MONOKOTE® Z-156

LEED DOCUMENTATION



For additional technical support, please contact:


**John Dalton**
Global Technical Services Manager
+1 617 498 4935 Office
+1 781 258 6463 Mobile
John.a.dalton@saint-gobain.com

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RE: MONOKOTE® Fireproofing Materials – Sustainability beyond LEED®.

GCP Applied Technologies is proud to participate in several sustainability programs that can help you design and construct a more sustainable building.

Sustainability information related to MONOKOTE® Fireproofing Materials can be found here.

Contributions to LEED

MONOKOTE® Fireproofing materials are shipped in recyclable packaging and contain recycled content. We also have publicly available transparency reports to provide insight into our products. Choosing MONOKOTE® Fireproofing can help projects achieve the following LEED® V4 credits under the Building Design + Construction and Interior Design + Construction rating systems:

| LEED V4 | |
|---|---|
| Building Product Disclosure and Optimization – Material Ingredients | Building Product Disclosure and Optimization – Environmental Product Declarations |
| Low Emitting Materials | Acoustic Performance |
| Building Product Disclosure and Optimization – Material Ingredients | Construction and Demolition Waste |

All MONOKOTE® Fireproofing materials have a Type III environmental product declaration prepared in accordance with ISO 14025, ISO 21930, ISO 14040/44, ASTM Product Category Rule (PCR) for Spray-applied Fire-Resistive Materials (SFRM) and ASTM General Program Instructions for Type III EPDs.

The Global Warming Potential of MONOKOTE® Fireproofing materials, per 1,000 kg of product may be found in the table below.

| MONOKOTE® | kg CO2 eq |
|---|---|
| MK-6/HY | 210 |
| MK-6s | 210 |
| MK-6 ES | 210 |
| MK-6/GF | 210 |
| RG | 210 |
| MK-10/HB | 210 |
| MK-10/HB ES | 210 |
| MK-1000/HB | 210 |
| MK-1000/HB ES | 210 |
| Z-106/HY | 493 |
| Z-106/G | 493 |
| Z-146 | 621 |
| Z-146PC | 621 |
| Z-146T | 621 |
| Z-156 | 621 |
| Z-156PC | 621 |
| Z-156T | 621 |

Regional Materials: Depending on your project location, you may also be eligible to claim a 100-mile regional sourcing multiplier for LEED® V4. MONOKOTE® Fireproofing materials are produced in the following cities in North America:

- Ajax, Ontario, Canada, Santa Ana, California
- Andover, Massachusetts (Firebond Concentrate only)

VOC – Content and Emissions ; The majority of MONOKOTE® Fireproofing products have been tested per the CDPH – CA Section 01350 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers Version 1.2.

The VOC Content of our MONOKOTE® Fireproofing products are as follows:

| MONOKOTE® Fireproofing Product | Volatile Organic Compounds (VOC) reported per the Emission Standards |
|---|---|
| MONOKOTE® Fireproofing | 0 g/L |
| Firebond® Concentrate | 0.60 g/L |

The recycled contents of MONOKOTE® Fireproofing are shown below:

| MONOKOTE® | % Weight Post-Consumer | % Weight Post- Industrial |
|---|---|---|
| MK-6/HY | 7.13 | 0.00 |
| MK-6s | 5.13 | 0.00 |
| MK-6 ES | 5.13 | 0.00 |
| MK-6/GF | 7.05 | 0.00 |
| RG | 8.27 | 0.00 |
| MK-10/HB | 6.99 | 0.00 |
| MK-10/HB ES | 5.01 | 0.00 |
| MK-1000/HB | 5.10 | 0.00 |
| MK-1000/HB ES | 5.09 | 0.00 |
| Z-106/HY | 5.05 | 0.00 |
| Z-106/G | 5.13 | 0.00 |
| Z-146 | 1.93 | 0.00 |
| Z-3306 | 4.51 | 0.00 |
| SK-III | 0.00 | 0.00 |
| Z-146PC | 1.91 | 0.00 |
| Z-146T | 1.91 | 0.00 |
| Z-156 | 1.25 | 0.00 |
| Z-156PC | 1.23 | 0.00 |
| Z-156T | 1.23 | 0.00 |
| Firebond Concentrate | 0.00 | 0.00 |
| MK Accelerator | 0.00 | 0.00 |

Contribution to the Living Building Challenge (LBC)
GCP Applied Technologies has developed Declare RED LIST FREE labels for several MONOKOTE® Fireproofing products, all of which are publicly available.

