

MATERIAL INGREDIENT GUIDE 2024

RESOURCES FOR MANAGING MATERIAL INGREDIENT
TRANSPARENCY IN THE TILE INDUSTRY

An Initiative of



Prepared by



INTRODUCTION TO THE GUIDE

The Tile Council of North America (TCNA) Material Ingredient Guide (MIG) is the result of a North American tile industry collaboration, led by WAP Sustainability through the support of TCNA and its members. It is a resource for ceramic tile, mortar, and grout manufacturers to use when providing the content and chemical makeup of their products or "material ingredient transparency" using reporting formats such as the Health Product Declaration (HPD) or Manufacturer Inventory (MI). Pertaining to this guide, material ingredient transparency is a fundamental step manufacturers take toward compliance with green and healthy building certification programs and developing brand trust with customers. Additionally, the MIG provides information about the material ingredients used industry-wide by North American manufacturers, references in-depth health assessments of the materials and provides insights into the industry's role in satisfying healthy building criteria. TCNA members who have participated in this effort have a unique opportunity to use the guide's referenced GreenScreen Assessments® in their material ingredient reports, pursuant toward contribution to green and healthy building "optimization" credits.

WAP Sustainability worked with dozens of organizations while creating this guide to bring clarity and structure to the complicated subject of material ingredient transparency. Resulting from TCNA's and its members' investment in disclosing industry-wide material ingredient information, suppliers and users of ceramic tile, mortar, and grout will have a more thorough and uniform understanding when specifying products in accordance with green and healthy building standards. Further, resulting from this effort, the North American ceramic tile industry is positioned as one of the most transparent of all building product industries, based on WAP Sustainability's extensive experience in this field. This transparency initiative amplifies the ceramic tile industry's already unified message of health and environmental sustainability, which was previously established through other various initiatives, including industry-wide Environmental Product Declarations (EPDs), Green Squared® certification, and its "Why Tile" campaign (visit www.WhyTile.com to learn more about health and sustainability aspects of ceramic tile).

About WAP Sustainability:

WAP Sustainability provides clients with the information and tools they need to create credible, measurable and attainable sustainability programs. Services are driven by sound scientific data and an in-depth understanding of each client's core business. Based in Chattanooga, Tennessee, WAP Sustainability has been helping a global roster of publicly traded, consumer product and building product companies as a sustainability resource for nearly 15 years. Learn more at www.wapsustainability.com.

About TCNA:

TCNA is a trade association representing manufacturers of ceramic tile, tile installation materials, tile equipment, raw materials, and other tile-related products. Established in 1945 as the Tile Council of America (TCA), it became the TCNA in 2003, reflecting the expansion of its membership to all of North America. The TCNA is recognized as a leader in the advancement of both North American and international industry quality and sustainability standards, benefiting all tile consumers. Moreover, TCNA regularly conducts independent research, and publishes guidelines, standards, and sustainability literature to help support the industry.

ACKNOWLEDGEMENTS

U.S. Green Building Council (USGBC) Materials & Resource Technical Advisory Group
Clean Production Action
Healthy Building Network
International Living Future Institute (ILFI)
Health Product Declaration Collaborative (HPDC)

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PURPOSE OF THE GUIDE

The purpose of this guide is to provide manufacturers with an easy-to-use resource for managing North American ceramic tile industry material ingredient transparency requests. Manufacturing users of the guide are better positioned to provide product information in order to resolve critical material ingredient transparency questions when collaborating with designers and specifiers. In developing this guide, 17 manufacturers collaborated on the largest crowdfunded collection of GreenScreen Assessments® to date, according to Clean Production Action, for the following two purposes: 1) Obtain GreenScreen® Benchmark Scores (listed within this guide) for the vast majority of material ingredients used by ceramic tile, mortar, and grout manufacturers, 2) Facilitate referencing these benchmark scores and associated GreenScreen Assessments® when developing Manufacturer Inventories (MI) and/or Health Product Declarations (HPD) that qualify for contribution to green and healthy building "optimization" credits.

This guide explains four stages of material ingredient transparency: Inventory, Screen and Assess, Disclosure, and Optimization. Each section introduces readers to the underlying intent and purpose of that section of material ingredient transparency, explaining the tools and trends relevant to ceramic tile, mortar, and grout, and exploring impacts and results of common tile industry ingredients, where applicable. The guide also aims to establish why material ingredient transparency is an important topic for ceramic tile, mortar, and grout manufacturers and their customers.

To make material ingredient transparency reporting easier for the ceramic tile industry, this guide includes descriptions of recommended reporting formats, detailing how they can facilitate manufacturer actions plans toward continuous improvement and product recognition in green and healthy building rating programs. Additionally, included are a number of reporting templates for tile and tile installation products. This guide focuses predominately on the following recommended material ingredient reporting formats:

- Health Product Declaration
- Manufacturer Inventory

This guide also highlights the following milestones that can be achieved through disclosure of product material ingredients:

- General market transparency
- Credits in LEED, WELL, Living Building Challenge (LBC), and other green and healthy building rating programs.

**TCNA AND ITS MEMBERS AIM TO
FACILITATE THOROUGHNESS,
CONSISTENCY, AND
TRANSPARENCY REGARDING
MATERIAL INGREDIENT
INFORMATION BEING REPORTED
BY MANUFACTURERS**

TCNA'S PERSPECTIVE ON INDUSTRY-WIDE MATERIAL INGREDIENT TRANSPARENCY

TCNA and its members share a common perspective on material ingredient transparency. This perspective is fundamental to the information reported within this guide.

1 Material ingredient disclosures are in high demand. This guide provides the guidance necessary to fulfill this demand so that the industry may be a leader in the field of transparency.

2 Marketplace confusion can arise from the existing variety of material ingredient disclosure options. The North American ceramic tile industry seeks to establish a credible and common approach to material ingredient reporting.

3 Manufacturers of ceramic tile, mortar, and grout use many of the same ingredients. TCNA and its members had a unique opportunity to develop the largest crowdfunded collection of GreenScreen® Assessments for a single industry; these can be referenced by participating manufacturers in their material ingredient reports, making their products eligible for contribution to green and healthy building "optimization" credits.

TRANSPARENCY IN GREEN BUILDING CERTIFICATIONS

Material ingredient transparency has emerged as an increasingly important trend in large institutions, such as Google, Walmart, Salesforce, Microsoft, Home Depot, and Kaiser Permanente, as well as in numerous states and municipalities that are creating governance mechanisms for chemical ingredient management. Additionally, major building projects throughout the country have increased their requirements for ingredient disclosure for building products driven by LEED, WELL and Living Building Challenge requirements. To date, WAP Sustainability estimates 25,000 chemical transparency documents have been created by various building product brands and manufacturers worldwide.

The growth of material ingredient transparency in the building product industry is largely attributed to its inclusion in major green building certification programs such as LEED, WELL, and Living Building Challenge. All these programs have criteria requiring building product manufacturers to provide material ingredient reports so that building projects may achieve credits for certification. Sustainability and healthy building have evolved to now fundamentally include expectations of transparency through material ingredient reporting.

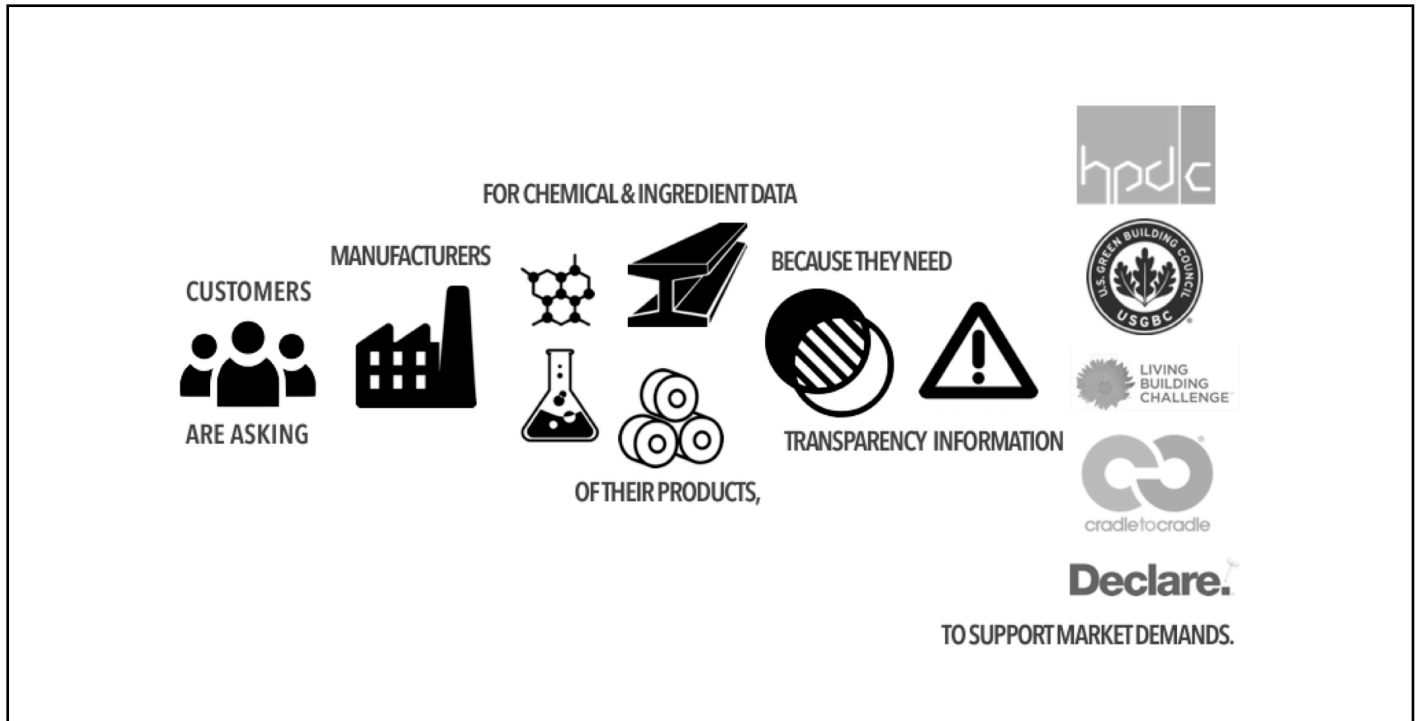


Figure 1.0 Transparency Information Flow for Green Building Certifications

The U.S. Green Building Council's (USGBC) LEED v4 & v4.1: Initially announced in 2012, LEED v4 introduced significant changes to the LEED rating system with the creation of Building Product Disclosure and Optimization (BPDO) criteria, including Material Ingredient Transparency credits requiring manufacturers to report product chemicals and ingredients to 1000ppm or 100ppm, depending on the level of credit desired, using approved reporting formats such as the HPD or MI.

The International Living Future Institute's (ILFI) Living Building Challenge (LBC): The ILFI and the LBC are the primary stewards of "The Red List," a list of harmful chemicals and ingredients most commonly used in the marketplace. In 2019, the LBC Watch List was established to identify chemicals with the potential to be added to the Red List. LBC requires all products to be Red List Free or LBC Compliant using its own reporting format, the Declare Label.

The International WELL Building Institute's (IWBI) WELL v1 and v2: WELL Material Ingredient Transparency criteria are harmonized with LEED's criteria with multiple levels of credit for manufacturers who effectuate higher levels of product ingredient reporting or third-party verification.

Despite differences in each green building certification program, material ingredient transparency is a staple of each. As such, this guide focuses on manufacturer transparency in a manner which is pursuant to the above programs, familiar to the supply chain, and popular to the building product industry, based on WAP Sustainability's experiences with market and A&D acceptance.

THE 4 STEPS OF TRANSPARENCY

There are four steps toward material ingredient transparency: Inventory, Screen and Assess, Disclosure, and Optimization. For each step, there are specific sets of tasks and tools, guidance for which is provided herein.

Following these steps can support ceramic tile, mortar, and grout manufacturer efforts in developing material ingredient reports using formats such as HPD and MI that satisfy common A&D criteria, through which there is an opportunity for product contribution to green and healthy building rating programs. Additionally, broad adoption of this approach creates a more consistent industry-wide presentation of material ingredient documentation and information. This helps suppliers and specifiers achieve a more uniform understanding of ceramic tile, mortar, and grout material ingredient transparency.



Figure 1.1 The 4 Steps of Transparency

MATERIAL INGREDIENT GUIDE GOALS

GUIDANCE	OPPORTUNITY	CONSISTENCY
<p>Create industry-recommended tasks and tools with steps to follow toward material ingredient transparency, making reporting formats such as HPDs and MIs easier and more accessible.</p>	<p>Uniquely position followers of this approach to achieve high-level credit contributions to green building certification programs, such as LEED and others.</p>	<p>Provide the market with tile and tile installation material transparency documents that are thorough and consistent in approach & messaging.</p>

THE INVENTORY PROCESS

The material ingredient reporting formats and green and healthy building programs described in this guide utilize a hazard-based screening and assessment approach. Chemicals are required to be inventoried if present at or above thresholds deemed as the minimum concentration of a substance that must be present in the product for that substance to be reported. Hazard-based approaches contribute to mitigating health risks by following the precautionary principle that, when there is significant uncertainty (as in the case of assigning risk), decisions should be made that protect the public first and foremost. For example, for all building products, the risk of chemical exposure should be considered high unless proven otherwise.

Under this precautionary principle, the reporting formats described in this guide require either 100ppm or 1000ppm level inventory thresholds.

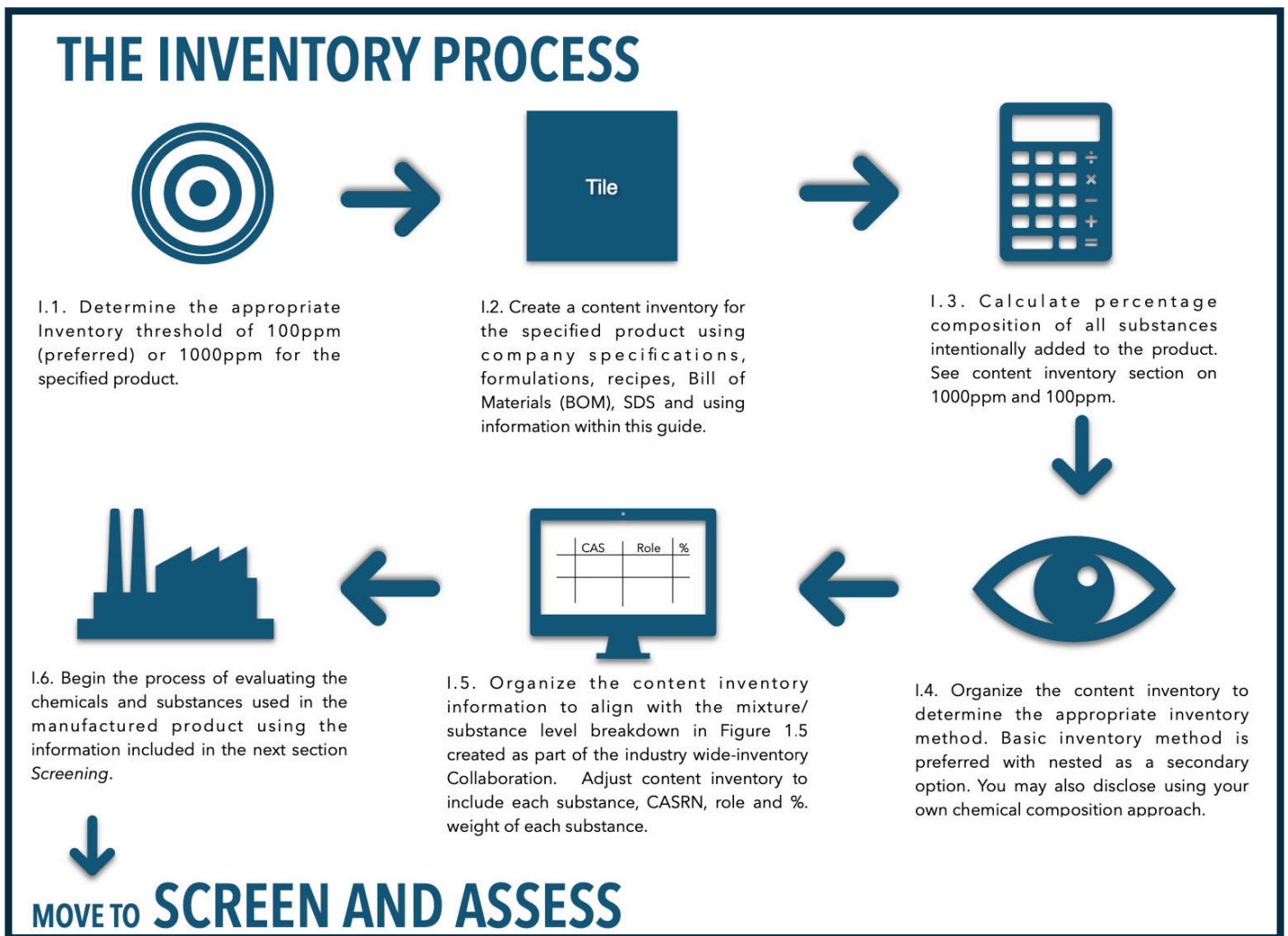


Figure 2.0 The Inventory Process

INVENTORY THRESHOLDS - 1000PPM & 100PPM (I1)

To comply with the requirements of various material ingredient reporting formats and green and healthy building programs, manufacturers need to be able to identify the substances used in their products to a threshold of 100ppm or 1000ppm. These substances need to be identified by a CASRN so that appropriate hazard screening methods can be completed (all screening methods are CASRN based). It is important to note that 100ppm is more stringent and requires inventorying substances present at lower concentrations than a threshold of 1,000 ppm, and hence, is likely to require inventorying more substances. WAP Sustainability recommends that manufacturers target a threshold of 100 ppm for all intentionally added substances to maximize contribution toward green and healthy building program requirements. Additionally, concentrations can be expressed as percentages, with 100 ppm = 0.01%, 1,000 ppm = 0.1%, and 10,000 ppm = 1.0%.

