

# USING INDUSTRY-WIDE GUIDANCE FOR CERAMIC TILE, MORTAR, AND GROUT INGREDIENT REPORTING

*TCNA’s Material Ingredient Guide is the first of its kind by any building product industry. The guide provides assessment data on common tile industry ingredients that facilitates ceramic tile, mortar, and grout manufacturer conformance to market demands for standardized reporting of the content and chemical makeup of products, or “material ingredient transparency.”*

Building product suppliers are increasingly required to provide material ingredient transparency. According to the Healthy Building Network, consumers have the “right to know,” and it is “the responsibility of the manufacturer” to provide this information. Requirements of LEED, WELL Building, the International Living Future Institute’s (ILFI) Living Building Challenge, and other green and healthy building programs add to the demand for material ingredient transparency.

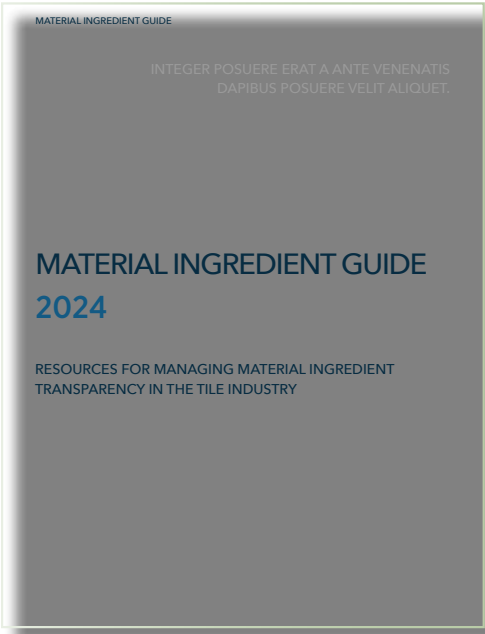
The Material Ingredient Guide provides the following:

- Guidance for manufacturers when they are developing material ingredient reports
- A list of the ingredients most commonly used by North American manufacturers and references to in-depth chemical assessments of these ingredients
- Insights into satisfying green and healthy building criteria

The following manufacturers collaborated in the development of TCNA’s Material Ingredient Guide:

Ardex	Interceramic USA
Arto Brick	Ironrock
Bostik	Laticrete
Crest	Porcelanite-Lamosa
Crossville, Inc.	Portobello America
Custom Building Products	Schluter Systems
Dal-Tile Corporation	StonePeak Ceramics, Inc.
Florida Tile	American Wonder Porcelain
Florim USA	

Highlighted in TCNA’s Material Ingredient Guide are four steps toward material ingredient transparency: Inventory, Screening and Assessment, Disclosure, and Optimization. Following these steps can support ceramic tile, mortar, and grout manufacturer efforts in developing material ingredient reports that satisfy common A&D criteria, through which there is an opportunity for product contribution to green and healthy building rating programs.



## The Inventory Process

The first step for a manufacturer toward material ingredient transparency involves listing all materials purchased to make a product, each identified by a Chemical Abstract Service Registry Number (CASRN). The list should include all material ingredients to 100ppm or 1,000ppm, with 100ppm being more stringent and likely requiring further identification of substances comprising each material ingredient. A product's final list of material ingredients and substances comprising each material is known as the product's content inventory.

TCNA's Material Ingredient Guide provides in-depth instructions on developing a product content inventory, explaining how manufacturers might prefer to target a threshold of 100ppm to maximize conformance to green and healthy building requirements. Furthermore, because manufacturers share many of the same raw materials, those who participated in the development of TCNA's Material Ingredient Guide agreed on a host of ingredients common to ceramic tile, mortar, and/or grout. To facilitate content inventorying efforts, the Material Ingredient Guide lists these ingredients, itemized to the substance level. Each participating manufacturer can obtain CASRN information from this list for the majority of ingredients used in most products.

