4 credits under “Building product disclosure and optimization—material ingredients” advance better knowledge of chemicals in products through “disclosure” and the selection of safer alternatives through “optimization.” Under “Option 1. Material ingredient reporting,” LEED v4 rewards project teams for selecting products that have complete ingredient disclosures. Because it makes knowledge of material ingredients in products available to the building community and the public in general, transparency is a critical step in changing the chemical content of products and improving the health of indoor environments. As the Supreme Court Justice Louis Brandeis said, “sunlight is said to be the best of disinfectants.” The more customers know about the chemicals in their products the better prepared they are to avoid chemicals of high concern and to request safer alternatives. From Apple in the

electronics sector to the Zero Discharge of Hazardous Chemicals (ZDHC) initiative in the apparel sector, transparency about chemicals in products across their lifecycle is a growing trend. LEED v4 places the built environment into the mainstream of the transparency movement.

In LEED v4, “Option 2. Material ingredient optimization,” the USGBC emphasizes the importance of replacing toxic chemicals with safer alternatives, thus avoiding so-called “regrettable substitutes” where, for example, a manufacturer replaces one toxic flame retardant with another that is equally toxic. This “optimization” credit provides points for both avoiding chemicals on scientifically authoritative lists as well as for selecting inherently safer alternatives.

LEED v4 has selected Clean Production Action’s GreenScreen® for Safer Chemicals as a key tool for achieving the new “Building product disclosure and optimization - material ingredients” credits. We wrote this guidance document in collaboration with a community of business and environmental group leaders with the intent of providing users with clear step-by-step instruction on how to apply the GreenScreen method and earn points for one or both LEED v4 options. By following the steps in this guidance, users can gain insight on how to use GreenScreen List Translator scores and GreenScreen Benchmark™ scores to meet LEED v4 Option 1: Material Ingredient Reporting (1 point), and Option 2: Optimization (1 point). This Guidance also includes an optional certification for products. The certification marks will help building industry professionals easily recognize products that can be used to earn these points.

# How to Use GreenScreen® for LEED v4

## 1. PURPOSE

This guidance document supports using GreenScreen® for Safer Chemicals (GreenScreen) to contribute to the following U.S. Green Building Council® (USGBC) Leadership in Energy & Environmental Design (LEED) credits:<sup>1</sup>

- LEED BD+C: New Construction | v4—LEED v4; Building product disclosure and optimization—material ingredients,
- LEED ID+C: Commercial Interiors | v4—LEED v4; Building product disclosure and optimization—material ingredients, and
- LEED BD+C: New Construction | v3—LEED 2009; Pilot Credit 76—Material ingredient reporting.

## 2. SCOPE

This document is for general users of GreenScreen and particularly for product manufacturers, and architects and designers who specify products and materials for use in buildings for which ingredient transparency, disclosure, and optimized products with low inherent hazard are a priority.

## 3. NORMATIVE REFERENCES

**3.1 GreenScreen “Guidance and Method Documents”**<sup>2</sup> necessary for effective implementation in LEED:

- GreenScreen Chemical Hazard Assessment Procedure
- GreenScreen Hazard Criteria
- GreenScreen Benchmark™ Criteria
- GreenScreen Assessment Report Template
- GreenScreen Specified Lists
- GreenScreen Information Sources
- GreenScreen List Translator

**3.2 LEED resources** necessary to implement this guidance document: LEED Requirements.<sup>3</sup>

**3.3 References** that have specified dates or version numbers should be applied according to the edition specified. However, it is the responsibility of the user to review the most recent editions and any other supporting documents available to gain further insight.

1 Note that this document does not provide guidance for satisfying the LEED v4 credits using Health Product Declaration, Cradle to Cradle Certified, the European Union’s Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH), or other options.

2 For GreenScreen “Guidance and Method Documents” go to <http://greenscreenchemicals.org/method/method-documents>.

3 For LEED BD+C: New Construction v4 see <http://www.usgbc.org/node/2616399?return=/credits/new-construction/v4>.  
For LEED ID+C: Commercial Interiors v4 see <http://www.usgbc.org/node/2616400?return=/credits/commercial-interiors/v4>.

## 4. OVERVIEW OF GREENSCREEN

Anticipating growing concern about chemicals in consumer products, a shifting regulatory environment, and the cost of multiple chemical substitutions, GreenScreen for Safer Chemicals was developed to help manufacturers and product developers become proactive in identifying chemicals of concern and safer alternatives. There are two types of GreenScreen assessment results that can be used to meet the LEED v4 credit for Disclosure and Optimization: 1) GreenScreen Benchmark scores generated using a Certified GreenScreen assessment and/or 2) a list-based assessment using the GreenScreen List Translator.

### 4.1 GreenScreen Benchmark Scores

GreenScreen assessments generate GreenScreen Benchmark scores (i.e., Benchmark-1, -2, -3, -4, and -U), and will always trump GreenScreen List Translator scores because they are more comprehensive. The following is a summary of the steps in a GreenScreen<sup>4</sup> assessment:

**a. Assess and Classify Hazards**

- i. Research and collect data on all Hazard Endpoints (e.g., Carcinogenicity, Mutagenicity, Endocrine Disruption, etc.) using GreenScreen Specified Lists, public summary data sets, scientific literature, information on chemical analogs, and measured, estimated, and modeled data.
- ii. Determine if there is sufficient data for each Hazard Endpoint to establish a hazard level and classify it using the GreenScreen Hazard Criteria: very High (vH), High (H), Moderate (M), Low (L), very Low (vL), or Data Gap (DG).
- iii. Fill in the GreenScreen Hazard Summary Table with hazard level classifications (i.e., vH, H, M, L, vL, DG) for each Hazard Endpoint and indicate the Level of Confidence (**bold** for high confidence or *italics* for low confidence).

**b. Apply the Benchmarks:** The GreenScreen Benchmark score is determined using a set of rules applied to the completed Hazard Summary Table. Evaluate feasible and relevant environmental transformation products and data gaps according to GreenScreen “Guidance and Method Documents”<sup>5</sup> and modify Benchmark scores if necessary.

**c. Make Informed Decisions:** Consider the specific application and use.

### 4.2 GreenScreen List Translator

The GreenScreen List Translator is a tool that compiles all GreenScreen Specified Lists (36 lists and over 450 list categories) and translates that information from the GreenScreen Hazard Criteria, where hazard classification levels (e.g., H or M or L) are assigned for each Hazard Endpoint. GreenScreen Specified Lists are only a subset of the complete set of GreenScreen Hazard Criteria. GreenScreen List Translator screening generates List Translator scores only (i.e., LT-1, LT-P1, and LT-UNK [“unknown”]).<sup>6</sup> An automated version of the GreenScreen List Translator is available in the Pharos “Chemical and Material Library.”<sup>7</sup> For the complete List Translator method see GreenScreen “Guidance and Method Documents.”<sup>8</sup>

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

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

<sup>6</sup> Note that if a difference arises between a GreenScreen Benchmark score and a GreenScreen List Translator score, the Benchmark score trumps the List Translator score.

<sup>7</sup> See Pharos <http://www.pharosproject.net/material>.

<sup>8</sup> See <http://www.greenscreenchemicals.org/method/method-documents>.