The threshold at which the substances are reported is the key to understanding the precision of the substance disclosure used in material ingredient reports. These thresholds also define how the material ingredient report complies with green and healthy building program requirements.

INVENTORY THRESHOLDS

There are two milestones for substance inventories that are most commonly referenced for baseline material ingredient disclosure.

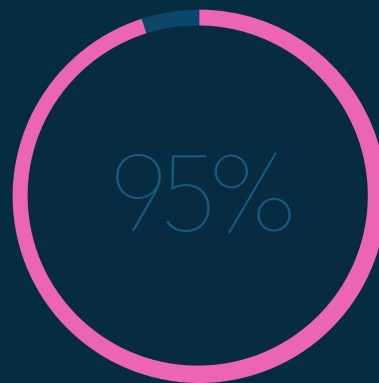
There are two milestones for substance inventories that are most commonly referenced for material ingredient optimization where additional hazard assessment and information are desired.



1000ppm level requires knowledge of intentionally added ingredients to 99.9%



100ppm level requires knowledge of intentionally added ingredients to 99.99%



75% and 95% are referenced by many healthy building programs as the % of substances assessed using GreenScreen® Assessments

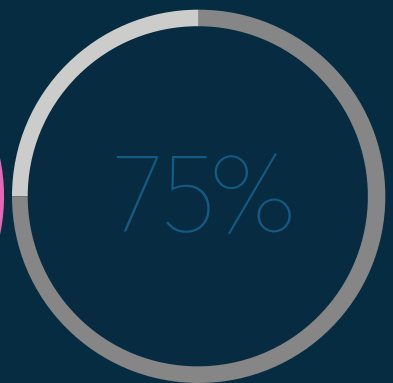


Figure 2.1 Common Inventory Thresholds

Targeting 100ppm requires the inventorying of substances used in each reported product. This information may be found in a bill of materials (BOM), batch sheets, safety data sheets (SDSs), or

material certificates of analysis but will likely require additional data collection from the supply chain.

A common resource for most manufacturers in compiling substance threshold information is to begin with SDSs. SDSs are based on the Globally Harmonized System (GHS) of Classification for Labelling of Chemicals. The SDS requires reporting at 1,000 ppm (0.1%) for reproductive toxicants, carcinogens, and Category 1 mutagens, and at 10,000 ppm (1%) for all other hazard categories. SDSs are required to report all hazardous contents at these thresholds that will be handled by workers in factories but are not required to report all substances.

In most cases, an SDS document itself will not offer sufficient information to meet the requirements of material ingredient reporting formats and green and healthy building programs. Furthermore, SDSs allow considerable masking of proprietary substances and chemical formulations and provide limited guidance on suitable terminology toward expressing these substances.

Given the limited effectiveness of using SDSs exclusively toward identifying inventory thresholds necessary for material ingredient reporting, manufacturers will need to engage their suppliers to collect additional information needed to meet the required thresholds.

A total compilation of substances to the necessary thresholds for each reported product is the end result of the inventory process, and the output of this process is called the content inventory which is described in detail in the next section.

CONTENT INVENTORY (I2 & I3)

Content inventory refers to the identification of both materials and substances in an organized manner. For tile and tile installation materials, the content inventory is essentially a product recipe, a list of everything purchased (by CASRN) to make the final finished product, accurate to the WAP Sustainability's recommended threshold of 100ppm.

Content Inventory Equals Product Recipe

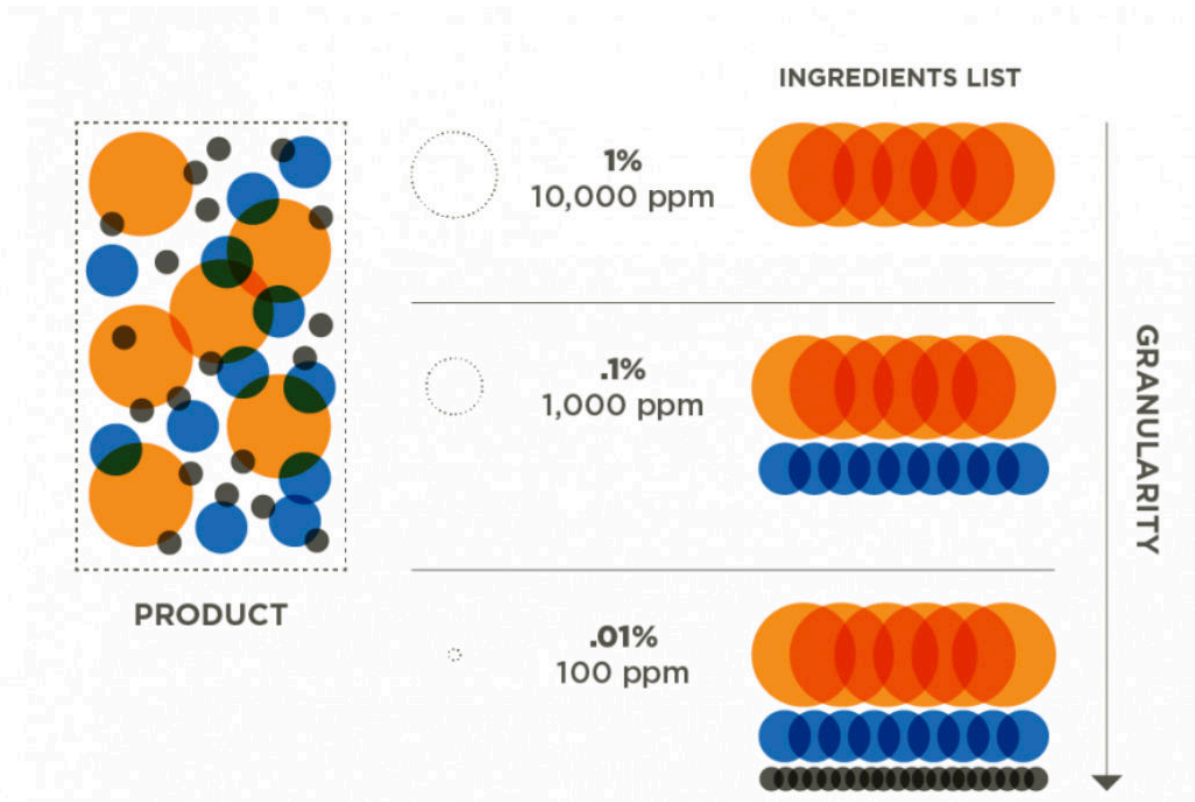


Figure 2.2 Content Inventory Visual from ILFI (International Living Future Institute)

The content inventory lists the substances used to make the final product, including their CASRN, role, and percentage. Hazard information such as GreenScreen scores, hazard lists, or Red List inclusion is derived from the content inventory.

A product's content inventory includes materials that are itemized by the substances comprising each material. Most products are composed of one or more materials, just as those materials are composed of one or more substances. Products can be composed of a few materials or can be very complex, involving numerous materials and extensive supply chains.

The term "mixture" would also be suitable, as some materials are in fact mixtures comprised of multiple unique substances. This is an important consideration that applies to many commonly used raw materials for tile and tile installation materials. For example, kaolin clay is a mixture and

not an individual substance, even though kaolin has a unique CASRN. This will be important to recall later in this guide when discussing the use of the TCNA GreenScreen assessments for LEED Optimization Credits.

To better define the use of these terms, the following definitions are provided:

- **Material:** A 'material' is a uniform solid, liquid, or gas. Materials are composed of one or more "substances." For example, clay may be itemized as a distinct material with a CASRN but is chemically a mixture of multiple unique substances.
- **Substance:** A 'substance' is an ingredient that can be characterized by the entities that comprise it (molecules, atoms, etc.) and by its physical properties (density, refractive index, electric conductivity, melting point, etc.). All 'materials' can be broken down into 'substances'.



Figure 2.3 CASRN Number Examples

Table 2-1 details mixture compositions common to ceramic tile, mortar and grout and how those compositions break down to the substance level.

Table 2-1: Mixture Compositions

Mixture	Substance	Composition %
Kaolin Clay 1332-58-7	Quartz as 14808-60-7	40% - 55%
	Aluminum Oxide as 1344-28-1	30% - 45%
	Iron Oxide as 1309-37-1	1% -10%
	Titanium dioxide as 13463-67-7	1% -10%
	Water as 7732-18-5	10% -20%
Feldspar 68476-25-5	Quartz as 14808-60-7	60% -80%
	Aluminum Oxide as 1344-28-1	15% -25%
	Calcium Oxide as 1305-78-8	1% -10%
	Potassium Oxide as 12136-45-7	1% -10%
	Sodium Oxide as 1313-59-3	5% -10%
Portland Cement 65997-15-1	Calcium Oxide as 1305-78-8	60% -75%
	Quartz as 14808-60-7	15% -25%
	Aluminum Oxide as 1344-28-1	2% - 8%
	Iron Oxide as 1309-37-1	1% -10%
	Sulfur trioxide as 7446-11-9	1% -10%
Calcium Aluminate Cement 65997-16-2	Calcium Oxide as 1305-78-8	30% - 45%
	Quartz as 14808-60-7	2% - 8%
	Aluminum Oxide as 1344-28-1	45-60
	Iron Oxide as 1309-37-1	1% -10%
	Magnesium Oxide as 1309-48-4	1% -10%
Limestone 16389-88-1	Calcium Carbonate as 1317-65-3	50% -70%
	Magnesium carbonate as 546-93-0	30% -50%
Fly Ash 68131-74-8	Quartz as 14808-60-7	30% -50%
	Aluminum Oxide as 1344-28-1	10% -30%
	Iron Oxide as 1309-37-1	15% -35%
	Calcium Oxide as 1305-78-8	1% -12%
Soda Lime borosilicate glass 65997-17-3	Quartz as 14808-60-7	70% -85%
	Boron trioxide (1303-86-2)	10% -20%
	Sodium Oxide as 1313-59-3	1% -10%
	Aluminum Oxide as 1344-28-1	1% -10%

Mixture	Substance	Composition %
Ball Clay 1218-74-7	Quartz as 14808-60-7	60% -80%
	Aluminum Oxide as 1344-28-1	20% -30%
	Iron Oxide as 1309-37-1	1% -10%
	Titanium dioxide as 13463-67-7	1% -10%
	Water as 7732-18-5	5% -15%
Wollastonite 13983-17-0	Calcium Oxide as 1305-78-8	40% -55%
	Quartz as 14808-60-7	45% -60%
Shale 1318-93-0	Quartz as 14808-60-7	30% -50%
	Feldspar (mixture)	30% -50%
	Iron Oxide as 1309-37-1	5% -15%
	Sodium Oxide as 1313-59-3	1% -10%
	Sulfur trioxide as 7446-11-9	1% -10%
Slag 65996-69-2	Calcium Oxide as 1305-78-8	30% -50%
	Quartz as 14808-60-7	28% -38%
	Aluminum Oxide as 1344-28-1	8% -24%
	Magnesium Oxide as 1309-48-4	1% -18%

INVENTORY METHODS (I4)

There are two inventory methods: nested or basic.

- **“Nested Materials” Inventory Method:** This method lists all mixtures used to make the product and includes the substances within each mixture above the threshold level. If a substance appears in multiple materials, it will be listed multiple times in the inventory, appearing under each material where it is a constituent (for example, quartz could be listed repeatedly).
 - Example: A cake is a mixture of three "ingredients" totaling 100%. Flour is 85%, flour is made up of 50% carbohydrates, 30% fiber and 20% minerals. Milk is 10%, milk is made up of 80% carbohydrates, 10% protein and 10% vitamins. Eggs are 5%, and eggs are made up of 80% proteins and 20% fat.
- **“Basic” Inventory method:** This method does not identify mixtures separately and uses a single list of all substances to describe the product based on the product-level threshold. A product-level threshold of 100ppm should be used.
 - Example: The basic inventory would list each cake ingredient at the combined substance level showing carbohydrates (42.5% + 8%), fiber (25.5%) minerals (17%), protein (1% + 4%), vitamins (1%), and fat (1%)) by their total percentages in the final product.

WAP Sustainability recommends that manufacturers follow the Basic Inventory Method. This fosters a consistent inventorying approach if adopted industry-wide and facilitates green and healthy building optimization conformance.

INDUSTRY-WIDE INVENTORY COLLABORATION (I5)

Sharing many of the same raw materials, the North American tile industry compiled a list of chemicals common to ceramic tile, mortar, and/or grout. To facilitate content inventorying efforts, each participating manufacturer can obtain CASRN information from this list for at least 75% of the ingredients in most of its products. Other chemicals contained within a product but not included in the industry-wide list will likely need to be added to the product's content inventory in order to achieve reporting thresholds of 100ppm or 1,000 ppm.

The ceramic tile industry-wide ingredient list (Table 2-2), created with input from TCNA and its members and through WAP research of ingredient formulations, highlights common mixture/substance level compositions of material ingredients in ceramic tile, mortar, and grout. Substance-level components of ingredients initially listed and deemed as mixtures have been identified so that they may be grouped together using the "basic" inventory method to define individual substance level compositions when developing a product content inventory.

Table 2-2: List of Chemicals Common to Ceramic Tile, Mortar, and/or Grout

Substance	CASRN Number
Chrome Ore (1308-31-2)	1308-31-2
Methylethylcellulose (9032-42-2)	9032-42-2
Calcium Formate (544-17-2)	544-17-2
Gypsum (13397-24-5)	13397-24-5
Barium Carbonate (513-77-9)	513-77-9
Iron Oxide (1309-37-1)	1309-37-1
Manganese Dioxide (1313-13-9)	1313-13-9
Calcium Carbonate (1317-65-3)	1317-65-3
Talc (14807-96-6)	14807-96-6
Calcium Oxide (1305-78-8)	1305-78-8
Magnesium Oxide (1309-48-4)	1309-48-4
Zinc Oxide (1314-13-2)	1314-13-2
Zirconium Silicate (10101-52-7)	10101-52-7
Zircon (14940-68-2)	14940-68-2
Quartz (14808-60-7)	14808-60-7
Aluminum Oxide	1344-28-1
Manganese Dioxide (1313-13-9)	1313-13-9
Potassium Oxide (12136-45-7)	12136-45-7
Sodium Oxide (1313-59-3)	1313-59-3
Magnesium Carbonate (546-93-0)	546-93-0
Boron Trioxide (1303-86-2)	1302-86-2
Titanium Dioxide (13463-67-7)	13463-67-7
Sulfur Trioxide (7446-11-9)	7446-11-9
Kaolin Clay (1332-58-7)	Mixture of SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , H ₂ O
Feldspar (68476-25-5)	Mixture of SiO ₂ , Al ₂ O ₃ , CaO, K ₂ O, Na ₂ O
Portland Cement (65997-15-1)	Mixture of CaO, SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , SO ₃
Calcium Aluminate Cement (65997-16-2)	Mixture of CaO, SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , MgO, TiO ₂
Ball Clay (1218-74-7)	Mixture of SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , H ₂ O
Wollastonite (13983-17-0)	Mixture of CaO and SiO ₂
Shale (1318-93-0)	Mixture of ball and kaolin clay, SiO ₂ , Feldspar, CaO, Fe ₂ O ₃ , Limestone
Slag (65996-69-2)	Mixture of CaO, SiO ₂ , Al ₂ O ₃ , and MgO
Limestone (16389-88-1)	Mixture of CaCO ₃ & MgCO ₃
Fly Ash (68131-74-8)	Mixture of SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , CaO
Soda Lime Borosilicate Glass (65997-17-3)	Mixture of SiO ₂ , B ₂ O ₃ , Na ₂ O, Al ₂ O ₃

Certain limitations arise from the use of the industry-wide ingredient list.

First, confirming the different ingredients inside a mixture can be complicated and requires additional discussion with suppliers. To simplify this process, TCNA is working with the HPD Collaborative to develop common ceramic compositions, referred to as “Special Conditions”, which can be generically regarded within the HPD reporting format, thus simplifying manufacturer execution. More information regarding tile industry Special Condition efforts is provided later in this guide.

Second, not every ceramic tile, mortar, and grout material mixture will contain the exact same concentrations of substances. To address this, ranges in mixture compositions have been created based on industry and supplier feedback.

Lastly, variation in ceramic tile, mortar and grout products by batch creates limitations in material ingredient reporting. Although, reporting formats have differing suggestions for managing batch-specific raw materials, best practice for the industry would be to use standard compositions from the industry-wide inventory as applicable to all batches or production runs.

With the content inventory completed, the following sections contain suggested steps for hazard screening and gathering and assembling relevant information into a material ingredient report. While these steps are intended to comprehensively assist manufacturers in navigating common material ingredient reporting requirements, each manufacturer may need to tailor these steps to be relevant to their specific systems and products.

PUTTING IT ALL TOGETHER

(for manufacturers)



At this point, you should be able to...

1. Determine the specific content inventory for the specified product.
2. Collect the Bill of Materials or batch recipes for the specified product.
3. Inventory chemicals, ingredients, and substances used in your product to 100ppm by CASRN Number to meet the defined disclosure threshold.
4. Reach out to suppliers to determine chemicals, ingredients, and substances not provided on Safety Data Sheets or Technical Data Sheets by CASRN Number.
5. Organize the specified product's content inventory in an Excel document or other database to organize substances and materials.
6. Make sure to check the industry-wide ingredient list for CASRN substances that might be in your product's content inventory.

THE SCREEN AND ASSESS PROCESS

Once the substances within the product are identified to the appropriate 100ppm or 1,000ppm threshold, the subsequent step is to begin the screening and assessment process. Simply put, this involves evaluating the toxicological profile associated with the individual CASRN identified for each substance within the content inventory. TCNA and 17 supporting manufacturers collaborated with WAP Sustainability to screen and assess the assembled list of common tile industry ingredients using the GreenScreen for Safer Chemicals® method.