Please feel free to contact myself or any member of the MONOKOTE® Fireproofing team should you require additional information or clarification.

We look forward to MONOKOTE® Fireproofing being your product of choice when sustainability is important to you.

Sincerely,
John Dalton P.E. LEED® GA

Global Technical Service Manager
Fire Protection Products
GCP Applied Technologies

# An Environmental Product Declaration

According to ISO 14025:2006 and ISO 21930:2017

## A Corporate Average Cradle-to-gate EPD for Standard, Medium and High & Ultra High-Density Spray-applied Fire-Resistive Materials (SFRMs)

This EPD has been prepared in conformance with ISO 14025, 14040, 14044 standards and according to the requirements of ISO 21930:2017 and ASTM International's EPD program operator rules. This EPD was commissioned by the GCP Applied Technologies and is verified by ASTM International to conform to the requirements of ISO 14040, 14044, 14025 and 21930.


ASTM International
West Conshohocken, PA
www.astm.org

Date of issue: 04.15.2022
Period of validity: 5 years
Declaration #: EPD 060

# Environmental Product Declaration Summary

| General Summary | |
|---|---|
| **Owner of the EPD** | **GCP Applied Technologies Inc.** (GCPAT)<br>2325 Lakeview Parkway Suite 450,<br>Alpharetta, GA 30009 U.S.A.<br>Link (URL): https://gcpat.com<br><br>With roughly 2,000 employees and 50 manufacturing facilities worldwide, GCP Applied Technologies serves customers in more than 100 countries.<br><br>GCPAT was formed in February 2016 by the spin-off of W. R. Grace & Co.'s construction products segment and its packaging technologies business.<br><br>The owner of the declaration is liable for the underlying information and evidence. |
| **SFRM Manufacturing Facilities** | **Ajax, Canada**<br>294 Clements Rd. West<br>Ajax, Ontario L1S 3C6<br><br>**Irondale, United States**<br>2601 Commerce Blvd.<br>Irondale, Alabama 35210<br><br>**Santa Ana, United States**<br>2500 & 2502 S. Garnsey Street<br>Santa Ana, California 92707 |
| **Product Group and Name** | Spray-applied Fire-Resistive Material (SFRM),<br>UN CPC 54650. |
| **Product Description** | SFRM is composed primarily of binding agents such as cement or gypsum and often contains other materials such as mineral wool, quartz, perlite, vermiculite, or bauxite along with various other ingredients |
| **Reference Product Category Rules (PCR)** | ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services. |
| **Certification Period** | 04.15.2022 - 04.15.2027 |
| **Declared Unit** | 1,000 kg of SFRM |
| **Declaration Number** | EPD 060 |


ASTM International
West Conshohocken, PA
www.astm.org

Date of issue: 04.15.2022
Period of validity: 5 years
Declaration #: EPD 060

| EPD and Project Report Information | |
|---|---|
| **Program Operator** | ASTM International |
| **Declaration Holder** | GCP Applied Technologies Inc. |

**Declaration Type**

A "Cradle-to-gate" EPD (Production stage) of GCPAT's production of standard, medium and high & ultra-high-density spray-applied fire-resistive material. The declaration presents a weighted average profile for all three North American facilities operated by GCP Applied Technologies Inc. that manufacture SFRMs. Product activities covered include the raw material supply, transport, and manufacturing (modules A1 to A3). The declaration is intended for Business-to-Business (B-to-B) communication.