## 5. TERMS AND DEFINITIONS

TERM	DEFINITION
<b>100 ppm</b>	A threshold used for inventorying substances in a product or material. One hundred (100) ppm is equivalent to 0.01% by weight.
<b>1000 ppm</b>	A threshold used for inventorying substances in a product or material. One thousand (1000) ppm is equivalent to 0.1% by weight.
<b>Assessment Report Template</b>	A report template used to document all findings gathered during a GreenScreen assessment.
<b>Authorized GreenScreen Assessment</b>	Authorized GreenScreen assessment reports are conducted by Authorized GreenScreen Practitioners and may be upgraded to Certified GreenScreen reports by submitting them for quality control to a Licensed GreenScreen Profiler or to Clean Production Action's toxicologist.
<b>Authorized GreenScreen Practitioner</b>	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 his or her registered organization.
<b>CASRN</b>	Chemical Abstract Service Registry Number (also known as "CAS#")
<b>Certified GreenScreen Assessment</b>	A GreenScreen assessment that has attained the highest level of quality and oversight. Either a Licensed GreenScreen Profiler performed the assessment or an Authorized GreenScreen Practitioner performed the assessment and subsequently submitted the assessment for certification. GreenScreen assessments for free and/or for sale can be found in: GreenScreen store, Interstate Chemicals Clearinghouse (IC2) database, and Pharos.
<b>Chemical Substance ("Substance")</b>	A substance of fixed composition, characterized by its molecular structure(s), which typically has an associated CASRN (and may also have synonym CASRNs). Synonyms include: "constituent;" "ingredient;" "chemical;" "compound;" or "component."
<b>Consultant</b>	Consultant is a general term used to distinguish among Licensed GreenScreen Profilers, Third-Party Certifiers, and Authorized GreenScreen Practitioners. Consultants in this context are companies or individuals that help manufacturers understand how to apply GreenScreen methods, help gain insight into products, and aid in earning LEED points. Consultants do not provide GreenScreen assessment or certification services. See Licensed GreenScreen Profiler or Third-Party Certifier for these other services.
<b>Data Gap (DG)</b>	A data gap 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. When generating a final GreenScreen Benchmark score, the presence and number of data gaps in different hazard categories can result in downgrading the Benchmark. This can result in a final GreenScreen Benchmark "U" or the addition of a subscript DG (e.g., GreenScreen Benchmark-2 <sub>DG</sub> or -3 <sub>DG</sub> ).

TERM	DEFINITION
<b>Feasible Environmental Transformation Product (TP)</b>	An environmental transformation product that is likely to form/occur under natural or artificial conditions 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). When generating a final GreenScreen Benchmark score, the hazards of any feasible and relevant transformation products are considered and can change the final Benchmark score. If the final Benchmark is altered due to a transformation product, subscript TP is appended (i.e., GreenScreen Benchmark-1 <sub>TP</sub> , -2 <sub>TP</sub> or -3 <sub>TP</sub> ).
<b>GreenScreen Assessment</b>	A GreenScreen assessment is a comprehensive chemical hazard assessment that is conducted using GreenScreen for Safer Chemicals “Guidance and Method Documents” ( <a href="http://www.greenscreenchemicals.org/method/method-documents">http://www.greenscreenchemicals.org/method/method-documents</a> ) and results in a GreenScreen Benchmark score (Benchmarks-1, -2, -3, -4, or -U).
<b>GreenScreen Benchmark™ Criteria</b>	A set of algorithms or decision logic used to assign a GreenScreen Benchmark score to a chemical based on the hazard profile of the chemical. The Benchmark criteria include a combination or combinations of GreenScreen hazard endpoints and hazard classifications.
<b>GreenScreen List Translator (LT)</b>	A streamlined chemical hazard assessment method developed by Clean Production Action that produces GreenScreen List Translator scores.
<b>GreenScreen List Translator (LT) Scores</b>	<p>List Translator scores are based upon screening chemicals against the GreenScreen Specified Lists using the GreenScreen List Translator method.</p> <p>“LT-1” means “Likely GreenScreen Benchmark-1”. If a GreenScreen assessment were performed on the chemical, it would likely result in a Benchmark-1 score.</p> <p>“LT-P1” means “Possible GreenScreen Benchmark-1”. Frequently this means that the chemical appears on a list that does not translate directly to a single Benchmark score and Benchmark-1 is included in the range of possible Benchmark scores.</p> <p>LT-UNK (“unknown”) indicates that a chemical is present on a GreenScreen Specified Lists but that there is insufficient information to classify the hazard as LT-1 or LT-P1. The LT-UNK score or the absence of a chemical on hazard lists does not mean it is safe. It may mean the chemical has not been reviewed by the body publishing the list or that the chemical has not yet been well tested.</p> <p>For complete details on List Translator method see GreenScreen “Guidance and Method Documents” (<a href="http://www.greenscreenchemicals.org/method/method-documents">http://www.greenscreenchemicals.org/method/method-documents</a>).</p>
<b>GreenScreen Software Provider—Pharos</b>	The Pharos Chemical and Material Library (CML) is a fee-based database that provides online access to chemical hazard information for over 30,000 CASRN identified substances and reports GreenScreen hazard classifications and GreenScreen List Translator scores for chemicals by applying the GreenScreen List Translator methodology. Developed and maintained by the Healthy Building Network, the Pharos Chemical and Material Library is available at <a href="http://www.pharosproject.net">http://www.pharosproject.net</a> .
<b>GreenScreen Specified Lists</b>	GreenScreen Specified Lists are chemical lists generated by state, national, or international governments, authoritative bodies, and expert organizations. These lists are recommended for use in identifying and classifying chemical hazards using the GreenScreen Hazard Criteria. GreenScreen List Translator relies on these lists to generate preliminary hazard scores. Details on how these lists translate to hazard endpoints and scores can be found in the GreenScreen “Guidance and Method Documents” ( <a href="http://www.greenscreenchemicals.org/method/method-documents">http://www.greenscreenchemicals.org/method/method-documents</a> ).

TERM	DEFINITION
<b>GreenScreen Specified Lists—Authoritative and Screening Lists</b>	<p>Authoritative lists are generated by recognized experts, often as part of a government regulatory process to identify chemicals and known associated hazards. These lists are considered to be of high reliability and should only be changed when new data or special circumstances clearly indicate that a new level-of-concern is warranted. Intervention of a toxicologist is typically required to validate such a change.</p> <p>Screening Lists result in a classification with a lower level of confidence because at least one of the following is true of the list. It was:</p> <ol style="list-style-type: none"> <li>developed using a less comprehensive review,</li> <li>compiled by an organization that is not considered to be authoritative,</li> <li>developed using predominantly or exclusively estimated data, or</li> <li>developed to identify chemicals for further review and/or testing.</li> </ol>
<b>Hazard Endpoint</b>	A specific type of adverse health outcome or physical property that can cause harm. The GreenScreen method specifies 18 hazard endpoints that must be evaluated. A few examples include: carcinogenicity, acute aquatic toxicity, bioaccumulation, and flammability.
<b>Hazard Summary Table</b>	A table in the GreenScreen Assessment Template used to document and present the hazard classifications for all 18 hazard endpoints. The template can be found in the GreenScreen “Guidance and Method Documents” ( <a href="http://www.greenscreenchemicals.org/method/method-documents">http://www.greenscreenchemicals.org/method/method-documents</a> ).
<b>Homogeneous Material (“Material”)</b>	A uniform solid, liquid, or gas composed of one or more substances that cannot be mechanically disjointed, in principle. It may be a chemical formulation or compound; a substance of unknown or variable composition, complex reaction product, or biological material (UVCB); or a combination of the two. Coatings and finishes such as plating, powder coats, enamels, etc., are considered unique homogeneous materials.
<b>Impurity</b>	Residuals from prior processes or contaminants from raw materials (i.e., residual output or byproduct from a prior process is a contaminant input to the next).
<b>Intended Reaction Product</b>	The product of any chemical reaction that is an intentional part of the production/formulation or material/mixture.
<b>Intentionally Used Substance</b>	Any chemical substance used in the production of the homogeneous material, whether or not it is intended to remain in the manufacturer’s finished product. Examples include: monomers, reagents, catalysts, reactive and nonreactive additives, auxiliaries, processing aids and other process chemicals, or any other chemical substance that is used in making the product, but may be present in reduced amounts (or not at all) in the finished product (i.e., it reacts, gets washed off, etc.).
<b>Licensed GreenScreen Profiler</b>	A company with expertise in toxicology and comparative chemical hazard assessment that is licensed to provide GreenScreen assessments on a fee-for-service basis to any individual or organization who seeks to commission one.
<b>Manufacturer’s Inventory</b>	The report generated and publicly disclosed as a result of completing a Product Inventory. Detailed requirements and a sample template are included in this document.
<b>Manufacturer Statement of Disclosure</b>	A reporting option for the LEED v4 Material Ingredient Option 2 (Optimization) that allows a manufacturer to document that there are no GreenScreen Benchmark–1 or LT-1 ingredients.