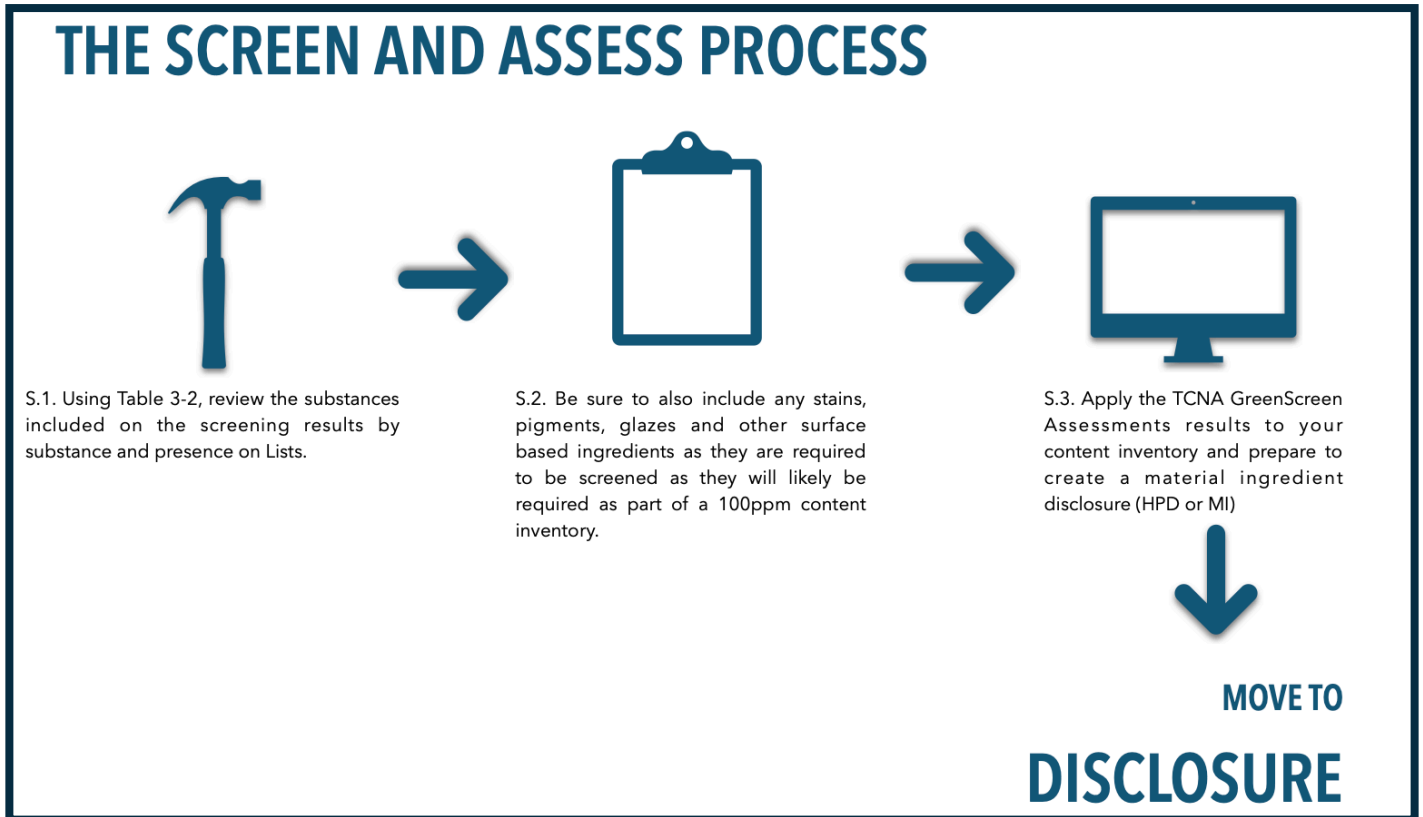


Figure 3.0 The Screen and Assess Process

Many tools exist for evaluating chemical substances for hazards. These include risk-based assessment, hazard-based assessment, environmental life cycle assessment, and alternative-based assessments focused on suggested chemical substitutions.

Manufacturers have many screening and assessment options, and it is recommended that manufacturers consider market demands when determining which option to pursue. In the case of construction products, hazard-based assessments are often employed, with GreenScreen for Safer Chemicals® being one of the more accepted methods. GreenScreen is the preferred hazard assessment method for LEED, WELL, and is the underlying framework for the ILFI Red List and the Living Building Challenge, which is why TCNA collectively pursued this hazard assessment framework.

The GreenScreen method has two levels of analysis:

GreenScreen List Translator™:

A screening method, available through free, online automated tools, for quickly identifying known high-hazard substances based solely on 40+ lists of CASRNs mapped to chemical hazard endpoints. GreenScreen List Translator results typically include a prefix of LT (LT-1, LT-P1, LT-UNK, UNK, etc.).

GreenScreen Assessments™:

A preliminary screening of the 40+ lists followed by a full toxicological review to fill hazard data gaps and identify safer substances using scientific literature and modeling tools. GreenScreen Assessment results typically include a prefix of BM (BM-1, BM-2, BM-3, BM-4, etc.).

GREENSCREEN LIST TRANSLATOR™

The GreenScreen List Translator™ provides a “list of lists” approach to quickly identify chemicals of high concern. The substances are scored based on information from over 40 authoritative and screening lists (Table 3-1), developed by various authoritative scientific bodies convened by international, national, and state governmental agencies, intergovernmental agencies, and NGOs. These GreenScreen specified lists include REACH categorizations and chemical hazard classifications by country, using the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). Each of the GreenScreen specified lists is mapped to one of 18 hazard endpoints, and a resulting hazard level or range based on the GreenScreen Hazard Criteria is applied.

Table 3-1 Authoritative and Screening Lists

List Name	List Type	GreenScreen® Specified List?
AOEC - Asthmaagens	Hazard	Yes
Boyes - Neurotoxicants	Hazard	Yes
CA DTSC Candidate	Hazard	No
CA Prop 65	Regulatory	Yes
ChemSec - SIN List	Hazard	Yes
EC - CEPA DSL	Hazard	Yes
EC - CEPA Toxic Substances (Sched 1)	Hazard	Yes
EC - Ozone depletion substances (EU Ozone)	Hazard	No
EU - Annex VI CMRs	Regulatory	Yes
EU - ESIS PBT	Regulatory	Yes
EU - GHS (H-Statements)	Regulatory	Yes
EU - Priority Endocrine Disruptors	Regulatory	Yes
EU - REACH Annex XVII CMRs	Regulatory	Yes
EU - R-Phrases	Regulatory	No
EU - SVHC Authorisation List	Regulatory	Yes
EU - SVHC Candidate List	Regulatory	Yes
EU - SVHC Prioritisation List	Regulatory	Yes
G&L - Neurotoxic Chemicals	Hazard	Yes
German FEA - Substances Hazardous to Waters	Hazard	Yes
GHS - Australia	Hazard	Yes
GHS - Japan	Hazard	Yes
GHS - Korea	Hazard	Yes
GHS - Malaysia	Hazard	Yes
GHS - New Zealand	Hazard	Yes
IARC	Hazard	Yes
Living Building Challenge 3.1 Red List	Private RSL	No
MAK Carcinogen	Hazard	Yes
MAK Mutagen	Hazard	Yes
MAK Pregnancy Risk	Hazard	Yes
MAK Sensitizing	Hazard	Yes
OR DEQ - Priority Persistent Pollutants	Hazard	Yes
OSPAR - Priority PBTs & EDs & equivalent concern	Hazard	Yes
Quebec CSST - WHMIS 1988	Regulatory	Yes
RoHS	Regulatory	No
San Antonio Statement on Brominated and Chlorinated Flame	Hazard	No
TEDX - Potential Endocrine Disruptor	Hazard	Yes
UNEP Stockholm Conv - Persistent Organic Pollutants	Hazard	Yes
US CDC - Occupational Carcinogens	Hazard	Yes
US EPA - Chemicals of Concern	Regulatory	No
US EPA - EPCRA Extremely Hazardous Substances	Hazard	Yes
US EPA - Global Warming Potentials (EPA-GW)	Hazard	No
US EPA - IRIS Carcinogens	Hazard	Yes
US EPA - Priority PBTs (NWMPP)	Hazard	Yes
US EPA - Priority PBTs (PPT)	Hazard	No
US EPA - Toxics Release Inventory PBTs	Hazard	Yes
US EPA Ozone Depleting Substances (EPA-ODS)	Hazard	No
US EPA PPT Chemical Action Plans	Hazard	No
US NIH - Report on Carcinogens	Hazard	Yes
US NIH - Reproductive & Developmental Monographs	Hazard	Yes
WA DoE - PBT	Regulatory	Yes
WELL Building Standard Restricted Materials	Private RSL	No

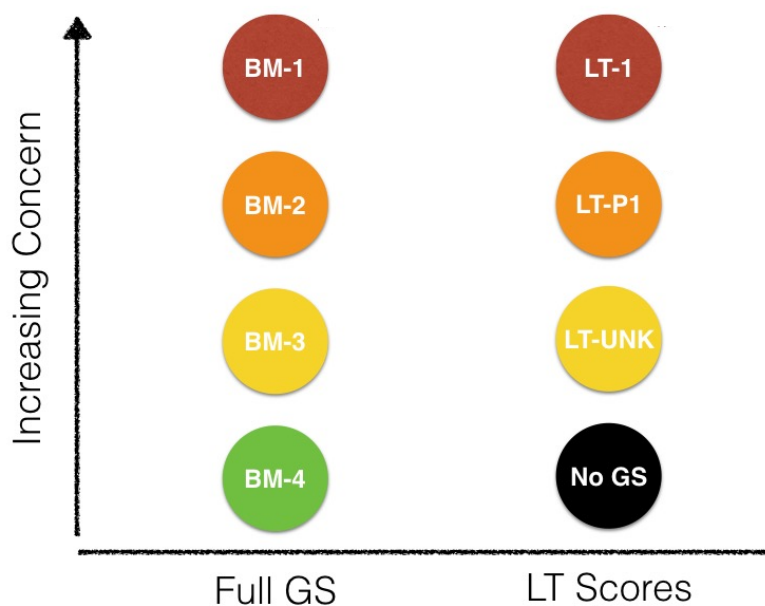


Figure 3.1 Scoring for GreenScreen for Safer Chemicals

The GreenScreen List Translator™ hazard classifications are used to derive a GreenScreen List Translator score. As will be discussed, full GreenScreen Assessments are used to determine the GreenScreen Benchmark score. Figure 3.1 shows the scoring comparison in more detail. A List Translator score of “LT-1” means the hazard classifications for a given substance meets one or more of the GreenScreen Benchmark-1 criteria and that this information originates

from one or more of the predetermined authoritative lists. A List Translator score of “LT-P1” means the hazard classifications for a given substance meets one or more of the GreenScreen Benchmark-1 criteria, but the information is based on screening lists and/or there is some uncertainty about key endpoint classification. Further research is needed on the flagged endpoint(s) to determine if the chemical is indeed a GreenScreen Benchmark-1. A List Translator score of “LT-UNK” indicates that although the chemical was present on a list, there is insufficient information to apply it to the substance scoring algorithm.

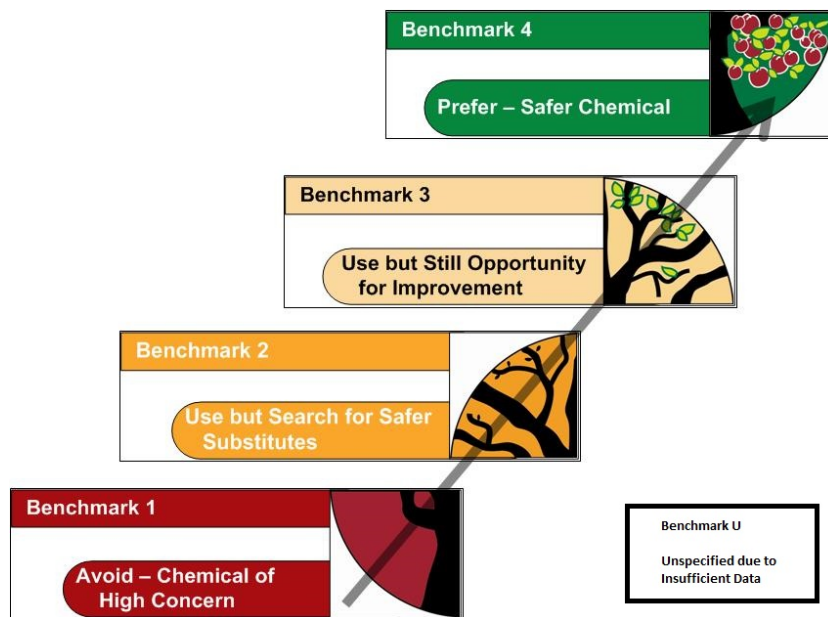


Figure 3.2 GreenScreen Benchmark Scoring

Although the lists provide some information on potential hazards associated with the chemical, a full GreenScreen Assessment is the most accurate method to determine a GreenScreen score. While authoritative lists are likely to generate definitive Benchmark Scores, results from a full GreenScreen Assessment always take precedence over results from the GreenScreen List Translator.

GREENSCREEN ASSESSMENTS™

A full GreenScreen Assessment provides a more comprehensive substance hazard profile than a List Translator screening. It involves a detailed review of toxicological and scientific literature to determine the hazard levels for all endpoints and calculates a GreenScreen Benchmark Score. It also uses models and studies of analogs where direct data is scarce. Each endpoint hazard level is also assigned a confidence level based on the quality of the data. A full GreenScreen Assessment must be generated by a licensed profiler, authorized by the owner of the GreenScreen Method, Clean Production Action (CPA).

The GreenScreen Method has substantial overlaps with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), the criteria for the US EPA's Design for the Environment, and the Cradle to Cradle (C2C) Material Health Assessment Methodology.

However, it differs from GHS in some significant ways. On one hand, the GreenScreen method has a more rigorous (lower) threshold of analysis. GreenScreen includes endocrine activity, addresses persistent, bio-accumulative toxins (PBTs) more comprehensively, and considers environmental transformation products. GreenScreen also requires and provides guidance on addressing data gaps. GHS, on the other hand, covers more physical workplace hazards than GreenScreen and provides guidelines for identifying hazards using hazard warning icons. The C2C Product Certification program includes a hazard screening protocol that is similar to GreenScreen and GHS in many ways and draws on the same human health endpoints but adds six additional endpoints. The main difference is that the C2C Assessment Method does not have a standalone public assessment format for individual substances.

Full GreenScreen Assessment hazard classifications produce a GreenScreen Benchmark Score. Figure 3.2 interprets the meaning of each score. It is important to recognize that products with material ingredients which have scored as BM-1 are very common. While the scoring method classifies BM-1 chemicals as "Avoid," the context of such classification, especially the likelihood of exposure at various stages in the supply chain, should be interpreted. For building products, "avoid" may be of relevance to a factory or construction worker, and may or may not be of relevance to a building occupant. As this guide explains in the Disclosure section, manufacturers have opportunities to clarify such interpretation in the substance notes of HPDs and Manufacturer Inventories.

SCREENED AND ASSESSED SUBSTANCES IN TCNA'S INVENTORY OF COMMON INGREDIENTS (S1 & S2)

Using the GreenScreen method, each substance in TCNA's inventory of ingredients common to ceramic tile, mortar, and/or grout obtained a List Translator (LT) Score and full GreenScreen Assessment (BM) Score. **These scores allow manufacturers to achieve higher product level contributions in green and healthy building certification programs.**

In Table 3-2, each substance's initial GreenScreen score (listed as "Previous GS Score") is listed as a GreenScreen List Translator score or a GreenScreen Assessment Benchmark score, if publicly available. Additionally, each substance's final Benchmark score is provided. Note that a substance's final GreenScreen score may vary from the initial score following the completion of a full GreenScreen assessment. Also provided as additional information is a display of the substances' presence in various relevant Restricted Substance Lists (RSL) such as the Living Building Challenge Red List and Watch List, the WELL Building Standard Restricted Materials List, Proposition 65 and the Chemical Footprint Project CoHC (Chemical of High Concern) Reference list. It is worth noting that these lists are often utilized in the building and construction product marketplace.