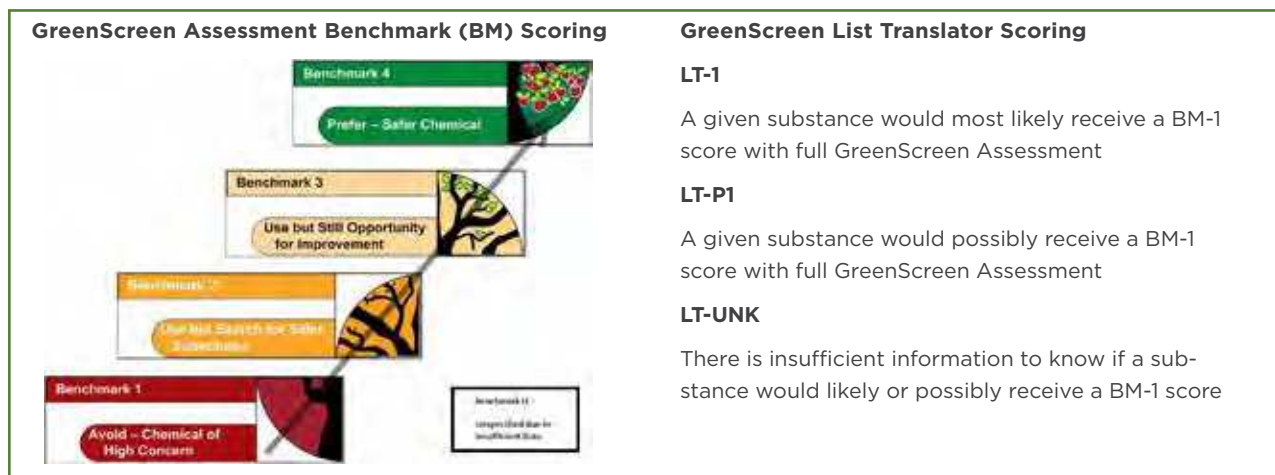
## The Screening and Assessment Process

Screening and assessment involve evaluating the toxicological profile associated with the individual CASRN identified for each material ingredient and substance within a product's content inventory. Manufacturers have many screening and assessment options—The Material Ingredient Guide describes *GreenScreen for Safer Chemicals*® as a market-accepted method for construction products as it is referenced by LEED, WELL Building, ILFI, and other green and healthy building programs. GreenScreen has two levels of analysis:

**The GreenScreen List Translator™** is a screening method available through free online-automated tools for quickly identifying whether a substance has known health data based solely on 40+ lists of CASRNs mapped to publicly available information. A substance's GreenScreen List Translator score is denoted by the prefix, "LT."

**GreenScreen Assessment™** involves preliminary screening of a substance using the GreenScreen List Translator, followed by a full review to fill data gaps using scientific literature and modeling tools. The substance is then assigned a full GreenScreen Benchmark Score, denoted by the prefix "BM."

### Overview of GreenScreen BM and LT Scoring (from greenscreenchemicals.org)



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Although a GreenScreen LT score provides some information on potential hazards associated with a substance, a full GreenScreen Assessment BM score is more accurate and takes precedence over GreenScreen LT scores in green and healthy building programs.

TCNA's Material Ingredient Guide assigns a full

GreenScreen Assessment BM score to each of the ingredients commonly used by North American ceramic tile, mortar, and/or grout manufacturers. Additionally, the Material Ingredient Guide states whether each ingredient is included in ILFI's Red List and/or WELL's Restricted Substance List (RSL).