TERM	DEFINITION
<b>Mixture</b>	A chemical and its impurities; a formulated mixture of single chemicals; a combination of formulated mixtures, polymeric materials and/or single chemicals (e.g., liquid cleaning product, fragrances, lotions, and printing ink).
<b>Monomer</b>	A molecule, typically small and of low molecular weight that can be bonded to other molecules to form a polymer.
<b>MSDS</b>	Material Safety Data Sheet
<b>Product</b>	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.
<b>Product Inventory</b>	Inventory of the chemical substances within a product.
<b>Proprietary Ingredient</b>	Ingredients in products that are confidential to the manufacturer or producer.
<b>Relevant Transformation Product</b>	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.
<b>SDS</b>	Safety Data Sheet
<b>Third-Party Certifier</b>	A Third-Party organization recognized by Clean Production Action to provide Third-Party certification for manufacturer claims for LEED Project submittal documents. This is for both Option 1 and Option 2 of the LEED v4 Material Ingredient credit. This is an optional step for LEED compliance for Option 1; however, it is encouraged to ensure that claims of the manufacturer are accurate. In Option 2, documentation (i.e., List Translator and/or GreenScreen assessments is required to prove your claim without third-party certification. If you have third-party certification of your Option 2 claim, additional documentation is not required.
<b>UVCB</b>	Substances of Unknown or Variable composition, Complex reaction products, or Biological materials. These substances have additional identification requirements due to their unknown or variable composition. Identifiers such as source, manufacturing process, and genetic code may be required to fully define the substance (European Chemicals Agency or ECHA, see <a href="http://echa-term.echa.europa.eu">http://echa-term.echa.europa.eu</a> ).
<b>Valid GreenScreen Assessment</b>	GreenScreen assessment reports are considered valid for three years, after which time they expire and should be updated to restore validity.

## 6. GREENSCREEN WORKFLOW FOR LEED v4 OPTIONS 1 & 2

The following three figures represent a high level overview of the steps to satisfy LEED v4 requirements using GreenScreen for Safer Chemicals. Additional specificity on process, roles and requirements is provided in the remaining sections of this guidance document.

FIGURE 1. GreenScreen workflow for LEED v4 Option 1—Material Ingredient Disclosure

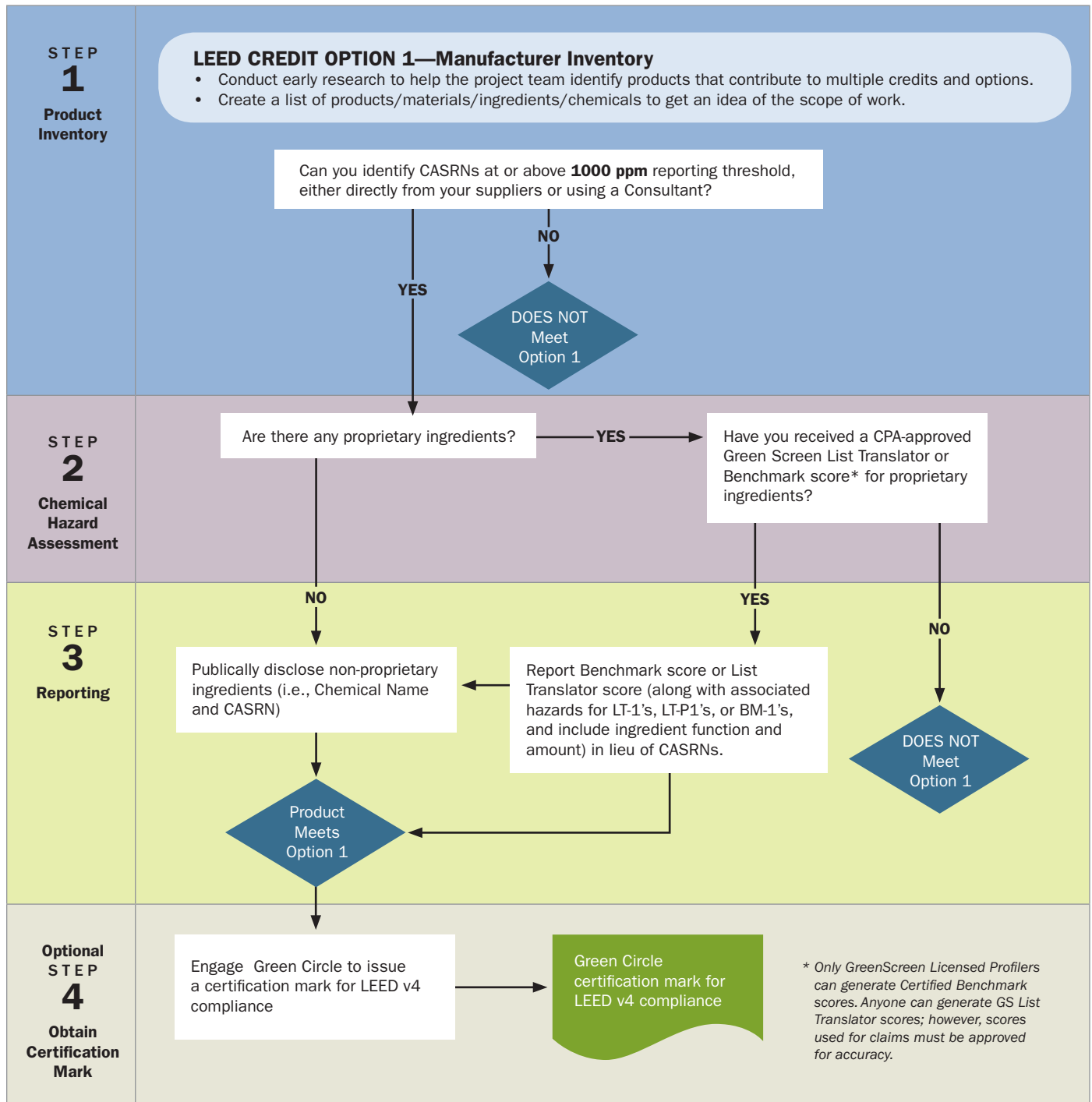


FIGURE 2. **GreenScreen workflow for LEED v4 Option 2—Optimization Using GreenScreen List Translator (Value at 100%)**