Table 3-2: Common Tile Industry Ingredient Screening and Assessment Results by Substance and presence on Lists

Substance	CASRN Number	Previous GS Score	TCNA GS Score	Substance on the ILFI Red List	Substance on the ILFI Watch List	Substance on the WELL RSL	Substance on Prop 65	Substance listed on Chemical Footprint Project
Aluminum Oxide	1344-28-1	BM - 2	BM-2	No	No	No	No	Yes
Barium Carbonate	513-77-9	LT - UNK	BM-2	No	No	No	No	No
Boron Trioxide	1303-86-2	LT - 1	BM-1	No	No	No	No	Yes
Calcium Carbonate	1317-65-3	LT - UNK	BM-3dg	No	No	No	No	No
Calcium Formate	544-17-2	LT - UNK	BM-3	No	No	No	No	No
Calcium Oxide	1305-78-8	LT - P1	BM-2	No	No	No	No	No
Chrome Ore	1308-31-2	LT - UNK	BM-2	No	No	No	No	No
Gypsum	13397-24-5	LT - UNK	BM-3dg	No	No	No	No	No
Iron Oxide	1309-37-1	BM - 1	BM-3dg	No	No	No	No	No
Magnesium Carbonate	546-93-0	LT - UNK	BM-2	No	No	No	No	No
Magnesium Oxide	1309-48-4	LT - UNK	BM-3dg	No	No	No	No	No
Manganese Dioxide	1313-13-9	LT - P1	BM-1	No	No	No	No	No
Methylethylcellulose	9032-42-2	LT - UNK	BM-2	No	No	No	No	No
Potassium Oxide	12136-45-7	LT - UNK	BM-2	No	No	No	No	No
Quartz	14808-60-7	LT - 1	BM-1	No	No	No	Yes*	Yes

*Form Specific Hazard - additional guidance may apply

Substance	CASRN Number	Previous GS Score	TCNA GS Score	Substance on the ILFI Red List	Substance on the ILFI Watch List	Substance on the WELL RSL	Substance on Prop 65	Substance listed on Chemical Footprint Project
Sodium Oxide	1313-59-3	LT - UNK	BM-2	No	No	No	No	No
Sulfur Trioxide	7446-11-9	LT - P1	BM-2	No	No	No	No	No
Talc	14807-96-6	BM - 1	BM-1	No	No	No	No	No
Titanium Dioxide	13463-67-7	LT - 1	BM-2	No	No	No	Yes*	Yes
Zinc Oxide	1314-13-2	BM - 1	BM-1	No	No	No	No	No
Zircon	14940-68-2	LT - UNK	BM-2	No	No	No	No	No
Zirconium Silicate	10101-52-7	LT - UNK	BM-2	No	No	No	No	No

APPLYING TCNA'S GREENSCREEN ASSESSMENTS (S3)

TCNA's list of commonly used tile industry ingredients, broken down to the substance level with GreenScreen BM scores assigned, is now available for use by TCNA Material Ingredient Guide participants in their product reporting. When screening and assessing a content inventory for a particular product, the manufacturer should review each substance to determine if that substance is included in TCNA's industry-wide list. If so, the substance has been fully assessed, and any previous screening and associated GreenScreen LT Score can be replaced with the substance's GreenScreen BM score from TCNA's list.

A product's content inventory should be reviewed to determine the percentage of substances which can be assigned a GreenScreen BM Score. Opportunities for increased green and healthy building program recognition will be available if at least 75% of the inventoried substances for a product contain a BM score (i.e. have been fully assessed). Substances appearing in a product content inventory which have not been fully assessed as part of TCNA's initiative can be submitted to a licensed GreenScreen profiler in order to obtain a BM score.

Using the GreenScreen Assessment BM scores in product material ingredient reporting helps North American ceramic tile, mortar, and grout manufacturers advance material ingredient transparency with fully assessed substance and increased product recognition by green and healthy building certification programs. **The tile industry is also a leader in green and healthy building as the first industry to collaborate on full assessments of common industry materials.**

PUTTING IT ALL TOGETHER

(for manufacturers)



At this point, you should be able to...

1. Consider using GreenScreen for Safer Chemicals as your inventory screening method as it has broad green and healthy building market acceptance.
2. Understand the hazard-based screening process employed in GreenScreen Assessments.
3. Review the list of substances in Table 3-2 and the corresponding GreenScreen Score located in the column "TCNA GS Score."
4. Apply TCNA's GreenScreen-assessed inventory of common industry ingredients by determining which substances listed in your product-specific Content Inventory are also listed in Table 3-2 and matching relevant GreenScreen Benchmark Scores.

THE DISCLOSURE PROCESS

WAP Sustainability worked with TCNA and its members to develop comprehensive guidance for manufacturers to follow when reporting material ingredients in their products. Such reporting involves standardized disclosure of chemicals and associated screening and assessment results, contained within product ingredient inventories. Following the recommended guidance simplifies otherwise complex disclosure options, as well as amplifies industry-wide advancements in transparency. Additionally, manufacturer reporting of material ingredients communicates the spirit of transparency to sales teams, distributors, and disclosure-minded customers.

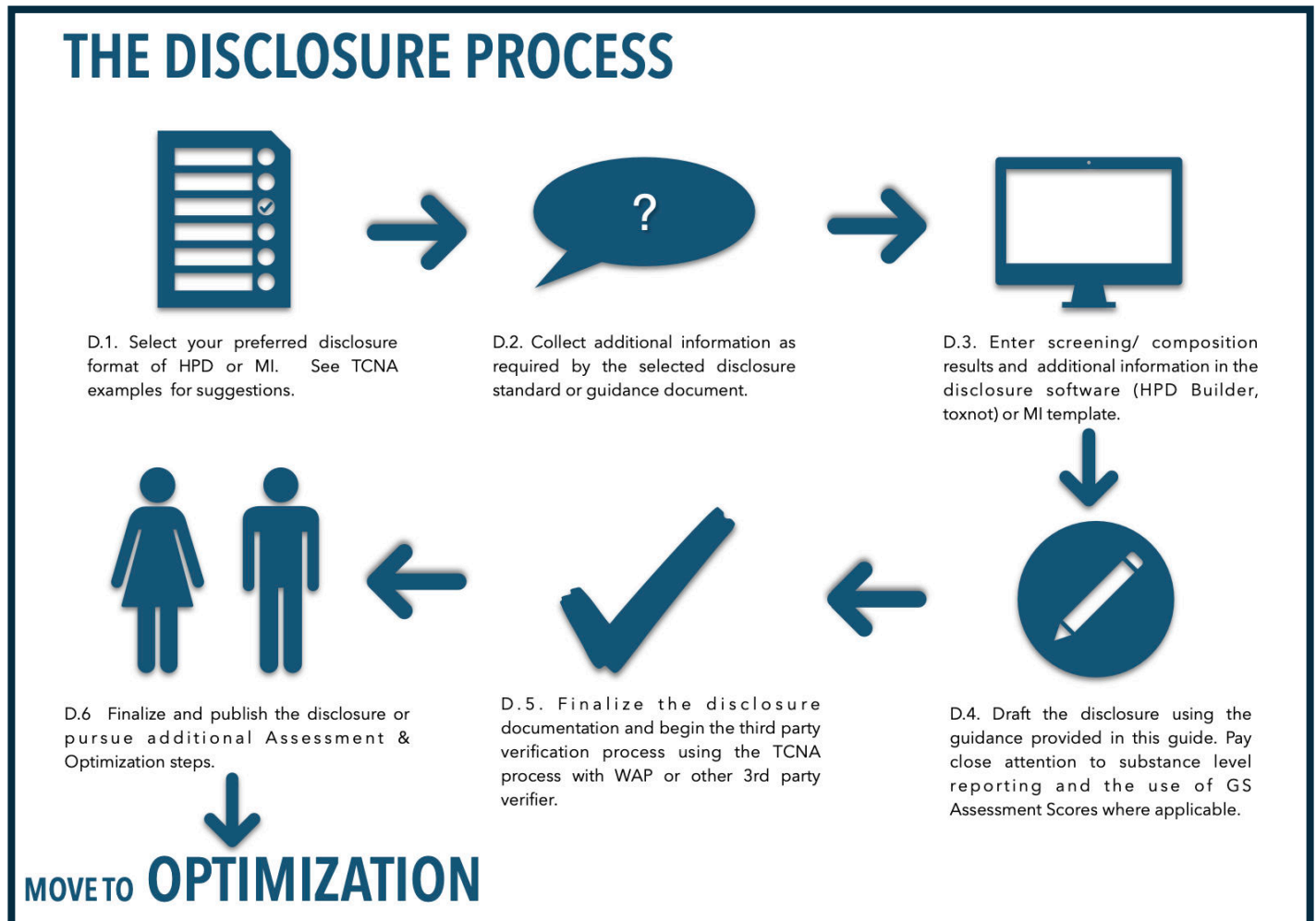


Figure 4.0 The Disclosure Process

TRANSPARENCY VS. DISCLOSURE

Disclosure, in and of itself, does not necessarily equate to transparency. Transparency is widely agreed to be beneficial, and disclosure of ingredients is an obvious pathway to achieve it. However, transparency and disclosure are not the same, and confusing them can harm transparency efforts.

In the simplest terms, a “transparent” product means the substances and ingredients that make up the product are easy to identify. If a user or purchaser of a product can identify material ingredient disclosures in complete, thorough, and accurate product reports, what is in the product is known. Users and purchasers have confidence in the product’s composition, values are clear, and credibility is assumed. Transparency is a trust virtue, and disclosure is the tool to achieve that trust.

Beyond building brand trust, manufacturers are also rewarded for disclosing their ingredients in green building certification programs such as LEED. Expectations for transparency may differ between building certification programs and reporting formats as disclosure requirements may differ. For example, proprietary ingredients listed as “not disclosed” may be acceptable in some cases, and not acceptable in others.

WAP Sustainability's perspective is that consistency in disclosure is a necessary condition for transparency. An unstructured and inconsistent approach to disclosure can reduce the perception of transparency and potentially damage trust. Disclosure should be accompanied by an ethos of transparency, and an informed buyer will always look for the spirit of transparency, which may, or may not, underline the act of disclosure. The ceramic tile industry's reference-able inventory of GreenScreen Assessments, in combination with the steps taken toward disclosure suggested throughout this guide, facilitate uniformity and thoroughness among material ingredient reports for North American ceramic tile, mortar, and grout products. As a result, the industry is well-positioned to benefit from increased market awareness making tile-related products synonymous with transparency.

Transparency Ethos of this Guide

1. Provide full transparency, without concealing proprietary ingredients, or trade secrets, if possible.
2. Never disclose less than what is already listed on a Safety Data Sheet (SDS).
3. When in doubt, over-disclose, never under-disclose.
4. Eliminate the obvious questions, such as percentages that do not total to 100%.
5. Recognize there is limited market acceptance of disclosing an ingredient as “proprietary,” and use the term cautiously.

This spirit of transparency is timely given evolving consumer expectations on disclosure. Changing industry expectations toward disclosure and transparency are driven by “Right to Know” regulations and changing consumer expectations impacting numerous product categories such as food, cleaning products, children’s products, and now building products. For example, consumers expect the right to know the contents of the food they consume, whether that is to avoid allergic reactions or to make healthier nutrition choices, as a result of the requirement to include Nutritional Facts Labels under the 1990 Nutrition Labeling and Education Act (NLEA).

The Green Building Certification marketplace is actively exploring the concept of "Right to Know" when it comes to products and materials that make up the buildings in which we live or work. Due to the complex and multi-tiered nature of the global production supply chain, little is known about the tens of thousands of chemicals in circulation today. This lack of data obscures the necessary information required to identify potential hazards within the built environment, and the built environment supply chain to human health and the environment.

Demand for material ingredient disclosure encourages supply chain transparency and, importantly, supports innovation and green chemistry. In a post-pandemic world, demand for transparency and disclosure is expected to grow as people spend more time indoors, and materials are reconsidered for their health impacts.

Disclosure also creates an opportunity for the tile industry for three reasons: 1) the majority of ingredients used by ceramic tile, mortar, and grout manufacturers have been inventoried, screened, and fully assessed; 2) substance-level breakdown of the ingredients common to ceramic tile, mortar, and grout is achievable and well-understood; 3) industry ingredient information is disclosable using reporting formats widely accepted as transparent by green and healthy building certification programs.

WAP Sustainability recommends two material ingredient reporting formats which are well-suited for the tile industry, and which enable disclosure in a manner widely accepted as transparent:

Health Product Declarations and Manufacturer Inventories.

HEALTH PRODUCT DECLARATION (HPD)

(D1 - D6)



WHO?

The Health Product Declaration® Collaborative (HPDC) is a not-for-profit, member organization working to continuously improve the building industry's performance by assisting the industry in providing transparency, openness, and innovation in the practices of reporting, disclosure, specification, and selection of building products.

WHAT?

The HPD Open Standard is a voluntary technical specification for reporting information on product content and associated health information. Developed by a coalition of architects, designers, specifiers, owners, manufacturers, contractors, materials researchers, and NGOs, the HPD Open Standard is a key element towards achieving greater transparency and disclosure in reporting the human and environmental health aspects of building materials.

HPDs can be used to accrue credits in LEED and other green and healthy building programs. HPDs also have a "LEED Pre-Check Indicator" to help determine whether an HPD meets LEED requirements.

WHY?

HPD is the most recognized and widely adopted material ingredient reporting format for disclosure throughout the building and construction supply chain. An HPD is a convenient vehicle for incorporating GreenScreen Assessment scores which makes possible high levels of transparency and market recognition of such for ceramic tile, mortar, and grout.

HOW MANY?

There are currently over 4,000 HPDs available from suppliers, according to HPDC.

THIRD-PARTY VERIFIED?

Yes. The HPDC Third Party Verification Program (3PV) was established to manage the credentialing and methodology for independent review and verification of completed HPDs. TCNA Material Ingredient Guide participants who incorporate TCNA GreenScreen Benchmark Assessment scores into their individual product HPDs are provided 3PV by WAP Sustainability.

HPD GUIDANCE

Using the comprehensive content inventory created for a product, ensure that each material with a concentration above 100ppm has substance level information from the supplier for all chemicals contained in that material. Also ensure that the CASRN of each chemical and its amount are included, and enter all information into the HPD Builder, available online.

WEB ADDRESS OF HPD BUILDER

HPD Builder: <https://builder.hpd-collaborative.org/login>

WEB ADDRESS OF STANDARD

HPD 2.2. Standard: <https://www.hpd-collaborative.org/hpd-2-1-standard/>

STEP-BY-STEP INSTRUCTIONS

HPD Training Modules: <https://www.hpd-collaborative.org/c-training/>

HPD User Guide: https://www.hpd-collaborative.org/wp-content/uploads/2020/05/Manufacturer-HPD-Guide-v2.2_FINAL_May-2020.pdf

THINGS TO KNOW ABOUT TILE

The HPD Builder focuses on chemical hazards of the constituent substances and assigns a GreenScreen List Translator score for each CASRN that has been entered into the builder. If known, a GreenScreen Assessment Benchmark score can be added for each substance, replacing the List Translator score. Regardless of BM or LT scores, the hazard warnings for substances in HPDs do not account for exposure risk throughout all life cycle phases of the product. As such, the hazards shown on the HPD for substances may not be an accurate representation of the actual exposure risk to end-users. Manufacturers can describe this in the substance notes and general notes when developing HPDs and, in the future, by referencing the HPD Special Condition for Ceramic Compositions (still in development by HPDC).

MORE ON FUTURE SPECIAL CONDITION: CERAMIC COMPOSITIONS

TCNA and HPDC recognize there are practical limitations to disclosure. For some types of materials, the ability to identify and characterize substances and/or CASRNs on an HPD may not represent the final product accurately. In other cases, there are issues relating to the GreenScreen Assessment method, where CASRNs are limited in availability for chemically transformed substances present within final products. HPDC uses "Special Conditions" to resolve these issues.

For background, the HPD Open Standard includes specific guidelines, or "Special Conditions," to address known issues. Disclosing ceramic compositions is one of the known issues that the HPDC has been working on since 2018 with the TCNA and others to develop a Special Condition for Ceramic Compositions.

The following describes the issues related to disclosing ceramic compositions:

GreenScreen Scores and associated hazard listings are determined based on the inherent qualities of substances using a precautionary approach and available toxicity data resulting in HPDs reporting hazards regardless of exposure context. However, substances fused under high heat in a ceramic matrix have "locked away" the exposure pathways of most hazards from constituent substances to such a degree that it warrants reflection on how those hazards get reported in an HPD.

HPDC is currently developing other Special Conditions for metal alloys, polymers, float glass, etc. Due to similar issues, HPDC is giving ceramics specific consideration as well. The HPD Open

Standard is not locked into a “hazards only” approach. As systems improve for rigorous, objective reporting of exposure considerations, as well as hazard assessment of multi-constituent materials, HPDC has expressed willingness to incorporate such into the HPD Open Standard.

Although users of the HPDs want full disclosure of ingredient information and hazards, this is offset by the desire for a high “signal to noise” ratio. If the product’s ingredients are transformed to a high degree, displaying detailed information on their pre-transformation characteristics is considered noisy and unnecessary to include.

HPDCs objective is to activate an option within the HPD reporting format allowing entry of “Special Condition: Ceramics” with no associated CASRN as a substance entry. All substances used prior to their transformation into a ceramic material will still need to be listed to 100ppm (or 1000ppm), but this information will likely be permitted to be included by reference using separate supplier HPDs, not within the product HPD itself. Additionally, the added Special Condition context will enable a practical strategy of providing substance-level hazard disclosure with statements to explain relevance to end users through notes describing the reduced hazard significance of certain substances where applicable.

The TCNA/HPDC Special Conditions work is still under development, and updates will be provided as they occur. Further, the proposed HPDC Special Condition is only inclusive of tile products, not tile installation materials.

Until the HPDCs Special Conditions are finalized, it is recommended that ceramic tile, mortar, and grout manufacturers continue inventorying, screening, and disclosing at the substance level to appropriate thresholds.

EXAMPLES OF HPD REPORTS

See Examples in Appendix A.

MANUFACTURER'S INVENTORY (MI)

(D1 - D6)



WHO:

There is no governing body for this format of chemical disclosure, only guidance and requirements on compliance with LEED and other green and healthy building programs. Clean Production Action, in their How to Use GreenScreen in LEED V4 guidance document, offers insight on how to incorporate GreenScreen LT or BM Scores into an MI. The USGBC LEED v4 and v4.1 Reference Guides also provide additional instructions for developing an MI.

WHAT:

An MI is a generic format for a manufacturer's public disclosure of a product inventory at 100ppm or 1000 ppm thresholds. An MI can be completed by a manufacturer in a format deemed suitable by the manufacturer for disclosing product material ingredients and substance screening results. Given the self-developed nature of the MI reporting format, verification by a third-party adds credibility and fosters market acceptance. Because MIs can vary from manufacturer to manufacturer, WAP Sustainability employs a common framework, which, if used by ceramic tile, mortar, and grout manufacturers, can facilitate industry consistency in MI reporting and minimize any confusion. Also, unlike an HPD which is made publicly available on HPDCs website once finalized, an MI needs to be made available for download from a manufacturer's website, sustainable product database, or third-party library of certified disclosures.

WHY?