**Applicable Countries**

United States and Canada

**Product Applicability**

SFRMs are used as part of a building's passive fire resistance strategy. SFRMs have thermal and acoustical properties and assists in controlling condensation. However, its main use is in insulating steel, metal decking and other assemblies from the high temperatures found during a fire. SFRMs are used to delay (or prevent) the weakening of steel and the spalling of concrete in structures that are exposed to the high temperatures found during a fire. They do this by thermally insulating the structural members to keep them below the temperatures that cause failure.

**Content of the Declaration**

This declaration follows *Section 9*; *Content of an EPD*, ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services.

| | |
|---|---|
| **This EPD was independently verified by ASTM in accordance with ISO 14025 and the core PCR ISO 21930:2017:**<br>**Internal** **External**<br>X | Tim Brooke, ASTM International |
| **The Project Report**<br>*Note that the Project Report is not part of the public communication (ISO 21930, 10.1).* | A Cradle-to-Gate Life Cycle Assessment of GCP Applied Technologies Standard, Medium and High & Ultra High-Density Spray-applied Fire-Resistive Materials (SFRMs). April 2022. |
| **Prepared by**<br>Athena Sustainable Materials Institute | Lindita Bushi, PhD, Mr. Jamie Meil and<br>Mr. Grant Finlayson<br>Athena Sustainable Materials Institute<br>280 Albert Street, Suite 404<br>Ottawa, Ontario, Canada K1P 5G8<br>info@athenasmi.org<br>www.athenasmi.org |
| **This EPD project report was independently verified by in accordance with ISO 14025, ISO 14040/44, and the core PCR ISO 21930:2017:** | Thomas P. Gloria, Ph. D.<br>Industrial Ecology Consultants |

# 1 PRODUCT IDENTIFICATION

## 1.1 PRODUCT DEFINITION

Spray-applied fire-resistive materials (UN CPC 54650) are composed primarily of binding agents such as cement or gypsum and often contain other materials such as quartz or bauxite along with various other ingredients. The other materials are used to help lighten the solution or to add air as an insulator. Chemical hardeners are sometimes used to either speed up hardening or to make the final fireproofing harder than the original.

Passive fire protection materials (commonly referred to as fireproofing) are used to prevent or delay the failure of steel and concrete structures exposed to fire. These materials are intended to insulate the structural members during the event of a fire, delaying any loss of the integrity of the structural members. There is an array of available fireproofing materials that can be used depending upon the specific application. Applied fireproofing is available as a wet or dry formula. It is typically sprayed but can also be troweled on. The fireproofing is generally delivered as a dry powder in bag, which is then mixed with water in the field. Modern formulas are asbestos-free and don't contain free crystalline silica. This is a company-specific EPD representing an array of available SFRMs produced at three of GCPAT's facilities located in North America and produced to various specifications as noted in Table 1. Table 1 summarizes key technical data for GCPAT SFRMs for the 2019 reference year (12 months). GCPAT SFRMs are classified in three major sub-categories based on the dry density minimum average values in pcf (pound per cubic foot). Full material selection guide and literature and the material safety data sheets are available for each of these fireproofing materials at https://gcpat.com.

**Table 1. Technical Data for GCPAT SFRMs**

| Primary Binding Agent | GCPAT SFRM-Sub-category | Dry density, minimum average- in kg/m$^3$ (pcf) | GCPAT Brand Names |
|---|---|---|---|
| Gypsum - based | Standard density | 240 (15) | MK Patch (GF Pail), MK-10/HB EXT SET WHITE, MK-10/HB EXT SET, MK-10/HB WHITE, MK-1000/HB, MK-1000/HB EXT SET, MK-10/HB, MK-10/HB EXT SET, MK-6 EXT SET, MK-6/GF, MK-6/HY, MK-6/HY EXT SET, MK-6/HY CE, MK-6/HY EXT SET, MK-6S, MK-6S CE, RG, Z-3306/G |
| Cement- or gypsum-based or a blend | Medium density | 352 (22) | SK-3, Z-106/G, Z-106/HY, Z-3306, Z-3306 Gray, Z-3306 White |
| Cement- based | High & ultra-high density | 640 (40) | Z-146, Z-146PC, Z-146T, Z-156, Z-156PC, Z-156T |