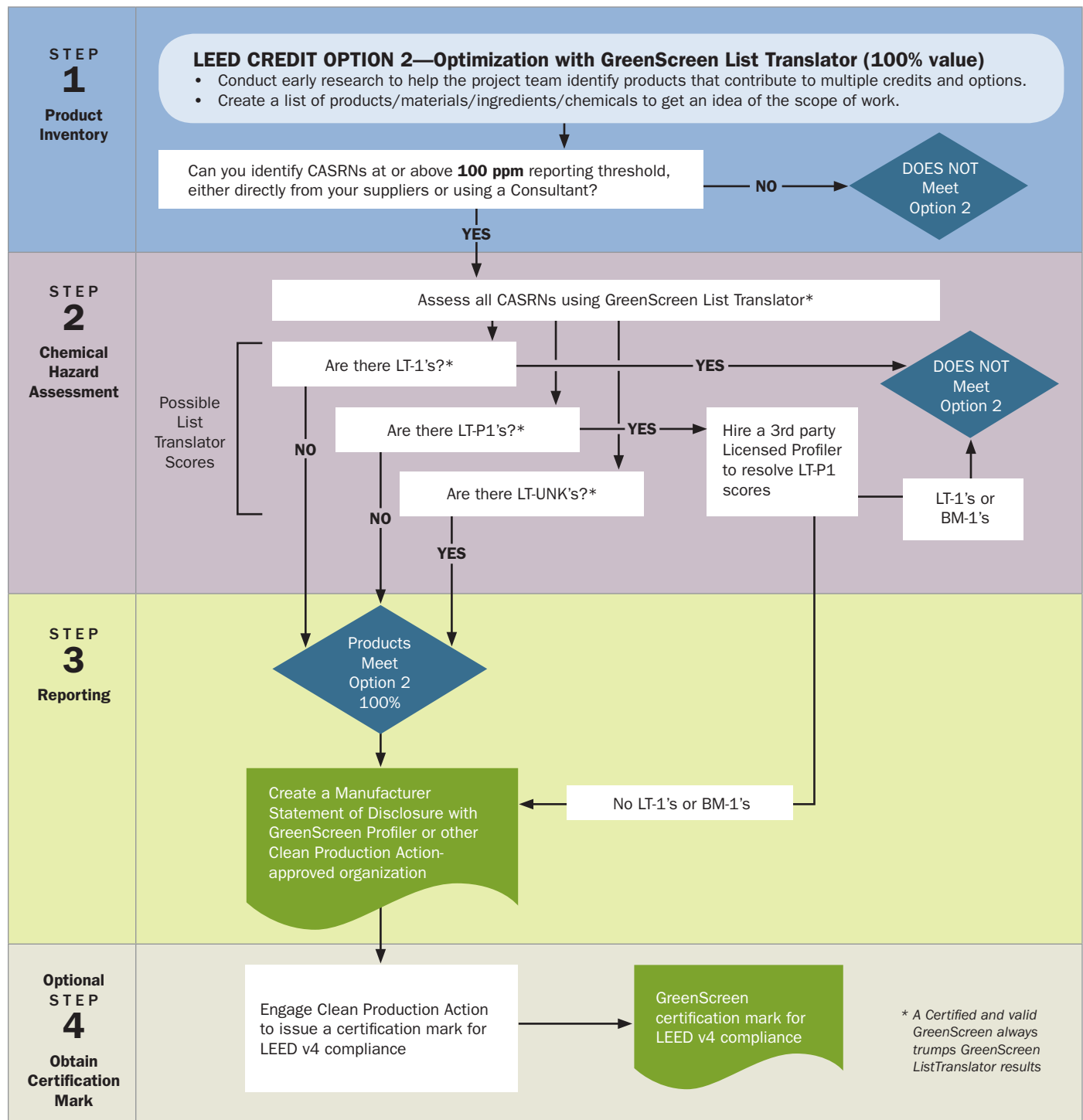
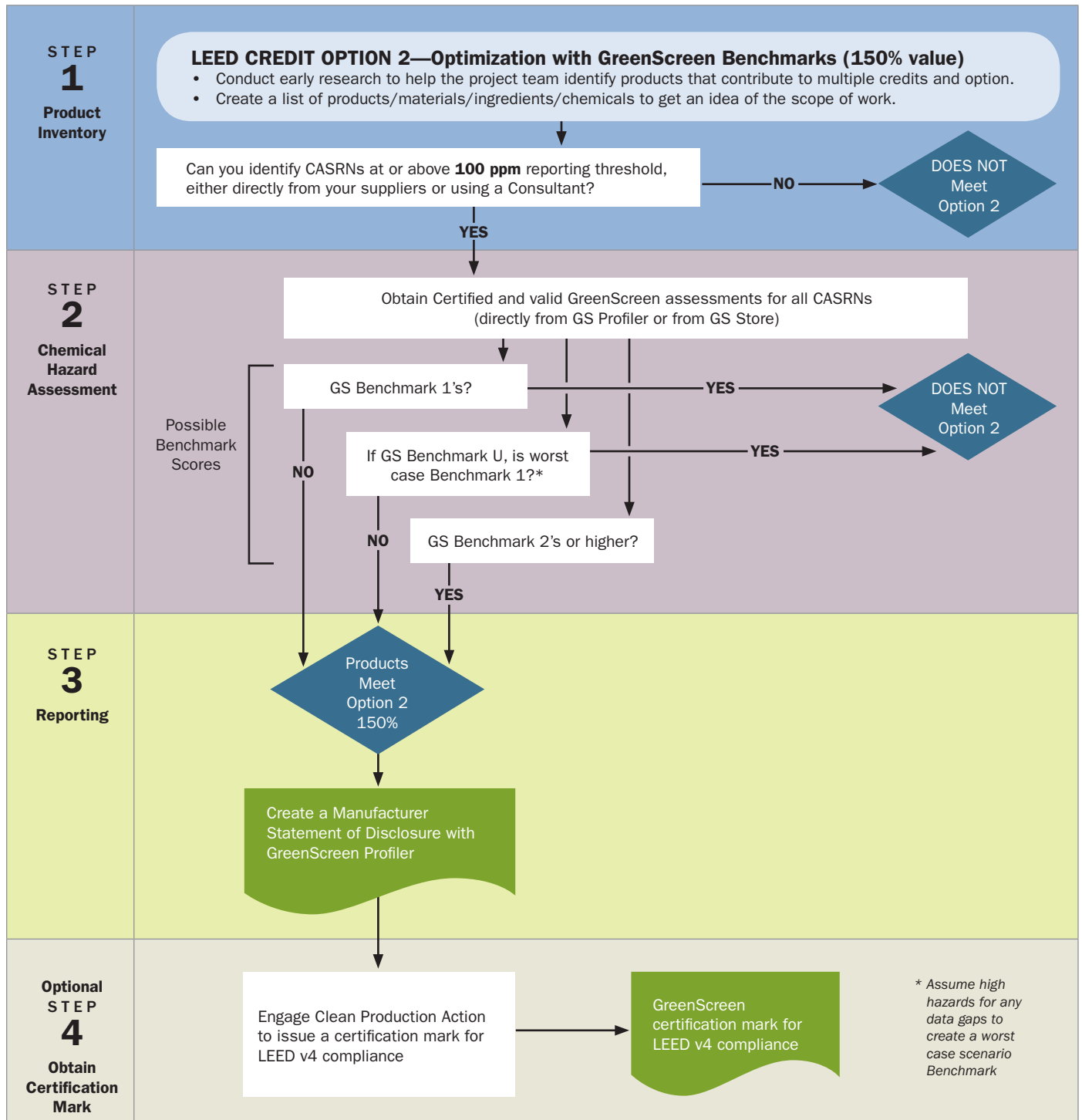


FIGURE 3. **GreenScreen workflow for LEED v4 Option 2—Optimization Using GreenScreen Benchmarks (Value at 150%)**



## 7. OVERVIEW OF LEED REQUIREMENTS

The following table provides an overview of requirements for each credit option with a focus on those options that use GreenScreen Benchmarks or GreenScreen List Translator.<sup>9</sup> For full LEED requirements see Annex I.