A correctly executed MI provides the same level of disclosure as an HPD and can satisfy market demands in green and healthy building certification programs. An MI also offers flexibility in the manufacturer's presentation of information, and in the case of ceramic tile, mortar, and grout, a vehicle to manually reference relevant TCNA GreenScreen Assessment results.

HOW MANY?

WAP Sustainability estimates there are currently over 250 MIs available from suppliers.

THIRD-PARTY VERIFIED?

Yes. WAP Sustainability and GreenCircle Certified are currently the only organizations offering 3PV of MIs. TCNA Material Ingredient Guide participants who incorporate TCNA GreenScreen Benchmark Assessment scores into their individual product MIs can be provided 3PV by WAP Sustainability.

MANUFACTURER INVENTORY GUIDANCE

1. Create an MI using a comprehensive content inventory created for a product, ensuring that substance concentrations are known and listed when present above 1000 ppm or 100 ppm.

2. Obtain SDS documents for all chemical substance inputs identified by CASRN so that they may be attached to the report. Additional supply chain data may need to be collected.
3. Obtain a screening result for each substance and develop the MI documentation by listing all substances contained within the product by name and CASRN, their role and concentration, and screening results. In the case of ceramic tile, mortar, and grout, many of the substances have been fully assessed and are included within TCNA's industry-wide inventory of GreenScreen Assessment BM scores, which can be assigned to applicable substances.
4. Follow the MI example template on the next page, and submit to WAP Sustainability for 3PV, if desired.

THINGS TO KNOW ABOUT TILE

MI is a convenient format for tile and tile installation product manufacturers to utilize to communicate material ingredient information. As an MI report is manually developed, there is no online software to automatically assign a screening score to each substance input. However, relevant substance information and associated GreenScreen Scores can be drawn from TCNA's inventory of common tile industry ingredients when developing an MI. An MI also offers a blank canvas for manufacturers to elaborate on substance properties, their role in manufacturing and the end product, and exposure relevance to end users.

STEP-BY-STEP INSTRUCTIONS (MI INSTRUCTIONS INTEGRATED WITHIN GREENSCREEN AND LEED GUIDANCE DOCUMENTATION):

How to use GreenScreen in LEED

<https://www.greenscreenchemicals.org/learn/how-to-gs-leed-request>

LEED V4.1 Reference Guide

<https://www.usgbc.org/leed/v41>

EXAMPLES OF MI REPORTS

See examples in Appendix B.

INGREDIENT DISCLOSURE: OTHER REPORTING FORMATS

Recognizing other reporting formats are available to manufacturers and understood by the market, it is important to be familiar with them and understand why HPD and MI are recommended for ceramic tile, mortar, and grout. Other reporting formats include the following programs: Cradle to Cradle Material Health Assessments, Chemical Footprint Project, Living Product Challenge, Product Lens, Declare Labels, and Proposition 65.

PUTTING IT ALL TOGETHER **(for manufacturers)**



At this point, you should be able to...

1. Understand why standardized or 3rd party verified disclosure of product material ingredients is a necessary condition of product transparency.
2. Understand that such disclosure can be achieved using either of two reporting mechanisms recommended for ceramic tile, mortar and grout manufacturers -- HPD or MI.
3. Submit substances level product information and associated screening results into the HPD Builder and/or an MI reporting template.
4. Consider 3PV for each product HPD or MI, available to TCNA Material Ingredient Guide participants from WAP Sustainability when product reports include substance information and associated scores drawn from TCNA's inventory of common ceramic tile, mortar, and grout ingredients.

THE OPTIMIZATION PROCESS

Material ingredient disclosure for ceramic tile, mortar, and grout using an MI or HPD per the steps outlined in this guide gives green and healthy building project teams multiple options for optimization. Simply put, optimization involves selecting products with the most thorough material ingredient reports. Green and healthy building rating programs incentivize optimization by awarding points to projects which use products for which material ingredient information has been inventoried, screened and assessed, and disclosed at the highest possible level.

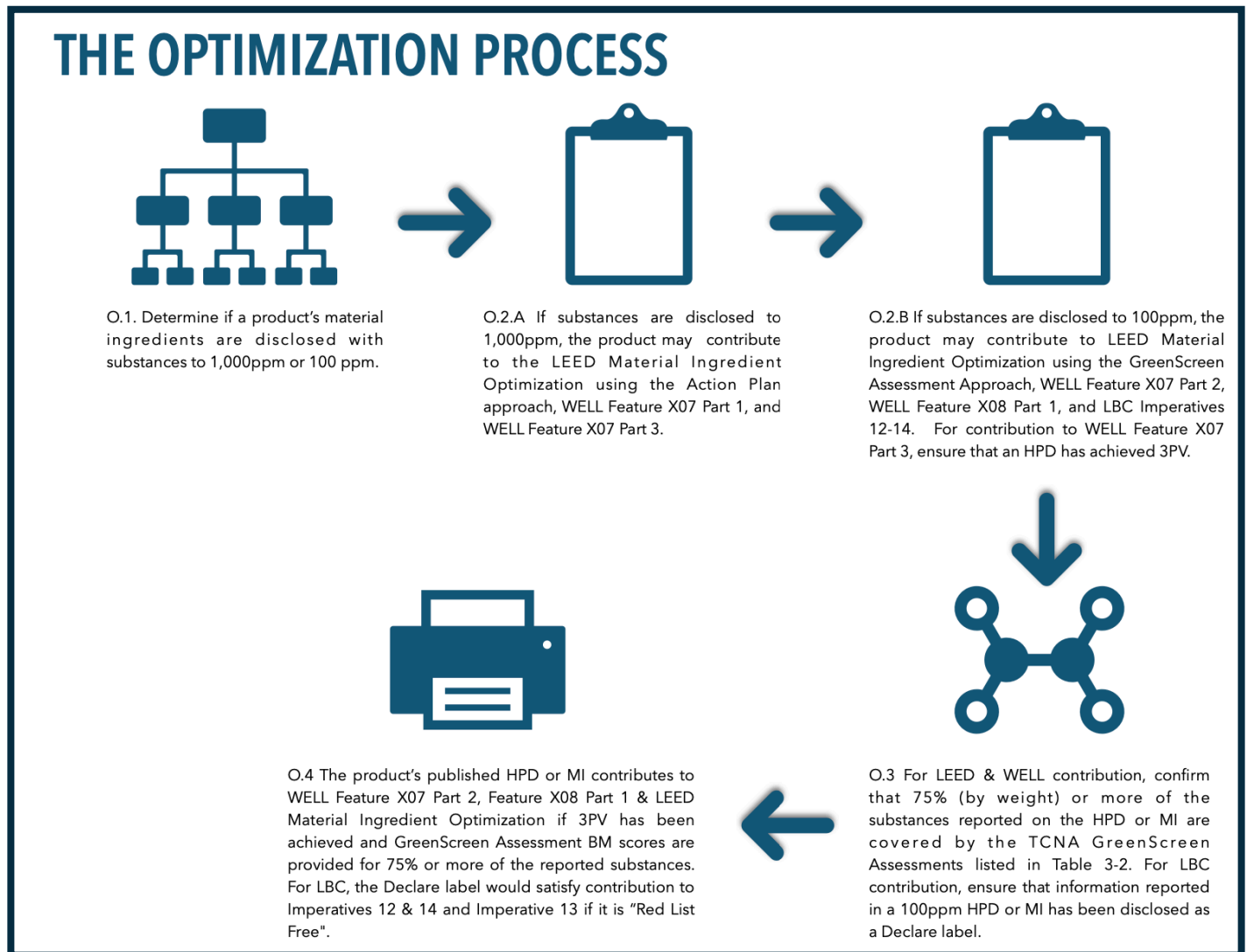


Figure 5.0 The Optimization Process

This guide focuses on three major green and healthy building rating programs common to the market which incentivize optimization, including LEED, WELL Building, and the Living Building Challenge. Herein, guidance is provided on how the tile industry's GreenScreen Assessments of common ingredients and recommended steps toward disclosure positively position ceramic tile, mortar, and grout for optimal product recognition and contribution to transparency credits in each program. Such contribution is an important advantage over other products without such transparency that might be considered to fill the same or comparable roles in buildings.

LEED V4 AND V4.1 (O1-O4)

Under the LEED v4 and v4.1 rating system, “points” toward certification can be obtained if a project team makes sustainable choices while designing, constructing, and operating a new or existing building or major renovation. Building materials and systems chosen for a project play an important role in satisfying requirements needed to attain certification. Regarding the use of building products that exhibit material ingredient transparency, a project can earn a total of two points: 1) first point if a minimum number of products achieve “Material Ingredient Reporting,” 2) an additional point if a minimum number of products achieve “Material Ingredient Optimization.”

MATERIAL INGREDIENT REPORTING

The first point is awarded to a project if 20 different permanently installed products from at least five different manufacturers use any of the LEED-specified material ingredient reporting formats to disclose product ingredients to at least 1000 ppm. HPD and MI reporting formats are both acceptable, thus ceramic tile, mortar, and grout products with material ingredient reports per either reporting format are eligible for contribution to LEED’s Material Ingredient Reporting credit. A single product counts 1x toward the 20-product threshold if the necessary steps outlined in this guide are followed toward preparing a product’s material ingredient inventory, listing each ingredient’s GreenScreen LT score, and disclosing this information through publishing an HPD or MI.

It should be noted that following WAP Sustainability’s recommended more stringent inventory threshold of 100ppm means that LEED’s 1,000 ppm threshold for the Material Ingredient Reporting credit is inherently satisfied. Furthermore, initial screening and assignment of a GreenScreen LT score for each ingredient suffices for this credit, and additional assessment is not required. The full benefits of inventorying, screening and assessing, and disclosing to 100ppm can be realized when pursuing LEEDv4 and v4.1’s additional material ingredient transparency point for Material Ingredient Optimization.

MATERIAL INGREDIENT OPTIMIZATION

A project is eligible for an additional point if five different permanently installed products from at least three different manufacturers satisfy a host of defined optimization pathways. Based on WAP Sustainability’s experience, very few LEED projects have been awarded this additional point due to a lack of building product manufacturers who have pursued optimization. However, resulting from the efforts of TCNA and its members to list, screen, and fully assess common industry ingredients at the substance level of 100 ppm, two of LEED’s specified optimization pathways are directly achievable for ceramic tile, mortar, and grout manufacturers: The Material Ingredient Optimization Action Plan Approach and the GreenScreen Assessment Optimization

Approach. Following either approach gives ceramic tile, mortar, and grout a competitive advantage over competing building products toward qualifying for LEED projects.

The following provides a breakdown of the criteria for the GreenScreen Assessment approach to the LEED Material Ingredient Optimization Credit.

A single product counts 1x toward the five-product threshold if:

- The product's material ingredients have been inventoried to 100ppm, and
- GreenScreen Assessment BM scores are assigned to at least 75% (by weight) of the listed substances, and
- The information is disclosed through publishing an HPD or MI, and
- The HPD or MI has been third-party verified (3PV).

A single product counts 1.5x toward the five-product threshold if:

- The product's material ingredients have been inventoried to 100ppm, and
- GreenScreen Assessment BM scores are assigned to at least 95% (by weight) of the listed substances with no BM-1 hazards, and
- GreenScreen LT scores are assigned to the remaining 5% (by weight) of the listed substances with no LT-1 hazards, and
- The information is disclosed through publishing an HPD or MI, and
- The HPD or MI has been third-party verified (3PV).

1x contribution is highly achievable for ceramic tile, mortar, and grout products. Following the suggested steps in this Material Ingredient Guide, particularly in "Applying TCNA's GreenScreen Assessments," manufacturers are encouraged to determine if 75% of the substances listed in a product-specific content inventory are included in TCNA's list of commonly used ingredients. If so, with reference-able GreenScreen BM scores and 3PV available from WAP Sustainability to participating companies, ensuring that ingredients are inventoried to 100ppm and that necessary disclosure steps are followed to develop an HPD or MI leads to 1x product contribution to this LEED credit.

Although not likely, 1.5x contribution might be possible if 95% of the substances listed in a product-specific content inventory are included in TCNA's list of commonly used ingredients and if none of the substances have been assigned BM-1 hazards.

It is possible that a ceramic tile, mortar, or grout product will not qualify for at least 1x contribution, perhaps for either of two reasons: 1) Substance disclosures in an MI or HPD do not meet the minimum 100 ppm threshold, but do meet 1000 ppm, or 2) At least 75% of the ingredients listed in an MI or HPD are not included in TCNA's list of common ingredients or cannot otherwise be assigned a GreenScreen BM score. In these cases, a product may still

contribute 0.5x toward the five-product threshold of LEED's Material Ingredient Optimization credit if a Material Ingredient Optimization Action Plan is developed.

The following provides a breakdown of the criteria for the Material Ingredient Optimization Action Plan approach to the LEED Material Ingredient Optimization Credit.

A single product counts 0.5x toward the five-product threshold if:

- The manufacturer has screened and disclosed the product ingredients to at least 1000 ppm using any of the LEED-specified formats for "Material Ingredient Reporting," and
- The manufacturer has completed a detailed action plan to mitigate or reduce known hazards using principles of green chemistry. The action plan must be product-specific (rather than the company, manufacturer, or brand), and must include the following information:
 - Description of the screening or assessment platform used by the manufacturer to complete the material ingredient screening and analysis.
 - Identification of the specific green chemistry principles targeted for implementation in the action plan.
 - Description of the specific steps planned for the implementation of the action plan. Include proposed changes in formulation or manufacturing processes that are anticipated as part of the green chemistry optimization strategy.
 - Specific dates and a full timeline for completion of all the steps described in the action plan.

First, as is the case for "Material Ingredient Reporting," HPD and MI are both acceptable reporting formats for satisfying initial Material Ingredient Optimization Action Plan screening and disclosure criteria. Ceramic tile, mortar, and grout products with material ingredient reports prepared per the steps outlined in this guide to WAP Sustainability's recommended inventory threshold of 100ppm inherently satisfy the minimum Material Ingredient Optimization Action Plan threshold of 1,000 ppm. GreenScreen Assessment BM scores should be disclosed, if available, and if not, initial GreenScreen LT scores should be disclosed.

Next, a Material Ingredient Optimization Action Plan can be developed using the template provided in Appendix C. An editable Microsoft Word version of this template is available from WAP Sustainability. Manufacturers should use the Material Ingredient Optimization Action Plan approach for products to obtain the 0.5x contribution to LEED's Material Ingredient Optimization criteria only if a 1x or 1.5x contribution using the GreenScreen Assessment approach is not possible.

WELL BUILDING (O1-O4)

The WELL Building Standard® is a performance-based system for measuring, certifying, and monitoring features of the built environment that impact human health and wellbeing. WELL is managed and administered by the International WELL Building Institute (IWBI) and offers two credits (“features”) related to material ingredient transparency which are best suited for users of this guide: Well Feature X07 – Material Transparency – Parts 1, 2, and 3, and WELL Feature X08 – Materials Optimization – Part 1.

WELL Feature X07 - Material Transparency - Part 1 - Disclosed Ingredients

A WELL Building project can earn 1 point if material ingredient information is disclosed for at least 50% (by count) of the permanently installed products, or 25 permanently installed products, whichever is less (including interior finishes, materials, and furnishings). Each product must be evaluated and disclosed to at least 1,000ppm using any of the WELL-specified material ingredient reporting formats. WELL accepts the HPD and MI reporting formats, thus ceramic tile, mortar, and grout products with material ingredient reports per either reporting format are eligible for contribution to this credit. Feature X07 prioritizes material ingredient transparency to offer specifiers tools to make fully informed choices when selecting healthier products.

WELL Feature X07 - Material Transparency - Part 2 - Enhanced Ingredient Disclosure

Feature X07 - a 2nd point can be earned if material ingredient information is disclosed for 15 permanently installed products (including interior finishes, materials and furnishings) to 100ppm using any of the WELL-specified material ingredient reporting formats. HPD and MI reporting formats are both acceptable, thus ceramic tile, mortar, and grout products with material ingredient reports per either reporting format are eligible for contribution to this credit.

Following WAP Sustainability’s recommended inventory threshold of 100ppm not only satisfies WELL Feature X07 - Part 2 criteria, but Part 1 criteria are also inherently satisfied, which means a material ingredient report prepared per this guide for a single product can contribute toward two WELL points.

WELL Feature X07 - Material Transparency - Part 3 - Third-Party Verified (3PV) Ingredients

A 3rd point can be earned if disclosed ingredient information, per Part 1 and/or Part 2, achieves 3PV. It is important to note HPDs are listed as one of the WELL-specified reporting formats eligible for 3PV and contribution to this credit, and MIs are not.

Following the suggested steps in this Material Ingredient Guide, contribution to at least two of the three available points under WELL Feature X07 is highly achievable for ceramic tile, mortar, and grout products. With 3PV available from WAP Sustainability to participating companies, contribution toward the third point is also achievable for manufacturers who pursue the HPD reporting format.

WELL Feature X08 - Materials Optimization - Part 1 - Enhanced Chemical Restrictions

A WELL Building project can earn 1 point if material ingredient information is disclosed for at least 25 permanently installed products (including interior finishes, materials, and furnishings) to at least 100ppm, and if the disclosure has been optimized using any of the WELL-specified optimization strategies. Material ingredient reports conforming to LEED Material Ingredient Optimization criteria are acceptable for contribution to this credit. This means that an MI or HPD that has been prepared for a ceramic tile, mortar, or grout product per this guide can contribute if: substances are reported to 100ppm, GreenScreen Assessment BM scores have been assigned to at least 75% (by weight) of the reported substances, and 3PV has been achieved.

In summary, through WELL Features X07 and X08 ceramic tile, mortar, and grout material ingredient reports, prepared pursuant to this guide can contribute to four points on WELL building projects.

LIVING BUILDING CHALLENGE (O1-O4)

The Living Building Challenge (LBC) is an international sustainable building certification program created in 2006 by the non-profit International Living Future Institute (ILFI). Within the LBC 4.0 Standard, material ingredient requirements are integrated under the Materials Petal, covering Imperatives 12, 13 and 14.