### 1.2 PRODUCT STANDARD

The physical characteristics of SFRM are determined according to various ASTM standards such as, but not limited to:

- E736/E736M-19, Standard Test Method for Cohesion/Adhesion of Sprayed Fire- Resistive Materials Applied to Structural Members
- E605/E605M-19, Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members
- E759/E759M-92(2020)e1 Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members
- E760/E760M-92(2020)e1 Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members
- E761/E761M-92(2020)e1 Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members
- E859/E859M-93(2020)e1 Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members
- E937/E937M-93(2020)e1 Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members.

## 2 DECLARED UNIT

The declared unit is 1,000 kg, 1 metric ton) of spray-applied fire-resistive materials (SFRM).

## 3 MATERIAL CONTENT

Table 2 shows the weighted average generic formulations for all three sub-categories of GCPAT fireproofing materials as produced at GCPAT's three manufacturing locations. For reasons of confidentiality a portion of each SFRM is reported as "additives".

**Table 2: Weighted Average Generic Formulations for Standard, Medium, High & Ultra High Density SFRMs**

| Standard Density | | Medium Density | | High & Ultra High Density | |
|---|---|---|---|---|---|
| **Material composition** | **%** | **Material composition** | **%** | **Material composition** | **%** |
| Stucco (CaSO4 ½H2O) | 87% | Stucco (CaSO4 ½H2O) | 54% | Bauxite | 49% |
| Recovered paper | 5% | Portland cement | 31% | Portland cement | 41% |
| Limestone | 3% | Clay | 6% | Clay | 3% |
| Rest- additives | 5% | Rest- additives | 9% | Rest- additives | 6% |
| Total | 100% | Total | 100% | Total | 100% |

Table 3 shows the amount of packaging materials per 1,000 kg of GCPAT SFRMs. Paper sacks are used for transporting fireproofing materials. The sacks are typically made of high-quality and weight kraft paper, usually virgin fiber.

**Table 3: Packaging Materials for GCPAT SFRMs**

| Packaging materials | Quantity | Units (per 1,000 kg SFRM) |
|---|---|---|
| Paper Sacks | 22.00 | kg |
| Cardboard Core | 0.30 | kg |

# 4 PRODUCTION STAGE

For this EPD, the boundary is “cradle-to-gate” or the *Production stage*, which includes the extraction of raw materials (cradle) through the manufacture of SFRM packaged ready for shipment (gate). Downstream activity stages - Construction, Use, End-of-life, and Optional supplementary information beyond the system boundary - are excluded from the system boundary (Figure 1).