TABLE 1. Summary of LEED v4 Material Ingredient Reporting Requirements—GreenScreen Options

Requirements	LEED v4 Option 1 (1 point possible) Material Ingredient Reporting— Manufacturer Inventory	LEED v4 Option 2 (1 point possible)	
		Material Optimization 100% value using GreenScreen List Translator Scores	Material Optimization 150% value using GreenScreen Benchmark Scores
<b>Applies to</b>	20 different permanently installed products (≥ 5 manufacturers)*	25% of permanently installed building products by cost.*	
<b>Product Inventory</b>	Prepare an inventory of all ingredients at or above 1000 ppm (0.1%).	Prepare an inventory of all ingredients at or above 100 ppm (0.01%).	
<b>Hazard Assessment</b>	1. Determine which chemicals to publicly disclose and which to keep as proprietary. 2. Assess all proprietary ingredients using either GreenScreen List Translator or generate GreenScreen Benchmark scores (same point value).	Assess all ingredients at or above 100 ppm using GreenScreen List Translator.	Assess all ingredients at or above 100 ppm using a valid and Certified GreenScreen assessment.**
<b>Reporting</b>	<p><b>For Non-proprietary ingredients:</b> Report chemical names and CAS Registration Numbers (CASRN).</p> <p><b>For proprietary ingredients assessed using GreenScreen List Translator:</b> Report proprietary ingredient role, amount, GreenScreen List Translator score (LT-1, LT-P1, or LT-UNK) and hazards associated with LT-1 and LT-P1 scores only. It is not necessary to report hazards associated with LT-UNK.</p> <p><b>For proprietary ingredients with Benchmark scores:</b> Report proprietary ingredient role, amount, GreenScreen Benchmark score, and hazards associated with Benchmark-1 scores only. It is not necessary to report hazards associated with GreenScreen Benchmarks 2, 3, 4 or U.</p> <p><b>Manufacturer's Inventory must be publicly available.</b></p>	<p><b>No LT-1 scores allowed</b> <b>LT-P1</b> scores must be resolved by a Licensed GreenScreen Profiler to determine if they are GreenScreen Benchmark-1 or LT-UNK.</p> <p>An alternative to assessing all hazard endpoints for an LT-P1 chemical is to assess only the endpoint(s) driving the LT-P1 classification to determine if the chemical is Benchmark-1. If the chemical is not Benchmark-1, then it is LT-UNK.</p>	<p><b>No Benchmark-1 scores allowed</b> Only valid and Certified GreenScreen assessments are allowed for this credit option.</p>
<b>Certification</b>	Green Circle Certified verification for LEED v4 compliance is optional for Material Ingredient Option 1.	GreenScreen verification for LEED v4 compliance is optional for Material Ingredient Option 2. Documentation is required to prove your claim without third-party certification. If you have third-party certification of your Option 2 claim, additional documentation is not required. Documentation includes List Translator results for Option 2 (100%) and Certified GreenScreen assessments for Option 2 (150%).	

\* See the LEED Reference Guide for instruction on how to calculate and track this.

\*\* Valid and Certified GreenScreen assessments are those that have not exceeded their three-year expiration date ("valid") and that have been performed by Licensed GreenScreen Profilers ("certified").



## 8. STEP 1: PRODUCT INVENTORY

An inventory of chemical substances in products is necessary for completing both Option 1 and Option 2 Material Ingredient credits in LEED v4. This section provides instructions for accurately documenting the product inventory for both Options 1 and 2.

**Limitations and Exemptions:** Some chemicals do not have a CASRN because they are substances of unknown or variable composition, complex reaction products, or biological materials (UVCBs). Inputs that do not have a CASRN may be modified or exempt from this type of analysis. Examples include wood products, some metal alloys (e.g., steel), some dyes and pigments, and some recycled content.

**Manufacturers can contribute to earning points for one or both options in the following ways:**

### OPTION 1: Manufacturer Inventory

Public disclosure of the product inventory at or above 1000 ppm in Option 1 will qualify for the point regardless of hazards.

### OPTION 2: Material Optimization

Manufacturers can contribute to Option 2 (no GreenScreen LT-1 or Benchmark–1 scores) without public disclosure of the product inventory. However, the inventory must be optimized to 100 ppm (i.e., the product inventory must include no chemicals at or above 100 ppm with LT-1 or Benchmark–1 scores).

#### 8.1. Product Inventory Procedure

A self-inventory can be completed by a manufacturer. To assist, Consultants and Licensed GreenScreen Profilers can conduct research or assist a manufacturer with completing the inventory process with tasks such as obtaining proprietary information from the supply chain. Completing the following steps will ensure products meet Options 1 or 2:

1. Create a Product Inventory using a product's Bill of Materials, including each input's percent by weight in each homogeneous material in the final product that falls within the reporting threshold.
2. Obtain MSDS or SDS sheets for all chemical substances identified by CASRNs within all product inputs. If users are intending to obtain a Third-Party certification mark for Option 1, MSDS or SDS are part of what is required and it is best to collect these at this stage (see Section 11 below on Third-Party Certification for LEED v4 Compliance).
3. Calculate the concentration of each chemical substance within each homogeneous material to determine if thresholds are met for either credit option (i.e., 1000 ppm for Option 1 or 100 ppm for Option 2).

9. Note Table 2 does not apply to other means for satisfying LEED v4 Material Ingredient Credit Requirements such as Health Product Declaration, Cradle to Cradle Certified, the European Union's Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH), or other options.

## 9. STEP 2: CHEMICAL HAZARD ASSESSMENT

GreenScreen List Translator scores or GreenScreen Benchmark scores can be used to help products meet LEED v4 requirements for either option. The information included in this step is for cases where the manufacturer:

1. Is using a GreenScreen Benchmark or List Translator score as an alternative to reporting trade secret CASRNs for Option 1; and/or
2. Will be looking to claim no GreenScreen Benchmark–1 or LT-1 chemical substances within their product(s) to help contribute to earning the LEED v4 Option 2 Material Optimization credit.

A thorough understanding of the hazards of product contents is essential. Below is a step-by-step procedure for the completion of each LEED Option.

### 9.1 Procedure for LEED v4 Option 1—Manufacturer Inventory

For Option 1, a combination of GreenScreen List Translator and GreenScreen Benchmark scores can be used in lieu of reporting proprietary CASRNs. There is no difference in point value between the two types of scores for Option 1.