Imperatives 12 & 14

Imperatives 12 and 14 require that, “all projects contain two Declare labeled products per 200 square meters of gross building area, or project area, whichever is smaller, up to forty products.” Project teams must also advocate to any manufacturers that are not participating in Declare, asking them to register their products in the Declare database.

Declare is an ingredient label for building products, similar to an HPD or MI, where manufacturers disclose the ingredients in their products to communicate that they are free of Red List chemicals. If a product has no Red List compounds, it receives the special designation of “Red List Free,” expressed on a Declare label. In addition to helping satisfy Imperative 12 and 14 criteria, Declare labels provide useful information to specifiers seeking conformance to Imperative 13.

Also, under Imperatives 12 and 14, “all projects (except residential) must incorporate one product certified under the Living Product Challenge per 1,000 square meters of gross building area or project area, whichever is smaller, up to three products.” Residential projects only need to incorporate one product per project certified under the Living Product Challenge.

The Living Product Challenge is a comprehensive third-party verification program developed by ILFI taking into account a number of other product ingredient reporting and assessment initiatives, including HPD, Cradle to Cradle, GreenScreen for Safer Chemicals, and BIFMA Level.

To obtain Living Product Challenge certification, a product must have a “Red List Free” Declare Label. In addition, each of a product’s ingredients must have undergone a full GreenScreen® Assessment.

Using ceramic tile, mortar, and grout can help LBC project teams meet Imperatives 12 and 14. Although steps toward developing a Declare label were not covered in the Disclosure section of this guide, manufacturers can use a product’s ingredient information contained within an HPD or MI to generate a Declare Label using ILFI’s online software. Furthermore, ceramic tile, grout, and mortar products may be eligible for Living Product Challenge certification, also required per LBC Imperatives 12 and 14, for two reasons: 1) “Red List Free” Declare labels are possible as none of the Table 3-2 chemicals common to ceramic tile, mortar, and/or grout are included in ILFI’s Red List, 2) Each of the chemicals listed in Table 3-2 has undergone a full GreenScreen® Assessment, which can be applied toward Living Product Challenge certification.

Imperative 13

Imperative 13 requires 90%, by cost, of a building project’s products be free of chemicals included in ILFI’s Red List, which is a catalogue of the 22 worst-in-class chemical families. Each chemical listed in a product’s material ingredient report which has been developed following the steps within this guide can be reviewed to determine whether it appears in ILFI’s Red List. From TCNA’s list of chemicals common to ceramic tile, mortar, and/or grout, provided in Table 3-2, none appear on ILFI’s Red List. Furthermore, introduced in 2019, ILFI has also developed a Watch List of chemicals that are candidates for future Red List inclusion, none of which appear in Table 3-2. Therefore, it is highly likely that ceramic tile, mortar, and grout products meet the criteria of Imperative 13.



PUTTING IT ALL TOGETHER

(for manufacturers)

LEED Optimization

Step by step guidance for ceramic tile, mortar, and grout contribution to
LEED v4 and v4.1 BPDO - Material Ingredients Credit and Optimization Credits

Note: Other options exist, but the steps below are deemed most applicable based on this Guide.

Material Ingredient Reporting (Contribution to 1st LEED point)

1. Provide a self-reported Manufacturer Inventory (MI) of CASRNs for the product to 1000ppm (each conforming product counts as +1 toward the requirements of the LEED MIR credit)

or

2. Provide a Health Product Declaration (HPD) to 1000ppm (each conforming product counts as +1 toward the requirements of the LEED MIR credit)

Material Ingredient Optimization (Contribution to 2nd LEED point)

1. From the reporting to 1000ppm above, provide a Material Ingredient Action Plan to mitigate/reduce known hazards using the principles of green chemistry - See Template in Appendix C (each conforming product counts as +0.5 toward the requirements of the LEED MIR credit)

or

2. Optimize the Disclosure with TCNA's GreenScreen Assessments (each conforming product counts as +1 toward the requirements of the LEED MIR credit)

- a. Start with an inventory of CASRNs for the product to 100 ppm or expand an existing inventory from 1000ppm to 100ppm via a self-reported Manufacturer Inventory or HPD
- b. Report GreenScreen Assessments Benchmark Scores for 75% (by weight) of the ingredients reported; can usually be compiled using Assessments provided in the Guide
- c. Demonstrate 3rd party verification of the 100ppm inventory and disclosure (HPD or MI) that include the associated GreenScreen Assessments; Third Party Verification is available from WAP Sustainability for project participants of this Guide



PUTTING IT ALL TOGETHER

(for manufacturers)

WELL Building Standard

Step by step guidance for ceramic tile, mortar, and grout contribution to
WELL 2.0 Materials Features

Note: Other options exist, but the steps below are deemed most applicable based on this Guide.

WELL Feature X07 - Material Transparency - Part 1 - Disclosed Ingredients (Contribution to 1st WELL point)

1. Provide a self-reported Manufacturer Inventory (MI) of CASRNs for the product to 1000ppm (each conforming product counts as +1 toward the requirements of the Feature X07 credit)

or

2. Provide a Health Product Declaration (HPD) to 1000ppm (each conforming product counts as +1 toward the requirements of the Feature X07 credit)

WELL Feature X07 - Material Transparency - Part 2 - Enhanced Ingredient Disclosure (Contribution to 2nd WELL point)

2. Expand reporting to 100ppm using an HPD or MI.

WELL Feature X07 - Material Transparency - Part 3 - Third-Party Verified (3PV) Ingredients (Contribution to 3rd WELL point)

1. Demonstrate 3rd party verification of the 100ppm HPD. Third Party Verification (3PV) is available from WAP Sustainability for project participants of this Guide (Note: MIs are not eligible for Part 3)

WELL Feature X08 - Material Optimization - Part 1 - Enhanced Chemical Restrictions (Contribution to 4rd WELL point)

a. Report GreenScreen Assessments Benchmark Scores for 75% (by weight) in the products HPD or MI of the ingredients reported to 100ppm; can usually be compiled using Assessments provided in the Guide. (Note: 3PV is required)



PUTTING IT ALL TOGETHER **(for manufacturers)**

Living Building Challenge

Step by step guidance for ceramic tile, mortar, and grout contribution to
Living Building Challenge 4.0 - Materials Petal

Note: Other options exist, but the steps below are deemed most applicable based on this Guide.

Imperative 12 & 14 (Contribution to 1st LBC credit)

1. Provide a self-reported Declare Label using the content inventory from a 100ppm HPD or MI.
(note: Declare Labels can be classified as Red List Free, Red List Approved, or Declared)

and/or

2. Obtain Living Product Challenge Certification for the product and utilize the GreenScreen Assessments to meet the Material Health Assessment requirements.

Imperative 13 (Contribution to 2nd LBC credit)

1. Document that the product is 'Red List Free' or 'Red List Approved' using the Declare Label or a Manufacturer Letter confirming no 'Red List' substances present in the product.

FINAL SUMMARY

Over the past several years, building professionals and large purchasers of building products have come to expect material ingredient transparency. The same “Right to Know” initiatives impacting various consumer products (e.g. food, cleaning products, and children’s products) are now affecting building products. The building industry response has been to promote, request, and, in some cases, require manufacturer disclosure of the chemicals making up their products. Most notably, as detailed in this guide, green and healthy building certification programs, including LEED, WELL Building, and Living Building Challenge, have established product disclosure criteria, reflecting that material ingredient transparency has become an integral component to building sustainability.

Demand for product ingredient disclosure has created important opportunities for specification of ceramic tile, mortar, and grout in green and healthy building. As such, TCNA and its members are committed to achieving thoroughness, consistency, and transparency in reporting material ingredient information. Furthermore, sharing many of the same ingredients throughout the industry, TCNA and its members were able to compile a list of chemicals common to ceramic tile, mortar, and/or grout, and subsequently crowdfund an initiative to fully assess the assembled list using the GreenScreen for Safer Chemicals® method. Manufacturers of ceramic tile, mortar, and grout can maximize the benefits of material ingredient reporting by integrating this information with their specific product composition and reporting such using either of two recommended reporting formats, HPDs or MIs. With an industry-wide effort to achieve material ingredient transparency using common ingredient information and following the 4 steps of material ingredient transparency outlined in this guide, WAP Sustainability believes that the North American ceramic tile industry will be responsible for the largest number of fully assessed material ingredient reports in the market.

When it comes to LEED building projects, these fully assessed material ingredient reports are eligible for contribution to two separate credits, Material Ingredient Reporting and Material Ingredient Optimization. Similarly, for WELL building projects, fully assessed material ingredient reports for ceramic tile, mortar, and grout developed following the steps in this guide can contribute to three separate credits for transparency, and a fourth for optimization. In fact, product contribution toward LEED and WELL optimization criteria is a feat rarely achieved by other building product industries. Finally, product ingredient information collected following the Inventory Process set forth in this guide can be used toward satisfying transparency criteria of Living Building Challenge projects. Furthermore, none of the chemicals in TCNA’s list of chemicals common to ceramic tile, mortar, and/or grout are included in ILFI’s Red List, giving the ceramic tile industry a competitive advantage over other flooring industries, including vinyl, wood, and others, toward product specification in Living Building Challenge projects.

This collaboration of North American ceramic tile, mortar, and grout manufacturers will result in common actions that can be taken to fully communicate material ingredient aspects of products.

Following this guide's suggested steps and referencing industry-wide GreenScreen Assessments® not only facilitates product compliance with green and healthy building certification programs, but also enhances brand trust with customers. As a result, the industry is well-positioned to benefit from increased market awareness making tile-related products synonymous with transparency.

KEY TERMS

Assessment Report Template

A report template used to document all the findings gathered during a GreenScreen Assessment.

Authorized GreenScreen Assessment

Authorized GreenScreen Assessment reports are conducted by authorized GreenScreen practitioners and may be upgraded to Certified GreenScreen Assessment reports by submitting them for quality control to a licensed GreenScreen profiler or Clean Production Action's toxicologist.

Authorized GreenScreen Practitioner

An individual who has completed advanced training in the GreenScreen Method has demonstrated scientific expertise and capacity to perform a high-quality GreenScreen assessment and is licensed by Clean Production Action to conduct GreenScreen Assessments for his or her registered organization.

CAS or CASRN

Chemical Abstract Service Registry Number (also known as "CAS#").

Certified GreenScreen Assessment

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 the GreenScreen Store, Interstate Chemicals Clearinghouse (IC2) database, Toxnot, and Pharos.

Chemical Substance ("Substance")

A substance of fixed composition, characterized by its molecular structure(s), which typically has an associated CASRN (and may also have synonymous CASRNs). Synonyms include: "constituent;" "ingredient;" "chemical;" "compound;" or "component."

CoHC

Chemical of High Concern.

Consultant

A consultant is a general term used to distinguish licensed GreenScreen profilers, Material Health Consultants, Third-Party Certifiers, and authorized GreenScreen practitioners. Consultants in this context are companies or individuals that help manufacturers understand how to apply material health transparency methods, gain insight into product ingredients, and earn LEED points.

Data Gap (DG)

A data gap indicates the 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_{DG} or -3_{DG}).

GreenScreen Assessment

A GreenScreen Assessment is a comprehensive chemical hazard assessment that is conducted using GreenScreen for Safer Chemicals “Guidance and Method Documents” (<http://www.greenscreenchemicals.org/method/method-documents>) and results in a GreenScreen Benchmark score (Benchmarks-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, based on the hazard profile of the chemical. The Benchmark criteria includes a combination or combinations of GreenScreen hazard endpoints and hazard classifications.

GreenScreen List Translator (LT)

A streamlined chemical hazard assessment method developed by Clean Production Action that produces GreenScreen List Translator scores.

GreenScreen List translator (LT) Scores

List Translator scores are based on screening chemicals against the GreenScreen Specified Lists using the GreenScreen List Translator method.

“LT-1” means “Likely GreenScreen Benchmark-1”. If a GreenScreen assessment was performed on the chemical, it would likely result in a Benchmark-1 score.

“LT-P1” means “Possible GreenScreen Benchmark-1”. Often, 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.

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 been well tested yet.

For complete details on the List Translator method see GreenScreen “Guidance and Method Documents” (<http://www.greenscreenchemicals.org/method/method-documents>).

GreenScreen Specified Lists

GreenScreen Specified Lists are chemical lists generated by the state, national and international governments, authoritative bodies, and expert organizations. These lists are recommended for use in identifying and classifying chemical hazards using the GreenScreen Hazard Criteria. The 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” (<http://www.greenscreenchemicals.org/method/method-documents>).

GreenScreen Specified Lists – Authoritative and Screening Lists

Authoritative lists are generated by recognized experts, often as part of a government's regulatory process to identify chemicals and known associated hazards. These lists are considered to be highly reliable and should only be changed when new data or special circumstances indicate that a new level-of-concern is warranted. The intervention of a toxicologist is typically required to validate such a change.

Screening Lists result in a classification with lower confidence because at least one of the following is true of the list. It was:

- a. developed using a less comprehensive review,
- b. compiled by an organization that is not considered to be authoritative,
- c. developed using predominantly or exclusively estimated data, or
- d. developed to identify chemicals for further review and/or testing.

Hazard Endpoint

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.

Hazard Summary Table

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” (<http://www.greenscreenchemicals.org/method/method-documents>).

Homogeneous Material (“Material”)

A uniform solid, liquid, or gas composed of one or more substances that, in principle, cannot be mechanically disjointed. 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. Coatings and finishes such as plating, powder coats, enamels, etc., are considered unique homogeneous materials.

Impurity

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).

Intentionally Used Substance

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 or gets washed off).

Licensed GreenScreen Profiler

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.

Manufacturer's Inventory

A report generated and publicly disclosed through the completion of a Product Inventory. Detailed requirements and a sample template are included in this document.

Manufacturer Statement of Disclosure

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.

Mixture

A chemical and the present 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).

MRSL

Manufacturers Restricted Substance List. A list of ingredients voluntarily restricted by a manufacturer.

MSDS

Material Safety Data Sheet.

PPM

A threshold used for inventorying substances in a product or material. One hundred (100) ppm is equivalent to 0.01% by weight.

Product

A finished good composed of parts, homogeneous materials, and/or chemical substances. A product may function as part of another product. A product may be made of one or more homogeneous materials.

Product Inventory

Inventory of the chemical substances within a product.

Proprietary Ingredient

Ingredients in products that are confidential to the manufacturer or producer.

Relevant Transformation Product

An environmental transformation product that is 1) persistent enough to be encountered after use or released from the parent chemical and 2) NOT a substance necessary for life or commonly formed in the ambient environment.

SDS

Safety Data Sheet

Third-Party Certifier or Verifier

A third-party organization recognized to provide third-party certification or verification for manufacturer claims for submittal documents.

HUMAN HEALTH ENDPOINTS SUMMARY

As defined earlier in this document, the detrimental effects of a hazardous chemical are referred to as an endpoint. Some of these endpoints are familiar to consumers, such as carcinogenicity and respiratory sensitization. Others, such as neurotoxicity and bioaccumulation, are less familiar. This section summarizes each endpoint to provide a better understanding of how the chemicals are measured.

It is important to note that some endpoints are directly related to the body, while others are related to environmental factors.

- 1. Carcinogenicity** - the ability to cause or increase the risk of cancer.
- 2. Mutagenicity/Genotoxicity** - the ability to cause or increase the rate of mutations (changes in the genetic material in cells).
- 3. Reproductive Toxicity** - the ability to disrupt the male or female reproductive systems, changing sexual development, behavior, or functions, decreasing fertility or resulting in the loss of the fetus during pregnancy.
- 4. Developmental Toxicity (including developmental neurotoxicity)** - the ability to cause harm to the developing child, including birth defects, low birth weight, and biological or behavioral problems that appear as the child grows.
- 5. Endocrine Activity** - the ability to interfere with hormone communication between the cells that control metabolism, development, growth, reproduction, and behavior (the endocrine system). Not currently included in GHS.
- 6. Acute Mammalian Toxicity** - potential to be fatal upon contact, ingestion, or inhalation for humans and other mammals.
- 7. Systemic Toxicity/Organ Effects (including immunotoxicity)** - single exposure - the ability to cause specific, non-lethal, but serious damage upon contact, ingestion, or inhalation to one or more organs (such as the heart, lungs, liver) distant from the toxicant point of entry.
- 8. Neurotoxicity** - single exposure - the ability to cause damage to the nervous system, including the brain. Not currently included in GHS.
- 9. Eye Irritation** - the ability to cause irritation or serious damage to the eye.
- 10. Skin Irritation** - the ability to cause irritation or serious damage to the skin.
- 11. Systemic Toxicity/Organ Effects (including immunotoxicity)** - repeated exposure - the ability to cause specific, non-lethal but serious damage on contact or ingestion or inhalation, to one or more organs (such as the heart, lungs, liver) distant from the point of entry of the toxicant over long-term repeated exposures.
- 12. Neurotoxicity** - repeated exposure - the ability to cause serious damage to the nervous system over long-term repeated exposures.
- 13. Respiratory Sensitization** - the ability to result in high sensitivity such that small quantities trigger asthma, rhinitis, or other allergic reactions in the respiratory system.

14. Skin Sensitization - the ability to trigger allergic reactions on the skin.

Ecotoxicity

15. Acute Aquatic Toxicity - a single exposure in a day may result in severe biological harm or death to fish and other aquatic organisms.

16. Chronic Aquatic Toxicity - long-term exposure of months or years may result in irreversible harm to fish or other aquatic organisms.

17. Terrestrial Ecotoxicity - the ability to cause harm to land-based plants, animals, or microorganisms.

Physical Hazard

18. Flammability - easily ignited and capable of burning rapidly.

19. Reactivity - may spontaneously ignite or explode on its own or in contact with water.

Environmental fate

20. Persistent - does not break down readily from natural processes. Not currently included in GHS.

21. Bioaccumulative - accumulates in organisms, concentrating as it moves up the food chain. Not currently included in GHS.