## Assessment Results of Common Tile Industry Ingredients Listed in TCNA's Material Ingredient Guide

Ingredient	Screened/Assessed CASRM	Full GreenScreen BM Score	ILFI Red List, WELL RSL
Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> )	1344-28-1	BM-2	No, No
Barium Carbonate (BaCO <sub>3</sub> )	513-77-9	BM-2	No, No
Boron Trioxide (B <sub>2</sub> O <sub>3</sub> )	1303-86-2	BM-1	No, No
Calcium Carbonate (CaCO <sub>3</sub> )	1317-65-3	BM-3	No, No
Calcium Formate (Ca(HCOO) <sub>2</sub> )	544-17-2	BM-3	No, No
Calcium Oxide (CaO)	1305-78-8	BM-2	No, No
Chrome Ore (FeCr <sub>2</sub> O <sub>4</sub> )	1308-31-2	BM-2	No, No
Gypsum (CaSO <sub>4</sub> •2H <sub>2</sub> O)	13397-24-5	BM-3	No, No
Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> )	1309-37-1	BM-3	No, No
Magnesium Carbonate (MgCO <sub>3</sub> )	546-93-0	BM-2	No, No
Magnesium Oxide (MgO)	1309-48-4	BM-3	No, No
Manganese Dioxide (MnO <sub>2</sub> )	1313-13-9	BM-1	No, No
Methyl ethyl cellulose (C <sub>34</sub> H <sub>66</sub> O <sub>24</sub> )	9032-42-2	BM-2	No, No
Potassium Oxide (K <sub>2</sub> O)	12136-45-7	BM-2	No, No
Quartz (SiO <sub>2</sub> )	14808-60-7	BM-1	No, No
Sodium Oxide (Na <sub>2</sub> O)	1313-59-3	BM-2	No, No
Sulfur Trioxide (SO <sub>3</sub> )	7446-11-9	BM-2	No, No
Talc (Mg <sub>3</sub> H <sub>2</sub> (SiO <sub>3</sub> ) <sub>4</sub> )	14807-96-6	BM-1	No, No
Titanium Dioxide (TiO <sub>2</sub> )	13463-67-7	BM-2	No, No
Zinc Oxide (ZnO)	1314-13-2	BM-1	No, No
Zircon (ZrSiO <sub>4</sub> )	14940-68-2	BM-2	No, No
Zirconium Silicate (ZrSiO <sub>4</sub> )	10101-52-7	BM-2	No, No
Kaolin Clay	Mixture of SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> , TiO <sub>2</sub> , H <sub>2</sub> O	See Individual Substance Scores	No, No
Feldspar	Mixture of SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , CaO, K <sub>2</sub> O, Na <sub>2</sub> O	See Individual Substance Scores	No, No
Portland Cement	Mixture of CaO, SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> , SO <sub>3</sub>	See Individual Substance Scores	No, No
Calcium Aluminate Cement	Mixture of CaO, SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> , MgO, TiO <sub>2</sub>	See Individual Substance Scores	No, No
Ball Clay	Mixture of SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> , TiO <sub>2</sub> , H <sub>2</sub> O	See Individual Substance Scores	No, No
Wollastonite	Mixture of CaO and SiO <sub>2</sub>	See Individual Substance Scores	No, No
Shale	Mixture of ball and kaolin clay, SiO <sub>2</sub> , Feldspar, CaO, Fe <sub>2</sub> O <sub>3</sub> , Limestone	See Individual Substance Scores	No, No
Slag	Mixture of CaO, SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , and MgO	See Individual Substance Scores	No, No
Limestone	Mixture of CaCO <sub>3</sub> & MgCO <sub>3</sub>	See Individual Substance Scores	No, No
Fly Ash	Mixture of SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> , CAO	See Individual Substance Scores	No, No
Soda Lime Borosilicate Glass	Mixture of SiO <sub>2</sub> , B <sub>2</sub> O <sub>3</sub> , Na <sub>2</sub> O, Al <sub>2</sub> O <sub>3</sub>	See Individual Substance Scores	No, No

It is important to recognize products with material ingredients that have scored as BM-1 are very common. While the scoring method classifies BM-1 chemicals as “avoid,” the context of such classification, especially whether the likelihood of exposure at various stages in the supply chain is relevant or irrelevant, should be interpreted. Through disclosure of product material ingredients, manufacturers are able to clarify such interpretation.

### Disclosure Process

TCNA’s Material Ingredient Guide provides two widely accepted disclosure formats for manufacturers to follow when reporting material ingredients in their products: Health Product Declarations (HPD) and Manufacturer Inventories (MI).