1. Using the Product Inventory, decide which chemical substances are non-proprietary and which will be considered proprietary. Determine which chemical substances are at or above the 1000 ppm threshold to be assessed.
  - a. **Non-proprietary Ingredients:** Disclose the name of ingredients and the CASRNs.
  - b. **Proprietary Ingredients:** Run each chemical substance CASRN through GreenScreen List Translator<sup>10</sup> to generate List Translator scores or obtain a GreenScreen Benchmark score for the substances. Some GreenScreen Benchmark scores are publicly available.<sup>11</sup> For substances with no publicly available Benchmark scores, manufacturers can either turn to a GreenScreen Practitioner (in-house) or Licensed Profiler to receive a Benchmark score for a substance.
2. Using the Product Inventory and Chemical Hazard Assessment, create the Manufacturer's Inventory documentation by listing all non-proprietary ingredients by substance name and CASRN. Report proprietary ingredients by role, amount (percent by weight/volume), GreenScreen List Translator score (LT-1, LT-P1 or LT-UNK) or GreenScreen Benchmark score and hazard associated with the LT-1, LT-P1, or Benchmark–1 score. It is not necessary to report hazards associated with LT-UNK or GreenScreen Benchmark scores greater than 1. For examples of acceptable LEED documentation see section "Step 3: Reporting."

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10. A manual version is available on the GreenScreen website: <http://greenscreenchemicals.org/method/method-documents>. The automated version is available from Pharos (<http://www.pharosproject.net/material>). Pharos also lists published GreenScreen assessments.

11. See GreenScreen Store (<http://www.greenscreenchemicals.org/gs-assessments>) or the Interstate Chemicals Clearinghouse database (<http://theic2.org/hazard-assessment>).

**9.2 Procedure for LEED v4 Option 2—Optimization (100% value) using GreenScreen List Translator Scores**

1. Using the Product Inventory, assess each chemical substance at or above the 100 ppm threshold. Run each CASRN through GreenScreen List Translator to obtain the List Translator score.
2. Determine if any ingredients have a GreenScreen LT-1 or LT-P1 score:
  - a. If a chemical substance has an LT-1 score, the product cannot contribute to earning points within this credit option. A GreenScreen assessment may be commissioned to determine if a more comprehensive assessment would generate a higher score.
  - b. If a substance has an LT-P1 score, consult a Licensed GreenScreen Profiler to resolve the score to either a Benchmark-U or Benchmark-2 or higher. As an alternative to assessing all hazard endpoints, LT-P1 chemicals may have only the endpoint(s) driving the LT-P1 classification reviewed in depth to determine if the chemical is Benchmark-1. If it is not Benchmark-1 based on an evaluation of the endpoints driving the LT-P1 score, then it is LT-UNK. If it is determined to be a Benchmark-1 based on this evaluation, the product cannot contribute to earning points within this credit option.
  - c. Using a combination of GreenScreen Benchmark and GreenScreen List Translator scores will apply only to the 100% valuation.
3. If the substance(s) do not generate LT-1 or LT-P1 scores, see section “Step 3: Reporting,” for examples of acceptable submittal documentation. LT-UNK scores are acceptable for this credit option.

**9.3 Procedure for LEED v4 Option 2 – Optimization (150% value) using GreenScreen Benchmark Scores**

1. Using the Product Inventory, obtain valid and Certified GreenScreen assessment reports for all chemical substances (ingredients) at or above 100 ppm of the product and identify the GreenScreen Benchmark scores. Consult public repositories such as the GreenScreen Store, the Interstate Chemicals Clearinghouse (IC2) hazard database, and Pharos to determine if a GreenScreen has been published. If a GreenScreen has not been previously completed for one or many of the substances, consult a GreenScreen Profiler<sup>12</sup> to commission a Certified GreenScreen assessment with associated Benchmark scores for these ingredients.
  - a. If one or more of the substances generates a Benchmark-1 score, the product *cannot* contribute to earning points within this credit option.
  - b. If *all* ingredients in the product inventory at or above 100 ppm generate a GreenScreen Benchmark-2, -3, or -4, the product *can* contribute to earning points within this credit.
  - c. If an ingredient generates a Benchmark-U, then the Licensed Profiler will apply a worst-case analysis to determine if filling the data gaps would result in a Benchmark-1 score. If not, then the ingredient may be considered to be not Benchmark-1. If a worst-case analysis does result in a Benchmark-1 score then the product would not contribute to this credit option. The product may qualify using the Option 2 Optimization procedure using GreenScreen List Translator.
2. Develop a Manufacturer Statement of Disclosure of “No Benchmark-1 Chemicals.” See section “Step 3: Reporting” for examples of a finalized Statement of Disclosure.

12. <http://greenscreenchemicals.org/professionals/profilers>

## 10. STEP 3: REPORTING

There are various ways to report results for Option 1 and/or Option 2 to fulfill LEED documentation submittal requirements. The following provides directions for this step:

### 10.1 LEED v4 Option 1—Manufacturer Inventory

For this option, LEED v4 requires all documentation be made publicly available for download without having to be requested. Examples of where to host or find manufacturer LEED submittal documentation include: manufacturer's website, online databases (e.g., GreenWizard, Material IQ, Pharos Building Product Library, and the Health Product Declaration), or a Third-Party Certifier's online database.

#### Self-Reporting or Consultant Report for Manufacturer Inventory

Reporting for Option 1 can be achieved using a custom format. However, a reporting document will need to include the following and be publicly available (see Figure 4, p. 15):

- An overall reporting threshold (i.e., chemical substances listed with their concentrations at or above 1000 ppm).
- For Non-Proprietary Ingredients:
  - chemical name, and
  - CASRN.
- For Proprietary Ingredients all Benchmark claims beyond List Translator must be approved by Clean Production Action:
  - if Benchmark-1, LT-1 or LT-P1, list hazard(s) associated with these scores,
  - chemical function or role, and
  - amount in total product (percent by weight/volume).

### 10.2 LEED v4 Option 2—Optimization (100% value) using GreenScreen List Translator Scores


Reporting for this credit option can be achieved using a custom format. However, with any reporting template used, the manufacturer must warrant that no ingredients in the product at or above 100 ppm are designated as GreenScreen LT-1 or Benchmark-1 chemicals. There are two ways to submit LEED documentation for Option 2 (100% value):

1. use a Health Product Declaration (HPD), or
2. create a Manufacturer Statement of Disclosure that has been verified by a third-party to be LEED v4 compliant (see section "Step 4: Third-Party Certification for LEED v4 Compliance" for details). A Statement of Disclosure document must be signed by a credible person within the Manufacturer's organization in order to be valid.

#### Example 1—Health Product Declaration:

Use the HPD Online Builder Tool to generate an HPD to display that there are no LT-1 chemicals within the product. Disclosure must be to the 100 ppm threshold for HPD.


FIGURE 4. Sample Manufacturer's Inventory Reporting Document for Option 1 (See template in Annex II)


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**LEED v4 Material Ingredient Credit, Option 1: Manufacturer Inventory**  
**Product Name:** Fancy Fence™  
**Reporting Threshold:** 1000 ppm  
**Expiration Date:** 9/01/2018

Homogeneous Material or Chemical Substance	CAS #	Percent of Final Product	Chemical Substances	Percent of Chemical Substances	Function of Chemical Substance	List Translator or Benchmark Score	Hazard
PET	25038-59-9						
Titanium Dioxide	1344-28-1						
Calcium Carbonate	1317-65-3						
Antioxidant	Proprietary MIXTURE	0.68%	Proprietary Substance	95%	Inhibits Oxidation	LT-1	High-Carcinogen
Impact Modifier	Proprietary MIXTURE	0.89%	Proprietary Substance	85%	Improves Impact Resistance	LT-UNK	

Sincerely,  
  
 John Smith, VP of Operations  
 XYZ Company, Inc.

**Example 2—manufacturer statement of disclosure with third-party certification:**

A signed statement (“Statement of Disclosure”) declaring that a product does not contain any GreenScreen LT-1 chemicals at or above 100 ppm (see Figure 5, p. 16). The manufacturer must obtain certification of the Manufacturer Statement of Disclosure from a third party if supporting documentation for the List Translator and/or Benchmark scores is not included. See Step 4 below for further clarification on the certification process.