22. Persistent Bioaccumulative Toxicant (PBT) - having characteristics of persistence and bioaccumulation, and is considered harmful in small quantities. Not currently included in GHS.

23. Global Warming - the ability to absorb thermal radiation, increasing the temperature of the atmosphere, and contributing to climate change. Not currently included in GreenScreen or GHS.

24. Ozone Depletion - the ability to contribute to chemical reactions that destroy the ozone in the earth's upper atmosphere. Not currently included in GreenScreen or GHS.

25. Multiple - list specifies more than one of the above endpoints.

Abbreviations

C2C - Cradle to Cradle Certified Products Program

C2CPII - Cradle to Cradle Products Innovation Institute

CASRN - Chemical Abstract Service Registration Number

CPA - Clean Production Action

GBCI - Green Building Certification Institute

GS - GreenScreen

HPD - Health Product Declaration

HPDC - Health Product Declaration Collaborative

ILFI - International Living Future Institute

IWBI - International Well Building Institute

LEED - Leadership in Energy and Environmental Design

MI - Manufacturers' Inventory

MR - Materials and Resources

MSDS - Material Safety Data Sheet

REACH - Registration, Evaluation, Authorization and Restriction of Chemicals

SDS - Safety Data Sheet

SVHC - Substance of Very High Concern

TCNA - Tile Council of North America

USGBC - United States Green Building Council

WAP - WAP Sustainability Consulting

APPENDIX A - (UNPUBLISHED) EXAMPLE HEALTH PRODUCT DECLARATION (MORTAR)

Mortar Example

Health Product Declaration v2.2

created via: DRAFT

CLASSIFICATION: 09 30 00

PRODUCT DESCRIPTION: THIS EXAMPLE HPD WAS CREATED AS PART OF THE TCNA MATERIAL HEALTH GUIDE.

+ Section 1: Summary

Basic Method/Product Threshold

CONTENT INVENTORY

Inventory Reporting Format <input type="radio"/> Nested Materials Method <input checked="" type="radio"/> Basic Method	Threshold Level <input checked="" type="radio"/> 100 ppm <input type="radio"/> 1,000 ppm <input type="radio"/> Per GHS SDS <input type="radio"/> Per OSHA MSDS <input type="radio"/> Other	Residuals/Impurities <input checked="" type="radio"/> Considered <input type="radio"/> Partially Considered <input type="radio"/> Not Considered Explanation(s) provided for Residuals/Impurities? <input checked="" type="radio"/> Yes <input type="radio"/> No	<i>All Substances Above the Threshold Indicated Are:</i> Characterized <input type="radio"/> Yes Ex/SC <input checked="" type="radio"/> Yes <input type="radio"/> No <i>% weight and role provided for all substances</i> Screened <input type="radio"/> Yes Ex/SC <input checked="" type="radio"/> Yes <input type="radio"/> No <i>Screened using Priority Hazard Lists with results disclosed</i> Identified <input type="radio"/> Yes Ex/SC <input checked="" type="radio"/> Yes <input type="radio"/> No <i>Disclosed by Name (Specific or Generic) and identifier</i> SC = Special Condition (See Notes)
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CONTENT IN DESCENDING ORDER OF QUANTITY

Summary of product contents and results from screening individual chemical substances against HPD Priority Hazard Lists and the GreenScreen for Safer Chemicals®. The HPD does not assess whether using or handling this product will expose individuals to its chemical substances or any health risk. Refer to Section 2 for further details.

MATERIAL | SUBSTANCE GREENSCREEN SCORE HAZARD TYPE;

QUARTZ BM-1 CAN; CALCIUM OXIDE BM-2 ; ALUMINUM OXIDE BM-2 RES | CAN; BORIC OXIDE BM-2 REP | MUL; DIIRON TRIOXIDE BM-2 CAN; SULFUR TRIOXIDE BM-2 MAM; SODIUM OXIDE BM-2 ; TBD POLYMER NoGS ; TBD ADDITIVES NoGS ; WATER BM-4 ; FORMIC ACID, CALCIUM SALT BM-3 ; GYPSUM BM-3dg ; TITANIUM DIOXIDE BM-2 CAN | END;

Number of GreenScreen® BM-4/BM-3 contents: 1

Contents highest concern GreenScreen® Benchmark or List Translator Score: BM - 1

Nanomaterial: No contents are characterized as a nanomaterial

INVENTORY AND SCREENING NOTES

At least 75% of the substances in this product have GreenScreen Benchmark Scores.

VOLATILE ORGANIC COMPOUND (VOC) CONTENT

VOC Content data is not applicable for this product category.

CERTIFICATIONS AND COMPLIANCE See Section 3 for additional listings

VOC Emissions: GREENGUARD Gold

CONSISTENCY WITH OTHER PROGRAMS

Pre-checked for LEED v4.0 & v4.1 Material Ingredients Option 1 and Option 2.

Third Party Verified? <input checked="" type="radio"/> Yes <input type="radio"/> No	PREPARER: Self-Prepared VERIFIER: WAP Sustainability VERIFICATION #:	SCREENING DATE: PUBLISHED DATE: Not published on the HPDC repository EXPIRY DATE: Not published on the HPDC repository
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Section 2: Content in Descending Order of Quantity

Basic Method/Product Threshold

This section lists contents in a product based on specific threshold(s) and reports detailed health information including hazards. This HPD uses the inventory method indicated above, which is one of three possible methods:

- Basic Inventory method with Product-level threshold
- Nested Material Inventory method with Product-level threshold
- Nested Material Inventory method with individual Material-level thresholds

Definitions and requirements for the three inventory methods and requirements for each data field can be found in the HPD Open Standard version 2.2, available on the HPDC website at: www.hpd-collaborative.org/hpd-2-2-standard

MORTAR EXAMPLE

PRODUCT THRESHOLD: 100 ppm RESIDUALS AND IMPURITIES CONSIDERED: Considered
 RESIDUAL/IMPURITIES NOTES: Residuals and impurities were considered and those that fall above the stated threshold are included.
 OTHER PRODUCT NOTES:

QUARTZ

ID: 14808-60-7

HAZARD TYPE	AGENCY AND LIST TITLES	WARNINGS
CAN	Australia - GHS	Carcinogenicity – category 1A
CAN	Australia - GHS	Specific target organ toxicity (repeated exposure) – category 1
CAN	Australia - GHS	H350i
CAN	CA EPA - Prop 65	cancer
CAN	IARC	1
CAN	Japan - GHS	CarcinogenicityCategory 1A
CAN	MAK	Carc. 1
CAN	New Zealand - GHS	6.7A
CAN	US NIH - Report on Carcinogens	Known Carcinogen

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.

CALCIUM OXIDE

ID: 1305-78-8

HAZARD TYPE	AGENCY AND LIST TITLES	WARNINGS
None Found	No warnings found on HPD Priority Lists	

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.

ALUMINUM OXIDE

ID: 1344-28-1

HAZARD TYPE	AGENCY AND LIST TITLES	WARNINGS
CAN	MAK	Carc. 2
RES	AOEC - Asthmagens	Rs

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.

BORIC OXIDE

ID: 1303-86-2

HAZARD TYPE	GS: BM-2	RC: None	NANO: NO	ROLE: Filler
MUL	AGENCY AND LIST TITLES ChemSec - SIN List		WARNINGS Classified CMR according to Annex VI of Regulation 1272/2008	
REP	Australia - GHS		Reproductive toxicity – category 1B	
REP	Australia - GHS		H360FD	
REP	EU - Annex VI CMRs		Repr. 1B	
REP	EU - GHS (H-Statements)		H360FD	
REP	EU - REACH Annex XVII CMRs		Entry 30 — Toxic to reproduction: category 1B (Table 3.1)/category 2 (Table 3.2)	
REP	Japan - GHS		Reproductive toxicity Category 1B	
REP	Korea - GHS		Reproductive toxicity 1	

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.

DIIRON TRIOXIDE

ID: 1309-37-1

HAZARD TYPE	GS: BM-2	RC: None	NANO: NO	ROLE: Binder
CAN	AGENCY AND LIST TITLES MAK		WARNINGS Carc. 3B	

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.

SULFUR TRIOXIDE

ID: 7446-11-9

HAZARD TYPE	GS: BM-2	RC: None	NANO: NO	ROLE: Binder
MAM	AGENCY AND LIST TITLES US EPA - EPCRA Extremely Hazardous Substances		WARNINGS Extremely Hazardous Substances	

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.

SODIUM OXIDE

ID: 1313-59-3

HAZARD TYPE	GS: BM-2	RC: None	NANO: NO	ROLE: Filler
None Found	AGENCY AND LIST TITLES No warnings found on HPD Priority Lists		WARNINGS	

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.

TBD POLYMER

ID: TBD POLYMER

HAZARD TYPE	GS: NoGS	RC: None	NANO: NO	ROLE: Binder
None Found	AGENCY AND LIST TITLES No warnings found on HPD Priority Lists		WARNINGS	

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction. This placeholder would house the polymer data collected from suppliers.

TBD ADDITIVES

ID: TBD ADDITIVES

HAZARD TYPE	GS: NoGS	RC: None	NANO: NO	ROLE: Viscosity modifier
None Found	AGENCY AND LIST TITLES No warnings found on HPD Priority Lists		WARNINGS	

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction. This placeholder would house the additive data collected from suppliers.

WATER

ID: 7732-18-5

%: 0.5-1	GS: BM-4	RC: None	NANO: NO	ROLE: Filler
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.

FORMIC ACID, CALCIUM SALT

ID: 544-17-2

%: 0.2-0.6	GS: BM-3	RC: None	NANO: NO	ROLE: Filler
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.

GYPSUM

ID: 13397-24-5

%: 0.2-0.6	GS: BM-3 _{dg}	RC: None	NANO: NO	ROLE: Binder
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.

TITANIUM DIOXIDE

ID: 13463-67-7

%: 0.05-0.5	GS: BM-2	RC: None	NANO: NO	ROLE: Filler
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
CAN	CA EPA - Prop 65		cancer	
CAN	IARC		2B	
CAN	MAK		Carc. 4	
CAN	US CDC - Occupational Carcinogens		Occupational Carcinogen	
END	TEDX - Potential Endocrine Disruptor		Potential Endocrine Disruptor	

SUBSTANCE NOTES: A range is provided due to the naturally occurring nature of the materials and the variable composition based on exact location of extraction.



Section 3: Certifications and Compliance

This section lists applicable certification and standards compliance information for VOC emissions and VOC content. Other types of health or environmental performance testing or certifications completed for the product may be provided.

VOC EMISSIONS

CERTIFYING PARTY: Third-Party

EXPIRY DATE:

APPLICABLE FACILITIES: All

CERTIFICATE URL: www.example.com

CERTIFICATE AND COMPLIANCE NOTES:

GREENGUARD Gold

ISSUE DATE: 2020-01-01

CERTIFIER OR LAB: UL Environment



Section 4: Accessories

This section lists related products or materials that the manufacturer requires or recommends for installation (such as adhesives or fasteners), maintenance, cleaning, or operations. For information relating to the contents of these related products, refer to their applicable Health Product Declarations, if available.

No accessories are required for this product



Section 5: General Notes

Mortar Example

Unpublished Draft HPD
Page 5 of 6



Section 6: References

MANUFACTURER INFORMATION

MANUFACTURER:
ADDRESS:

CONTACT NAME:
TITLE:
PHONE:
EMAIL:

WEBSITE:

The listed contact is responsible for the validity of this HPD and attests that it is accurate and complete to the best of his or her knowledge.

KEY

OSHA MSDS Occupational Safety and Health Administration Material Safety Data Sheet
GHS SDS Globally Harmonized System of Classification and Labeling of Chemicals Safety Data Sheet

Hazard Types

AQU	Aquatic toxicity	GLO	Global warming	PHY	Physical Hazard (reactive)
CAN	Cancer	MAM	Mammalian/systemic/ organ toxicity	REP	Reproductive toxicity
DEV	Developmental toxicity	MUL	Multiple hazards	RES	Respiratory sensitization
END	Endocrine activity	NEU	Neurotoxicity	SKI	Skin sensitization/ Irritation/corrosivity
EYE	Eye irritation/corrosivity	OZO	Ozone depletion	LAN	Land toxicity
GEN	Gene mutation	PBT	Persistent Bioaccumulative Toxic	NF	Not found on Priority Hazard Lists

GreenScreen (GS)

BM-4	Benchmark-4 (prefer – safer chemical)	LT-P1	List Translator Possible Benchmark 1
BM-3	Benchmark-3 (use but still opportunity for improvement)	LT-1	List Translator Likely Benchmark 1
BM-2	Benchmark-2 (use but search for safer substitutes)	LT-UNK	List Translator Benchmark Unknown (insufficient information from List Translator lists to benchmark)
BM-1	Benchmark-1 (avoid – chemical of high concern)	NoGS	Unknown (no data on List Translator Lists)
BM-U	Benchmark Unspecified (insufficient data to benchmark)		

Recycled Types

PreC	Preconsumer (Post-Industrial)
PostC	Postconsumer
Both	Both Preconsumer and Postconsumer
Unk	Inclusion of recycled content is unknown
None	Does not include recycled content

Other Terms

Inventory Methods:

- Nested Method/Material Threshold** Substances listed within each material per threshold indicated per material
- Nested Method/Product Threshold** Substances listed within each material per threshold indicated per product
- Basic Method/Product Threshold** Substances listed individually per threshold indicated per product

Nano Composed of nanoscale particles or nanotechnology

Third Party Verified Verification by independent certifier approved by HPDC

Preparer Third party preparer, if not self-prepared by manufacturer

Applicable facilities Manufacturing sites to which testing applies

The Health Product Declaration (HPD) Open Standard provides for the disclosure of product contents and potential associated human and environmental health hazards. Hazard associations are based on the HPD Priority Hazard Lists, the GreenScreen List Translator™, and when available, full GreenScreen® assessments. The HPD Open Standard v2.1 is not:

-a method for the assessment of exposure or risk associated with product handling or use,

-a method for assessing potential health impacts of: (i) substances used or created during the manufacturing process or (ii) substances created after the product is delivered for end use.

Information about life cycle, exposure and/or risk assessments performed on the product may be reported by the manufacturer in appropriate notes sections, and/or, where applicable, in the Certifications section.

The HPD Open Standard was created and is supported by the Health Product Declaration Collaborative (the HPD Collaborative), a customer-led organization composed of stakeholders throughout the building industry that is committed to the continuous improvement of building products through transparency, openness, and innovation throughout the product supply chain.

The product manufacturer and any applicable independent verifier are solely responsible for the accuracy of statements and claims made in this HPD and for compliance with the HPD standard noted.

Mortar Example

Unpublished Draft HPD
Page 6 of 6

APPENDIX A - (UNPUBLISHED) EXAMPLE HEALTH PRODUCT DECLARATION (TILE)

Tile Example

Health Product Declaration v2.2

created via: DRAFT

CLASSIFICATION: 09 30 00

PRODUCT DESCRIPTION: This example HPD was created as part of the TCNA Material Ingredient Guide



Section 1: Summary

Basic Method/Product Threshold

CONTENT INVENTORY

Inventory Reporting Format

- Nested Materials Method
- Basic Method

Threshold Disclosed Per

- Material
- Product

Threshold Level

- 100 ppm
- 1,000 ppm
- Per GHS SDS
- Per OSHA MSDS
- Other

Residuals/Impurities

- Considered
- Partially Considered
- Not Considered

Explanation(s) provided for

Residuals/Impurities?
 Yes No

All Substances Above the Threshold Indicated Are:

Characterized Yes Ex/SC Yes No
% weight and role provided for all substances

Screened Yes Ex/SC Yes No
Screened using Priority Hazard Lists with results disclosed

Identified Yes Ex/SC Yes No
Disclosed by Name (Specific or Generic) and identifier

SC = Special Condition (See Notes)

CONTENT IN DESCENDING ORDER OF QUANTITY

Summary of product contents and results from screening individual chemical substances against HPD Priority Hazard Lists and the GreenScreen for Safer Chemicals®. The HPD does not assess whether using or handling this product will expose individuals to its chemical substances or any health risk. Refer to Section 2 for further details.

MATERIAL | **SUBSTANCE** GREENSCREEN SCORE HAZARD TYPE;

QUARTZ BM-1 CAN; **ALUMINUM OXIDE** BM-2 RES | CAN; **TBD ADDITIVES** NoGS ; **TBD COLORANTS** NoGS ; **WATER** BM-4 ; **CALCIUM OXIDE** BM-2 ; **TITANIUM DIOXIDE** BM-2 CAN | END; **POTASSIUM OXIDE (K2O)** BM-2 ; **SODIUM OXIDE** BM-2 ; **DIIRON TRIOXIDE** BM-2 CAN; **SILICON** LT-UNK ; **TALC** BM-1 CAN; **ZIRCON (ZR(SIO4))** BM-2 ; **SILICA, VITREOUS** LT-UNK ; **CHROMITE (CHROMITE ORE)** BM-2 ; **CRISTOBALITE (SIO2)** LT-1 CAN; **ZINC OXIDE** BM-1 AQU | RES | END | MUL; **CARBONIC ACID, BARIUM SALT (1:1)** BM-2 ; **MAGNESIUM OXIDE (MGO)** BM-3dg CAN;

Number of GreenScreen® BM-4/BM-3 contents: 1

Contents highest concern GreenScreen® Benchmark or List Translator Score: BM - 1

Nanomaterial: No contents are characterized as a nanomaterial

INVENTORY AND SCREENING NOTES

At least 75% of the substances in this product have GreenScreen Benchmark Scores.

VOLATILE ORGANIC COMPOUND (VOC) CONTENT

VOC Content data is not applicable for this product category.