HPD is the most recognized and widely adopted material ingredient reporting format for disclosure throughout the building and construction supply chain. By inputting ingredient CASRNs into a free online builder tool developed by the HPD Collaborative, a manufacturer can generate a material ingredient report that conforms to the HPD Open Standard. For each CASRN input into the builder, a GreenScreen LT or BM score (if available) is output to the HPD. Manufacturers have the option to add BM scores to the final report if not already included in the builder.

MI is a generic format for a manufacturer’s public disclosure of a product’s content inventory. An MI can be completed by a manufacturer in a format deemed suitable by the manufacturer for disclosing product material ingredients and substance screening/assessment results. Because MIs can vary from manufacturer to manufacturer, the TCNA Material Ingredient Guide employs a common framework. If used consistently by ceramic tile, mortar, and grout manufacturers, this common framework can facilitate industry uniformity in MI reporting and minimize confusion.



TCNA Material Ingredient Guide participants who incorporate referenced GreenScreen Assessment BM scores into their individual HPDs and/or MIs are provided third-party verification by WAP Sustainability.


TCNA’s Material Ingredient Guide provides in-depth instructions and templates for manufacturers to follow when developing an HPD or MI. For both, a manufacturer must first have a product content inventory and screening/assessment results for each material ingredient and substance included in the inventory. The Material Ingredient Guide’s GreenScreen Assessment BM scores for the ingredients common to ceramic tile, mortar, and grout, when disclosed, increase transparency. Additionally, when a manufacturer who collaborated in the development of TCNA’s Material Ingredient Guide develops an HPD or MI using this information, the disclosure report is eligible for third-party verification (based on an arrangement between TCNA and WAP Sustainability). A third-party verified HPD or MI with full GreenScreen Assessment BM scores is highly credible and facilitates green and healthy building “optimization” by providing a high level of material ingredient transparency.

### The Optimization Process

Optimization involves selecting products with high levels of material ingredient transparency. Green and healthy building programs incentivize optimization by awarding points to projects that use products for which material ingredient information has been inventoried, screened and assessed, and disclosed following steps such as those detailed in the Material Ingredient Guide.

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## LEED V4.0 and V4.1

Under the credit category Material Ingredients, up to two points toward LEED certification of a building can be earned by using products that exhibit material ingredient transparency.		
Option 1 (one Point) Material Ingredient Reporting	AND/OR	Option 2 (one Point) Material Ingredient Optimization
<div> <div> <p>One point can be earned for using at least 20 different permanently installed products with any of the LEED-specified material ingredient reporting formats to disclose product ingredients to at least 1,000ppm.</p> <p>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.</p> <p>A single product counts 1x toward the 20-product threshold if the steps outlined in TCNA’s Material Ingredient Guide are followed toward preparing a product’s material ingredient inventory, listing each ingredient’s GreenScreen LT or BM score, and disclosing this information through publishing an HPD or MI. It should be noted that following the Material Ingredient Guide’s recommended more stringent inventory threshold of 100ppm means that the 1,000ppm threshold for LEED’s Material Ingredient Reporting credit is inherently satisfied.</p>  </div> <div> <p>One point can be earned for using five different permanently installed products with any of the LEED-specified material ingredient optimization pathways, including the GreenScreen Assessment Pathway:</p> <p>A single product counts 1x toward the five-product threshold if:</p> <ul style="list-style-type: none"> <li>• Material ingredients have been inventoried to 100ppm, and</li> <li>• GreenScreen Assessment BM scores are assigned to at least 75% (by weight) of the listed substances, and</li> <li>• The information is disclosed through publishing an HPD or MI, and</li> <li>• The HPD or MI has been third-party verified.</li> </ul> <p>Following the same criteria above, a single product counts 1.5x toward the five-product threshold if BM scores are assigned to at least 95% (by weight of the listed substances) of the listed substances with no BM-1 hazards and no LT-1 hazards for the remaining 5% of listed substances.</p> <p>Following the steps outlined in TCNA’s Material Ingredient Guide, manufacturers are encouraged to determine if 75% or 95% of the substances listed in a product-specific content inventory are included in the list of common industry ingredients. Referencing this information in an HPD or MI and achieving third-party verification from WAP Sustainability can satisfy the requirements of this credit.</p> <p>If BM scores are not available for at least 75% of the listed substances, or if material ingredients have been inventoried to 1,000ppm instead of 100ppm, a single product counts 0.5x toward the five-product threshold if the manufacturer has developed a detailed action plan to mitigate or reduce known hazards in the product. TCNA’s Material Ingredient Guide provides a breakdown of LEED’s action plan criteria, including a template for manufacturers to follow.</p> </div> </div>		