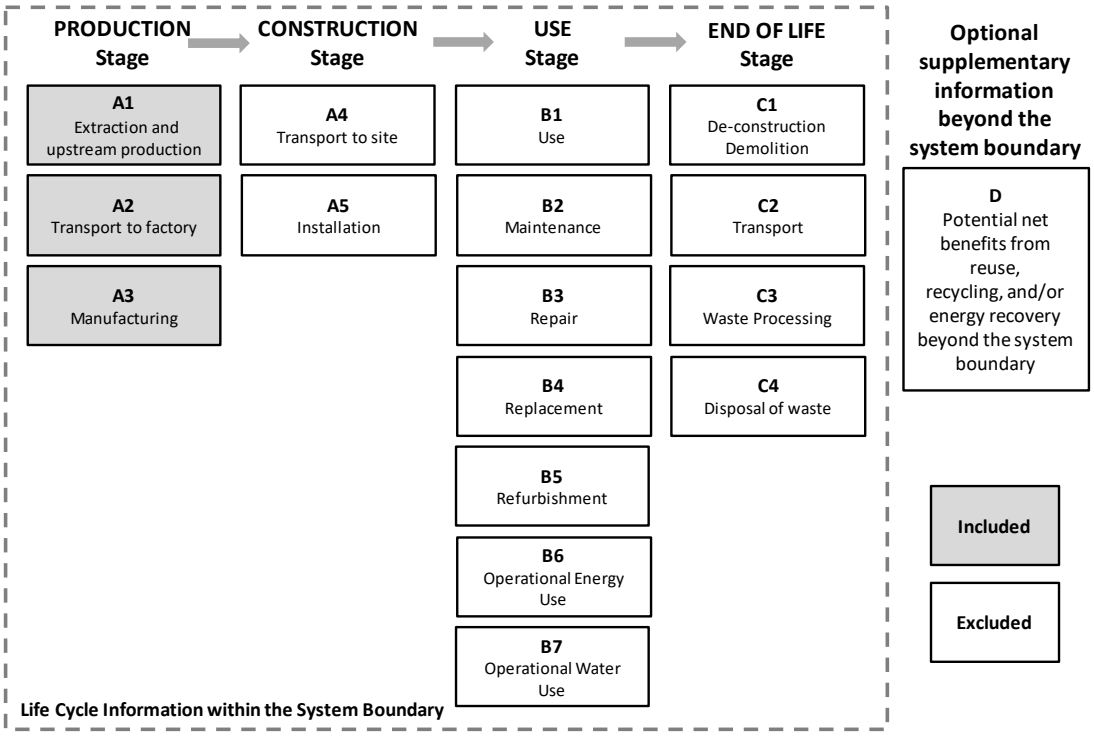



***Figure 1 Common four life cycle stages and their information modules for construction products and the optional supplementary module [2]***

The **Production stage** (modules A1 to A3) includes the following processes:

**A1 Extraction and upstream production**: Extraction and processing of input raw materials used in the production of standard, medium, high & ultra-high-density SFRMs, including fuels used in extraction and transport within the process.

**A2 Transportation to factory**: Transportation of input raw materials (including recovered materials) from extraction site or source to manufacturing facilities, including empty backhauls.

**A3 Manufacturing**: Manufacturing of the SFRMs, including all on-site energy and ancillary materials required and emissions to air, water and land and wastes produced. This also includes transportation from manufacturing site to landfill for on-site wastes, including empty backhauls and the waste disposal process. The A3 module includes grinding, mixing, blending, pneumatic conveying, high-speed auger packaging, lighting and heating, ventilation and air conditioning, operation of environmental equipment (baghouses and bin vents), on-site transportation (loading and unloading) and storage of SFRMs.

# 5 LIFE CYCLE INVENTORY

## 5.1 DATA COLLECTION, SOURCE AND CALCULATIONS

LCI data collection was based on a customized survey of all three GCPAT's SFRM manufacturing sites. All facility specific LCI data were weighted based on facility level total annual production to calculate the weighted average LCI profile for each product type (per 1,000 kg). Data calculation procedures follow ISO 14044. Per ISO 21930, 7.2.2 the net calorific value (lower heating value) of fuels is applied according to scientifically based and accepted values specific to the combustible material.

## 5.2 DATA QUALITY REQUIREMENTS AND ASSESSMENTS

A detailed description of collected data and the data quality assessment regarding the core PCR requirements and ISO 14044 is provided in the LCA report. Data quality is assessed based on its representativeness (technology coverage, geographic coverage, time coverage), completeness, consistency, reproducibility, transparency, and uncertainty (Table 4).