CERTIFICATIONS AND COMPLIANCE *See Section 3 for additional listings*

VOC Emissions: Inherently Non-Emitting per LEED

CONSISTENCY WITH OTHER PROGRAMS

Pre-checked for LEED v4 & v4.1 Material Ingredients Option 1 and Option 2.

Third Party Verified?

- Yes
- No

PREPARER: Self-Prepared
VERIFIER: WAP Sustainability
VERIFICATION #:

SCREENING DATE:

PUBLISHED DATE: Not published on the HPDC repository
EXPIRY DATE: Not published on the HPDC repository

Tile Example

Unpublished Draft HPD
Page 1 of 7



This section lists contents in a product based on specific threshold(s) and reports detailed health information including hazards. This HPD uses the inventory method indicated above, which is one of three possible methods:

- Basic Inventory method with Product-level threshold
- Nested Material Inventory method with Product-level threshold
- Nested Material Inventory method with individual Material-level thresholds

Definitions and requirements for the three inventory methods and requirements for each data field can be found in the HPD Open Standard version 2.2, available on the HPDC website at: www.hpd-collaborative.org/hpd-2-2-standard

TILE EXAMPLE

PRODUCT THRESHOLD: 100 ppm RESIDUALS AND IMPURITIES CONSIDERED: Considered
 RESIDUAL/IMPURITIES NOTES: Residuals and impurities were considered and those that fall above the stated threshold are included.
 OTHER PRODUCT NOTES:

QUARTZ

ID: 14808-60-7

HAZARD TYPE	AGENCY AND LIST TITLES	WARNINGS	ROLE: Structure Component
GS: 60-75	GS: BM-1 RC: None	NANO: No	
CAN	Australia - GHS	Carcinogenicity – category 1A	
CAN	Australia - GHS	Specific target organ toxicity (repeated exposure) – category 1	
CAN	Australia - GHS	H350i	
CAN	CA EPA - Prop 65	cancer	
CAN	IARC	1	
CAN	Japan - GHS	CarcinogenicityCategory 1A	
CAN	MAK	Carc. 1	
CAN	New Zealand - GHS	6.7A	
CAN	US NIH - Report on Carcinogens	Known Carcinogen	

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

ALUMINUM OXIDE

ID: 1344-28-1

HAZARD TYPE	AGENCY AND LIST TITLES	WARNINGS	ROLE: Structure Component
GS: 15-35	GS: BM-2 RC: None	NANO: No	
CAN	MAK	Carc. 2	
RES	AOEC - Asthmagens	Rs	

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

TBD ADDITIVES

ID: TBD ADDITIVES

HAZARD TYPE	AGENCY AND LIST TITLES	WARNINGS	ROLE: Structure Component
GS: 5-20	GS: NoGS RC: None	NANO: No	
None Found	No warnings found on HPD Priority Lists		

SUBSTANCE NOTES: This example list of additives would need to be replaced with data collected from suppliers. A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

Tile Example

Unpublished Draft HPD
Page 2 of 7

TBD COLORANTS				ID: TBD COLORANTS
%: 1-5	GS: NoGS	RC: None	NANO: No	ROLE: Pigment
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			
SUBSTANCE NOTES: The example colorants contained herein would need to be replaced with data collected from the suppliers. A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.				

WATER				ID: 7732-18-5
%: 2-8	GS: BM-4	RC: None	NANO: No	ROLE:
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			
SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.				

CALCIUM OXIDE				ID: 1305-78-8
%: 2-8	GS: BM-2	RC: None	NANO: No	ROLE: Structure Component
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			
SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.				

TITANIUM DIOXIDE				ID: 13463-67-7
%: 2-8	GS: BM-2	RC: None	NANO: No	ROLE: Structure Component
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
CAN	CA EPA - Prop 65		cancer	
CAN	IARC		2B	
CAN	MAK		Carc. 4	
CAN	US CDC - Occupational Carcinogens		Occupational Carcinogen	
END	TEDX - Potential Endocrine Disruptor		Potential Endocrine Disruptor	
SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.				

POTASSIUM OXIDE (K2O)				ID: 12136-45-7
%: 0.5-5	GS: BM-2	RC: None	NANO: No	ROLE: Structure Component
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			
SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.				

SODIUM OXIDE				ID: 1313-59-3
%: 2-5	GS: BM-2	RC: None	NANO: No	ROLE: Structure Component
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			
SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.				

DIIRON TRIOXIDE				ID: 1309-37-1
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%: 0.2-4	GS: BM-2	RC: None	NANO: No	ROLE: Structure Component
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
CAN	MAK		Carc. 3B	

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

SILICON ID: 7440-21-3

%: 0.3-3	GS: LT-UNK	RC: None	NANO: No	ROLE: Structure Component
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

TALC ID: 14807-96-6

%: 0.3-3	GS: BM-1	RC: None	NANO: No	ROLE: Structure Component
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
CAN	IARC		2B	
CAN	MAK		Carc. 3B	

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

ZIRCON (ZR(SIO4)) ID: 14940-68-2

%: 0.2-2	GS: BM-2	RC: None	NANO: No	ROLE: Opacifier
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

SILICA, VITREOUS ID: 60676-86-0

%: 0.2-2	GS: LT-UNK	RC: None	NANO: No	ROLE: Structure Component
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

CHROMITE (CHROMITE ORE) ID: 1308-31-2

%: 0.1-1	GS: BM-2	RC: None	NANO: No	ROLE: Pigment
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

CRISTOBALITE (SIO2) ID: 14464-46-1

%: 0.1-1	GS: LT-1	RC: None	NANO: No	ROLE: Structure Component
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
CAN	Australia - GHS		H350i	
CAN	Australia - GHS		Carcinogenicity – category 1A	
CAN	Australia - GHS		Specific target organ toxicity (repeated exposure) – category 1	
CAN	CA EPA - Prop 65		cancer	

CAN	IARC	1
CAN	Japan - GHS	CarcinogenicityCategory 1A
CAN	MAK	Carc. 1
CAN	New Zealand - GHS	6.7A
CAN	US NIH - Report on Carcinogens	Known Carcinogen

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

ZINC OXIDE

ID: 1314-13-2

%: 0.01-0.1	GS: BM-1	RC: None	NANO: No	ROLE: Pigment
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
AQU	EU - GHS (H-Statements)		H400	
AQU	EU - GHS (H-Statements)		H410	
END	TEDX - Potential Endocrine Disruptor		Potential Endocrine Disruptor	
MUL	German FEA - Substances Hazardous to Waters		2	
RES	AOEC - Asthmagens		Rs	

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

CARBONIC ACID, BARIUM SALT (1:1)

ID: 513-77-9

%: 0.01-0.1	GS: BM-2	RC: None	NANO: No	ROLE: Pigment
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
None Found	No warnings found on HPD Priority Lists			

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.

MAGNESIUM OXIDE (MGO)

ID: 1309-48-4

%: 0.01-0.1	GS: BM-3 _{dg}	RC: None	NANO: No	ROLE: Structure Component
HAZARD TYPE	AGENCY AND LIST TITLES		WARNINGS	
CAN	MAK		Carc. 4	

SUBSTANCE NOTES: A range is given due to the variable product thickness, various color options, and due to the variable composition of naturally occurring materials.



Section 3: Certifications and Compliance

This section lists applicable certification and standards compliance information for VOC emissions and VOC content. Other types of health or environmental performance testing or certifications completed for the product may be provided.

VOC EMISSIONS

CERTIFYING PARTY: Self-disclosed

EXPIRY DATE:

APPLICABLE FACILITIES: All

CERTIFICATE URL:

CERTIFICATE AND COMPLIANCE NOTES:

Inherently Non-Emitting per LEED

ISSUE DATE: 2020-01-01

CERTIFIER OR LAB: N/A



Section 4: Accessories

This section lists related products or materials that the manufacturer requires or recommends for installation (such as adhesives or fasteners), maintenance, cleaning, or operations. For information relating to the contents of these related products, refer to their applicable Health Product Declarations, if available.

Mortar

HPD URL: No HPD Available

CONDITION WHEN RECOMMENDED OR REQUIRED AND/OR OTHER NOTES:

Mortar is required for all installations to adhere the product to the substrate.

Grout

HPD URL: No HPD Available

CONDITION WHEN RECOMMENDED OR REQUIRED AND/OR OTHER NOTES:

Grout is required to fill joints between installed tiles.



Section 5: General Notes

Tile Example

Unpublished Draft HPD
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Section 6: References

MANUFACTURER INFORMATION

MANUFACTURER:
ADDRESS:

CONTACT NAME:
TITLE:
PHONE:
EMAIL:

WEBSITE:

The listed contact is responsible for the validity of this HPD and attests that it is accurate and complete to the best of his or her knowledge.

KEY

OSHA MSDS Occupational Safety and Health Administration Material Safety Data Sheet
GHS SDS Globally Harmonized System of Classification and Labeling of Chemicals Safety Data Sheet

Hazard Types

AQU	Aquatic toxicity	GLO	Global warming	PHY	Physical Hazard (reactive)
CAN	Cancer	MAM	Mammalian/systemic/ organ toxicity	REP	Reproductive toxicity
DEV	Developmental toxicity	MUL	Multiple hazards	RES	Respiratory sensitization
END	Endocrine activity	NEU	Neurotoxicity	SKI	Skin sensitization/ Irritation/corrosivity
EYE	Eye irritation/corrosivity	OZO	Ozone depletion	LAN	Land toxicity
GEN	Gene mutation	PBT	Persistent Bioaccumulative Toxic	NF	Not found on Priority Hazard Lists

GreenScreen (GS)

BM-4	Benchmark-4 (prefer – safer chemical)	LT-P1	List Translator Possible Benchmark 1
BM-3	Benchmark-3 (use but still opportunity for improvement)	LT-1	List Translator Likely Benchmark 1
BM-2	Benchmark-2 (use but search for safer substitutes)	LT-UNK	List Translator Benchmark Unknown (insufficient information from List Translator lists to benchmark)
BM-1	Benchmark-1 (avoid – chemical of high concern)		
BM-U	Benchmark Unspecified (insufficient data to benchmark)	NoGS	Unknown (no data on List Translator Lists)

Recycled Types

PreC	Preconsumer (Post-Industrial)
PostC	Postconsumer
Both	Both Preconsumer and Postconsumer
Unk	Inclusion of recycled content is unknown
None	Does not include recycled content

Other Terms

Inventory Methods:

Nested Method/Material Threshold Substances listed within each material per threshold indicated per material

Nested Method/Product Threshold Substances listed within each material per threshold indicated per product

Basic Method/Product Threshold Substances listed individually per threshold indicated per product

Nano Composed of nanoscale particles or nanotechnology

Third Party Verified Verification by independent certifier approved by HPDC

Preparer Third party preparer, if not self-prepared by manufacturer

Applicable facilities Manufacturing sites to which testing applies

The Health Product Declaration (HPD) Open Standard provides for the disclosure of product contents and potential associated human and environmental health hazards. Hazard associations are based on the HPD Priority Hazard Lists, the GreenScreen List Translator™, and when available, full GreenScreen® assessments. The HPD Open Standard v2.1 is not:

-a method for the assessment of exposure or risk associated with product handling or use,

-a method for assessing potential health impacts of: (i) substances used or created during the manufacturing process or (ii) substances created after the product is delivered for end use.

Information about life cycle, exposure and/or risk assessments performed on the product may be reported by the manufacturer in appropriate notes sections, and/or, where applicable, in the Certifications section.

The HPD Open Standard was created and is supported by the Health Product Declaration Collaborative (the HPD Collaborative), a customer-led organization composed of stakeholders throughout the building industry that is committed to the continuous improvement of building products through transparency, openness, and innovation throughout the product supply chain.

The product manufacturer and any applicable independent verifier are solely responsible for the accuracy of statements and claims made in this HPD and for compliance with the HPD standard noted.

Tile Example

Unpublished Draft HPD

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APPENDIX B - (UNPUBLISHED) EXAMPLE MANUFACTURER INVENTORY (TILE)

MANUFACTURER INGREDIENT DISCLOSURE

Product: Tile Example

Manufacturer:

Publishing Date: Month, Day, Year

Disclosure Threshold: 100 ppm

Expiration Date: Month, Day, Year

GreenScreen Benchmark Scores: >84.33%

The following material ingredient disclosure has been provided by the manufacturer to comply with the USGBC LEED v4.0 and v4.1 Material and Resources Credit: Building Product Disclosure and Optimization – Material Ingredients, Options 1 and 2.

Name	CAS number	Ingredient Role	Ingredient Amount	GreenScreen Score
Quartz	14808-60-7	Base/Glaze	60-75%	BM-1
Aluminum Oxide	1344-28-1	Base/Glaze	15-35%	BM-2
TBD Additives	TBD Additives	Base/Glaze	5-20%	UNK
Water	7732-18-5	Base/Glaze	2-8%	BM - 4
Calcium Oxide	1305-78-8	Base/Glaze	2-8%	BM-2
Titanium dioxide	13463-67-7	Base/Glaze	2-8%	BM-2
TBD Colorants	TBD Colorants	Pigment	1-5%	UNK
Potassium oxide	12136-45-7	Base/Glaze	0.5-5%	BM-2
Sodium Oxide	1313-59-3	Base/Glaze	2-5%	BM-2
Diiron Trioxide	1309-37-1	Base/Glaze	0.2-4%	BM-2
Silicon	7440-21-3	Base/Glaze	0.3-3%	LT - UNK
Talc	14807-96-6	Base/Glaze	0.3-3%	BM-1
Zircon	14940-68-2	Opacifier	0.2-2%	BM-2
Silica, Vitreous	60676-86-0	Base/Glaze	0.2-2%	LT - UNK
Chromite	1308-31-2	Pigment	0.1-1%	BM-2
Cristobalite	14464-46-1	Base/Glaze	0.1-1%	LT - 1
Zinc oxide	1314-13-2	Pigment	0.01-0.1%	BM-1
Barium Carbonate	513-77-9	Pigment	0.01-0.1%	BM-2
Magnesium oxide	1309-48-4	Base/Glaze	0.01-0.1%	BM-3dg

This disclosure has been third-party verified by WAP Sustainability to comply with the LEED v4 and v4.1 requirements for material ingredient reporting and optimization.

William Paddock
 Managing Director
 WAP Sustainability

Manufacturer Employee Name
 Manufacturer Employee Title
 Manufacturer Name



Manufacturer Logo

APPENDIX C - (UNPUBLISHED) EXAMPLE MATERIAL INGREDIENT ACTION PLAN

Material Ingredient Optimization Action Plan

for LEED version 4.1 credit:

BPDO Material Ingredients, Option 2 (BD+C and ID+C rating systems)

MANUFACTURER

PRODUCT NAME



Material Ingredient Screening and Optimization Action Plan

Summary Sheet

Manufacturer Name:	
Product Name:	
Product Lines/Series covered by the Action Plan:	
Product Type:	
Product Description or Role:	
Contact Information for the Organization Representative:	
Action Plan Creation Date:	
Action Plan Expiration Date:	
Action Plan Unique ID:	
Third Party Verification of Action Plan:	Yes
Verifier:	WAP Sustainability
Link to publicly available product content inventory:	
The product was screened using the following:	GreenScreen List Translator, Licensed GreenScreen Assessments, and HPDC v2.1 Priority Hazard and Warning List
Disclosure Threshold;	100ppm

Logo

1. GREEN CHEMISTRY PRINCIPLES COVERED BY ACTION PLAN

Green Chemistry Principles	Included in Action Plan	Summary of Action
1 Prevention		
2 Atom Economy		
3 Less Hazardous Chemical Syntheses		
4 Designing Safer Chemicals		
5 Safer Solvent and Auxiliaries		
6 Design for Energy Efficiency		
7 Use of Renewable Feedstocks		
8 Reduced Derivatives		
9 Catalysis		
10 Design for Degredation		
11 Real-Time Analysis for Pollution Prevention		
12 Inherently Safer Chemistry for Accident Prevention		

2. SUMMARY OF ACTION

Summary

We have created Material Ingredient Transparency Documentation for our XYZ Product and have evaluated the substances used to make our product to the 100ppm level threshold. In reviewing the hazard screening and assessments results, we identified substances that we would like to evaluate further using the GreenScreen for Safer Chemicals Assessment Methodology.

As a member of the Tile Council of North American (TCNA) we are participating in the Tile Councils Crowdfunded GreenScreen Assessment program, whereby industry members come together to source and share GreenScreen Assessments. This program is part of a larger Material Ingredient Program TCNA has developed for its members.

As part of our action plan, we are committed to exploring additional substances using the GreenScreen for Safer Choice methodology to further support Green Chemistry Principles of

Prevention and Designing Safer Chemicals. Once the GreenScreen Assessments are complete, we will evaluate the results of the Assessment to determine the impacts to human health of workers and users of our products. If concerns are identified in the Assessment, we will begin the process of exploring alternative substances.

We will also use the results of the GreenScreen Assessment to update our Material Ingredient Disclosure Document with the latest GreenScreen BM scores and replace the current GreenScreen List Translator results.

2. TIMELINE FOR ACTION

Timeline
Actions will occur over the next 6 to 12 months.

3. SPECIFIC STEPS

Specific Steps	Due Date	Outcome
1 Prevention	12 Months from Publication of Action Plan	Gather GreenScreen Assessment Reports for substances of concern. Use GreenScreen BM Results in Material Ingredient Transparency Documents.
4 Designing Safer Chemicals	12 Months from Publication of Action Plan	Annual update to overall product with regards to hazard or alternatives assessment

4. ENDORESEMENT

Endorsement	
This Action Plan was prepared by WAP Sustainability Consulting as the lead GreenScreen Assessment Body for Manufacturer	Signature of Preparer
	William Paddock, Managing Director
This Action Plan was Confirmed by an Executive of the Manufacturer	Signature of Executive
	Name of Executive