**10.3 LEED v4 Option 2—Optimization (150% value) using GreenScreen Benchmark Scores**

Reporting for this credit option can be achieved using a custom format (see Figure 6). However, with any reporting template used, the manufacturer must warrant that no ingredient in the product at or above 100 ppm is a GreenScreen Benchmark-1 chemical. A GreenScreen assessment must be completed for each chemical within the product. GreenScreen verification for LEED v4 compliance is optional for Material Ingredient Option 2 (150%) when supporting documentation is provided to substantiate the Manufacturer Statement of Disclosure. Supporting documentation includes Certified GreenScreen assessments. The HPD Builder also reflects Certified GreenScreen assessments that have been published in the Pharos “Chemical and Material Library,” and can also be used for the 150% LEED point.

FIGURE 5. **Signed and Certified Statement of Disclosure for Option 2 (100% value)**



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**LEED v4 Material Ingredient Credit, Optimization: Statement of Disclosure**  
**Option 2 List Translator (100% value)**  
**Product Name:** Fancy Fence™  
**Reporting Threshold:** 100 ppm  
**Expiration Date:** 9/01/2018

To Whom It May Concern,

In XYZ Company's commitment to holistic sustainability, we take pride in not only focusing on reducing the life cycle environmental impacts of our products but also in reducing our products' impact on human health. This document is to be used as a Statement of Disclosure verifying that there are no GreenScreen LT-1 chemicals (to the 100 ppm level) within the Fancy Fence™ product. J&G Company continues to excel in the realm of sustainability, and takes pride in the fact that Fancy Fence™ does not have any GreenScreen LT-1 chemicals.

For questions or concerns, please contact me at [John.Smith@xyzcompanyinc.com](mailto:John.Smith@xyzcompanyinc.com).

These claims have been verified by \_\_\_\_\_. Please refer to certificate number 00-0000 for further reference. Please contact \_\_\_\_\_ at \_\_\_\_\_ for questions in regard to verification.

Sincerely,  
  
 John Smith, VP of Operations  
 XYZ Company, Inc.



**LEED v4 Compliant  
MR Credit  
Materials Ingredients  
Option 2 Optimization  
GreenScreen® List Translator—  
100% by Cost**

FIGURE 6. **Signed and Certified Statement of Disclosure for Option 2 (150% value)**

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**LEED v4 Material Ingredient Credit, Optimization: Statement of Disclosure**

**Option 2 with Certified GreenScreen assessments (150% value)**

**Product Name:** Fancy Fence™

**Reporting Threshold:** 100 ppm

**Expiration Date:** 9/01/2018

To Whom It May Concern,

In XYZ Company's commitment to holistic sustainability, we take pride in not only focusing on reducing the life cycle environmental impacts of our products but also in reducing our products' impact on human health. This document is to be used as a Statement of Disclosure verifying that there are no GreenScreen BM-1 chemicals (to the 100 ppm level) within the Fancy Fence™ product. J&G Company continues to excel in the realm of sustainability, and takes pride in the fact that Fancy Fence™ does not have any GreenScreen BM-1 chemicals.

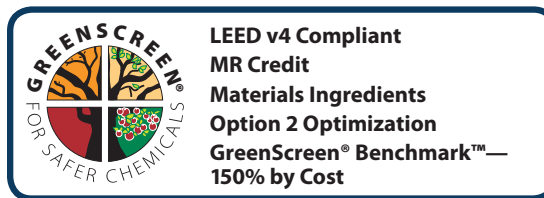
For questions or concerns, please contact me at John.Smith@XYZcompanyinc.com.

These claims have been verified by \_\_\_\_\_. Please refer to certificate number 00-0000 for further reference. Please contact \_\_\_\_\_ at \_\_\_\_\_ for questions in regard to verification.

Sincerely,

*John Smith*

John Smith, VP of Operations  
XYZ Company, Inc.



**Example 1—manufacturer statement of disclosure with supporting documentation:**

A manufacturer's document warranting that a product does not contain any GreenScreen Benchmark-1 chemicals at or above 100 ppm in a "Statement of Disclosure." The manufacturer must provide supporting valid and Certified GreenScreen assessments displaying the GreenScreen Benchmark for each chemical substance within the product. If a GreenScreen assessment is purchased through the GreenScreen store or Interstate Chemicals Clearinghouse database, the report must be Certified and valid and meet GreenScreen store terms of use.

**Example 2—manufacturer statement of disclosure through a third-party:**

A manufacturer's document warranting that a product does not contain any GreenScreen Benchmark-1 chemicals at or above 100 ppm in a "Statement of Disclosure." Where no supporting documentation is provided, the manufacturer must obtain certification of their "Statement of Disclosure" through Clean Production Action to be considered a valid form of documentation (see section "Step 4: Third-Party Certification for LEED v4 Compliance" for details). If a GreenScreen assessment is obtained through the GreenScreen store or Interstate Chemicals Clearinghouse database, the report must be Certified and valid and meet GreenScreen store terms of use.

## 11. STEP 4: THIRD-PARTY CERTIFICATION FOR LEED v4 COMPLIANCE

Verification is available for manufacturer's claims and documentation to meet all requirements for compliance with LEED v4 Material Ingredient Credit Options 1 and 2. The certification mark gives project teams confidence that the Manufacturer Inventory and/or Manufacturer Statement of Disclosure was verified by a third party. Manufacturers get assurance that their inventories are complete and accurate. This section briefly explains the steps for obtaining a certification mark for Options 1 and 2.

### 11.1 LEED v4 Option 1: Material Ingredient Reporting (Optional)

1. Contact third-party certifier, such as Green Circle Certified, LLC (Green Circle), to enter into a third-party certification agreement and to obtain a scope of work and estimate. In order for Green Circle to validate these claims, the following documentation is required:
  - Completed Product Inventory,
  - Purchase Orders for all ingredients under review within the product,
  - A Technical Sheet or MSDS/SDS for the product (as applicable),
  - All MSDS or SDS for all ingredients under review within the product,
  - A copy of the Manufacturer's Inventory,<sup>13</sup> and
  - Copies of valid, Certified GreenScreen assessment reports (where applicable).

---

13. The report generated and publicly disclosed as a result of completing a Product Inventory. It must include GreenScreen List Translator or GreenScreen assessment results for proprietary ingredients.



2. Certifier will complete the following in order to provide validation of claims:
  - Initial Data Collection Phase (includes call(s) with supply chain contacts),
  - Desktop Analysis to verify manufacturer's claims,
  - Conclusion call to report results of verification, and
  - Final audit process report submitted to the manufacturer.
3. Upon completing verification, a Green Circle certification mark for LEED v4 compliance will be distributed (see Figure 7, p. 20).
  - These marks can be used on the Manufacturer's Inventory documentation for submittal in LEED v4 projects.
  - Online Product Database: Manufacturer's documentation can be uploaded and stored on Green Circle's online product database for download and reference.
  - If Green Circle deems a claim to be in non-conformance, a written explanation will be provided to the manufacturer stating specifically what is non-conformant. The manufacturer will have a certain period of time (determined by the degree of non-conformance) to resolve this issue or certification will not be issued.

#### **11.2 LEED v4 Option 2: Optimization (optional)**

In Option 2, documentation (i.e., List Translator results and/or publicly available Certified GreenScreen assessments) is required to prove your claim without third-party certification. If you have third-party certification of your Option 2 claim, additional documentation is not required.