**Table 4 Data Quality Requirements and Assessments**

| Data Quality Requirements | Description |
|---|---|
| **Technology Coverage** | Data represents the prevailing company technology in use in U.S. and Canada. Whenever available, for all upstream and core material and processes, North American typical or average industry LCI datasets were utilized.<br>*Technological representativeness is characterized as "high".* |
| **Geographic Coverage** | The geographic region considered is U.S. and Canada. The geographic coverage of all LCI databases and datasets is given in in the LCA background report.<br>*Geographical representativeness is characterized as "high".* |
| **Time Coverage** | Activity data are representative as of 2019.<br>- SFRM manufacturing process- primary data collected from 3 facilities: reference year 2019 (12 months);<br>- In-bound/ out-bound transportation data- primary data collected from 3 facilities: reference year 2019 (12 months);<br>- Generic data: the most appropriate LCI datasets were used as found in the US LCI Database, ecoinvent v.3.7.1 database, 2021.<br>*Temporal representativeness is characterized as "high".* |
| **Completeness** | All relevant, specific processes, including inputs (raw, secondary, ancillary, and packaging materials, and energy flows) and outputs (emissions and production volume) were considered and modeled to provide a weighted average for the SFRM products of interest.<br>The relevant background materials and processes were taken from the US LCI Database, ecoinvent v 3.7.1 LCI database, and modeled in SimaPro v9.2.0.2, 2021. The completeness of the cradle-to-gate process chain in terms of process steps is rigorously assessed for SFRM products of interest and documented in the LCA background report. |

| Data Quality Requirements | Description |
|---|---|
| **Consistency** | To ensure consistency, the LCI modeling of the production weighted input and output LCI data for the SFRM product of interest used the same LCI modeling structure across the 3 facilities, which consisted of input raw, secondary, ancillary, and packaging materials, energy flows, water resource inputs, product outputs, co-products, by-products, emissions to air, water and soil, and solid and liquid waste disposal. Crosschecks concerning the plausibility of mass and energy flows were continuously conducted. The LCA team conducted mass and energy balances at the facility level and selected process levels to maintain a high level of consistency. |
| **Reproducibility** | Internal reproducibility is possible since the data and the models are stored and available in *GCPAT_SFRM_LCI database* developed in SimaPro, 2021. A high level of transparency is provided throughout the report as the weighted average LCI profile is presented for each of the declared products as well as major upstream inputs. Key primary (manufacturer specific) and secondary (generic) LCI data sources are summarized in Annex C. External reproducibility is also possible as a high level of transparency is provided throughout the Project Report and LCI data and sources are also summarized. |
| **Transparency** | Activity and LCI datasets are transparently disclosed in the project report, including data sources. |
| **Uncertainty** | A *sensitivity check* was conducted to assess the reliability of the EPD results and conclusions by determining how they are affected by uncertainties in the data or assumptions on calculation of LCIA and energy indicator results. The sensitivity check includes the results of the *sensitivity analysis* and *Monte Carlo uncertainty analysis* both of which are summarized in the LCA report. |

## 5.3 ALLOCATION AND CUT-OFF RULES

"Mass" was deemed as the most appropriate physical parameter for allocation used for the SFRMs manufacturing system to calculate the input energy flows (electricity, natural gas, and propane), packaging materials and waste flows per declared unit of 1,000 kg of SFRM. LCI modeling accounts for the plant specific fabrication yields in accordance with ISO 14044, 4.3.4.2.

Secondary materials such as hammermilled newsprint and post-industrial polystyrene are considered recovered materials. However, only the materials, water, energy, emissions, and other elemental flows associated with reprocessing, handling, sorting, and transportation from the generating industrial process to their use in the production process are considered. Any allocated burdens before reprocessing are allocated to the original product. Allocation related to transport are based on the mass of transported product.

The cut-off criteria as per ISO 21930, were followed for this EPD. All input/output data required were collected and included in the LCI modelling. No substances with hazardous and toxic properties that pose a concern for human health and/or the environment were identified in the framework of this EPD. Any data gaps for the reference year 2019 - e.g., packaging materials were filled in with plant generic data from previous years.

The Production Stage *excludes* the following processes:

- Capital goods and infrastructure;
- Human activity and personnel related activity (travel, furniture, office operations and supplies);
- Energy and water use related to company management and sales activities that may be located either within the factory site or at another location.

# 6 LIFE CYCLE ASSESSMENT

## 6.1 RESULTS OF THE LIFE CYCLE ASSESSMENT

This section summarizes the product stage life cycle impact assessment (LCIA) results including resource use and waste generated metrics based on the cradle-to-gate life cycle inventory inputs and outputs analysis. Table 5 presents the calculated results for each product density based on 1,000 kg (1 metric ton). *It is noted that LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks* [2], [3].