## WELL Building

Under the credits (“features”) X07 – Material Transparency and X-08 – Materials Optimization, up to four points toward WELL certification of a building can be earned by using products that exhibit material ingredient transparency.		
WELL Feature X07 – Material Transparency	AND/OR	WELL Feature X08 – Materials Optimization
<p><b>Part 1 – Disclosed Ingredients (one point):</b> One point can be earned 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) to 1,000ppm using any of the WELL-specified material ingredient reporting formats.</p> <p><b>Part 2 – Enhanced Ingredient Disclosure (second point):</b> A second point can be earned if material ingredient information is disclosed for 15 permanently installed products (including interior finishes, materials, or furnishings) to 100ppm using any of the WELL-specified material ingredient reporting formats.</p> <p><b>Part 3 – Third-Party Verified Ingredients (third point):</b> A third point can be earned if disclosed ingredient information, per Part 1 and/or 2, achieves third-party verification.</p> <p>WELL accepts the HPD and MI reporting formats, thus material ingredient reports developed according to TCNA’s Material Ingredient Guide and the recommended inventory threshold of 100ppm are eligible for contribution to Parts 1 and 2 of this feature. Furthermore, with third-party verification available from WAP Sustainability to TCNA Material Ingredient Guide participating companies, contributions toward Part 3’s third point is achievable for ceramic tile, mortar and grout.</p>		<p><b>Enhanced Chemical Restrictions (one point)</b> One point can be earned 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 feature.</p> <p>An MI or HPD that has been prepared for a ceramic tile, mortar, or grout product per TCNA’s Material Ingredient 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 third-party verification has been achieved.</p> 

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## Living Building Challenge (LBC)

Within ILFI's LBC 4.0 standard, material ingredient requirements are integrated under the Materials Petal, covering Imperatives 12, 13, and 14 toward LBC certification of a building.	
Imperatives 12 and 14	<p>A project must contain at least two Declare-labeled products per 200 square meters of gross building area, or project area, whichever is smaller, up to forty products. Additionally, a project 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.</p> <p>Declare is an ingredient label for building products, similar to an HPD or MI, where manufacturers disclose the ingredients in their products. The Living Product challenge is a third-party verification program, developed by ILFI, requiring that a product's Declare label is free of ILFI Red List chemicals and that the product's ingredients have undergone full Green Screen Assessments.</p> <p>Using ceramic tile, mortar, and grout can help LBC project teams meet imperatives 12 and 14. Although steps toward developing a Declare label are not described in TCNA's Material Ingredient Guide, manufacturers can use product ingredient information contained within an HPD or MI to generate a Declare label using ILFI's online software. Furthermore, ceramic tile, mortar, and grout products may be candidates for Living Product Challenge certification as none of the common chemicals listed in TCNA's material ingredient guide appear on ILFI's Red List, and all have undergone a full GreenScreen Assessment.</p>
Imperative 13	<p>90%, by cost, of a building project's products must be free of chemicals included in ILFI's Red List.</p> <p>LBC project teams may consider ceramic tile, mortar, and grout products to facilitate meeting Imperative 13 as none of the common chemicals listed in TCNA's Material Ingredient Guide appear on ILFI's Red List.</p> <div><div>LIVING BUILDING CHALLENGE</div></div>