1. Contact Clean Production Action to enter into a certification license agreement. In order for Clean Production Action to verify claims, the following documentation is required:
  - Letter from GreenScreen Licensed Profiler, or other Clean Production Action-approved organizations that contains information sufficient to verify that the product was assessed per the requirements specified in Steps 1, 2, and 3 in this guidance document for Option 2—Optimization.
  - Manufacturer Statement of Disclosure (see Figures 5 and 6, pp. 16 and 17).
2. Upon completing verification of documentation, a GreenScreen certification mark for LEED v4 compliance will be distributed (see Figures 8 and 9, p. 20).
  - These marks can be used on the Manufacturer Statement of Disclosure documentation for submittal in LEED v4 projects.
  - If Clean Production Action deems a claim to be in non-conformance, a written explanation will be provided to the manufacturer stating specifically what is non-conformant. The manufacturer will have a certain period of time (determined by the degree of non-conformance) to resolve this issue or certification will not be issued.

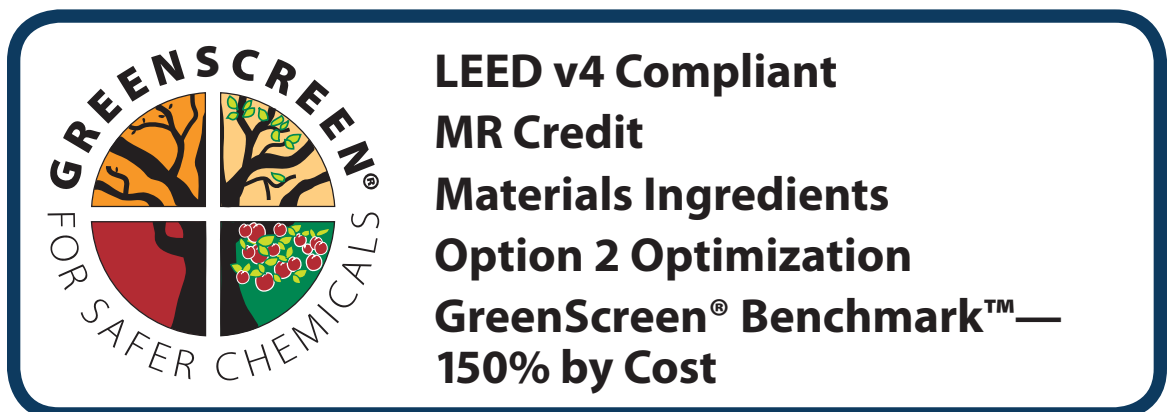
FIGURE 7. **LEED-Compliant Option 1**



FIGURE 8. **LEED-Compliant Option 2—GreenScreen List Translator (100%)**



FIGURE 9. **LEED-Compliant Option 2—GreenScreen Benchmark (150%)**



## 12. QUALITY CONTROL

Claims made for LEED v4 points for Option 1 or Option 2 must be substantiated by up-to-date information on the product and data on each chemical. GreenScreen Benchmark scores used to earn these points must be valid (unexpired) and Certified. If the product manufacturer, Consultant, Licensed GreenScreen Profiler, or Third-Party Certifier preparing or auditing any part of the reporting documentation becomes newly aware of any significant changes regarding the chemical make-up of a product (e.g., a change in supplier or a change in the formula), or the hazards of a chemical (i.e., List Translator or Benchmark scoring changes), this new information shall be added and resubmitted for approval regardless of expiration date.

The Manufacturer Inventory and Manufacturer Statement of Disclosure will expire after three years. Renewing these documents includes an update to GreenScreen List Translator scores, renewing expired GreenScreen assessments, and verifying that formulations and suppliers have not changed.

Certification marks are valid for a period of one year. Annual renewal will ensure that any claims being made based on List Translator or the GreenScreen method are still valid, suppliers used are still the same, and to verify any changes in the product composition or GreenScreen List Translator or Benchmark scores.

## 13. ANNEX I—FULL REQUIREMENTS FOR LEED v4

LEED BD+C: Core and Shell | v4—LEED v4

Building product disclosure and optimization - material ingredients

### Intent

To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.

### Requirements

#### Option 1. material ingredient reporting (1 point)

Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).

- Manufacturer Inventory. The manufacturer has published complete content inventory for the product following these guidelines:
  - A publicly available inventory of all ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)
  - Materials defined as trade secret or intellectual property may withhold the name and/or CASRN but must disclose role, amount and GreenScreen Benchmark, as defined in GreenScreen v1.2.
- Health Product Declaration. The end use product has a published, complete Health Product Declaration with complete disclosure of known hazards in compliance with the Health Product Declaration open Standard.
- Cradle to Cradle. The end use product has been certified at the Cradle to Cradle v2 Basic level or Cradle to Cradle v3 Bronze level.
- USGBC approved program. Other USGBC approved programs meeting the material ingredient reporting criteria.

AND/OR

#### Option 2. Material ingredient optimization (1 point)

Use products that document their material ingredient optimization using the paths below for at least 25%, by cost, of the total value of permanently installed products in the project.

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14. For the optimization credit, you can also use GreenScreen assessments to meet the Cradle to Cradle® Certification pathways (v2 gold and platinum; v3 silver, gold or platinum). Through a Memorandum of Understanding between Clean Production Action and the Cradle to Cradle Product Innovation Institute, GreenScreen assessments on individual chemicals will be accepted toward the material health section of the C2C standard. This ensures that your work will be valued and you will not need to pay twice.

- GreenScreen v1.2 Benchmark. Products that have fully inventoried chemical ingredients to 100 ppm that have no Benchmark–1 hazards:
  - If any ingredients are assessed with the GreenScreen List Translator, value these products at 100% of cost.
  - If all ingredients have undergone a GreenScreen Assessment, value these products at 150% of cost.<sup>14</sup>
- Cradle to Cradle Certified. End use products are certified Cradle to Cradle. Products will be valued as follows:
  - Cradle to Cradle v2 Gold: 100% of cost
  - Cradle to Cradle v2 Platinum: 150% of cost
  - Cradle to Cradle v3 Silver: 100% of cost
  - Cradle to Cradle v3 Gold or Platinum: 150% of cost
- International Alternative Compliance Path—REACH Optimization. End use products and materials that do not contain substances that meet REACH criteria for substances of very high concern. If the product contains no ingredients listed on the REACH Authorization or Candidate list, value at 100% of cost.
- USGBC approved program. Products that comply with USGBC approved building product optimization criteria.

## 14. ANNEX II—MANUFACTURER INVENTORY TEMPLATE

Homogeneous Material or Chemical Substance	CAS #	Percent of Final Product	Chemical Substances	Percent of Chemical Substances	Function of Chemical Substance	List Translator or Benchmark score	Hazard
Non-proprietary							
Non-proprietary							
Non-proprietary							
Proprietary	Not reported						
Proprietary	Not reported						

\* Exact format of template is dependent on product complexity, and must include an expiration date.



# How to Use GreenScreen® for LEED v4

The intent of this publication is to provide users with clear step-by-step instructions on how to apply the GreenScreen® for Safer Chemicals method and earn credit for one or both LEED v4 options. By following the steps in this guidance, users can gain insight on how to use GreenScreen List Translator scores and GreenScreen Benchmark™ scores to meet LEED v4 Option 1: Material Ingredient Reporting (1 point), and Option 2: Optimization (1 point). This Guidance also includes an optional certification for products. The certification marks will help building industry professionals easily recognize products that can be used to earn these credits.



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