**Table 5 Production Stage (A1-A3), EPD Results for 1,000 kg standard, medium, high & ultra-high density SFRMs**

| Impact category and inventory indicators | Unit | Standard Density (min 15 pcf) | Medium Density (min 22 pcf) | High & Ultra High Density (min 40 pcf) |
|---|---|---|---|---|
| Global warming potential, GWP 100[1)], AR5 | kg $CO_2$ eq | **210** | **493** | **621** |
| Ozone depletion potential, ODP[1)] | kg CFC-11 eq | **1.2E-04** | **1.3E-04** | **1.4E-04** |
| Smog formation potential, SFP[1)] | kg $O_3$ eq | **29.1** | **35.3** | **52.5** |
| Acidification potential, AP[1)] | kg $SO_2$ eq | **1.4** | **1.9** | **2.6** |
| Eutrophication potential, EP[1)] | kg N eq | **0.33** | **0.67** | **0.89** |
| ADP elements, CML[2)] | kg Sb eq | **1.0E-04** | **6.6E-04** | **1.8E-03** |
| ADP surplus, TRACI[1)] | MJ surplus | **515** | **607** | **683** |
| Renewable primary resources used as an energy carrier (fuel), $RPR_E$[3)] | MJ LHV | **166.9** | **405.6** | **450.3** |
| Renewable primary resources with energy content used as material, $RPR_M$[3)] | MJ LHV | **0** | **0** | **0** |
| Non-renewable primary resources used as an energy carrier (fuel), $NRPR_E$[3)] | MJ LHV | **3,849** | **5,051** | **5,833** |
| Non-renewable primary resources with energy content used as material, $NRPR_M$[3)] | MJ LHV | **0** | **0** | **0** |
| Secondary materials, SM[3)] | kg | **71** | **90** | **63** |
| Renewable secondary fuels, RSF[3)] | MJ LHV | **0.080** | **17** | **23** |
| Non-renewable secondary fuels, NRSF[3)] | MJ LHV | **0.77** | **167** | **218** |
| Recovered energy, RE[3)] | MJ LHV | **0** | **0** | **0** |
| Consumption of freshwater, FW[3)] | $m^3$ | **0.31** | **0.62** | **0.64** |
| Hazardous waste disposed, HWD[3)] | kg | **0.035** | **0.027** | **0.009** |
| Non-hazardous waste disposed, NHWD[3)] | kg | **19.9** | **116.0** | **143.5** |
| High-level radioactive waste, conditioned, to final repository, HLRW[3)] | $m^3$ | **9.8E-07** | **9.8E-07** | **1.0E-06** |
| Intermediate- and low-level radioactive waste, conditioned, to final repository, ILLRW[3)] | $m^3$ | **2.8E-06** | **3.3E-06** | **5.0E-06** |
| Components for re-use, CRU[3)] | kg | **0** | **0** | **0** |
| Materials for recycling, MR[3)] | kg | **0** | **0** | **0** |
| Materials for energy recovery, MER[3)] | kg | **0** | **0** | **0** |
| Recovered energy exported from the product system, EE[3)] | MJ LHV | **0.0029** | **0.62** | **0.81** |
| Global warming potential - biogenic, GWP-100 bio[3)4)] | | 1.1E-03 | 0.23 | 0.30 |
| Emissions from calcination[3)4)] | | 0.71 | 152.3 | 200.0 |

| Impact category and inventory indicators | Unit | Standard Density (min 15 pcf) | Medium Density (min 22 pcf) | High & Ultra High Density (min 40 pcf) |
|---|---|---|---|---|
| Emissions from combustion of waste from renewable sources[3)4)] | | 3.00E-04 | 0.064 | 0.085 |
| Emissions from combustion of waste from non-renewable sources[3)4)] | | 0.072 | 15.5 | 20.3 |
| Removals associated with biogenic carbon content of the bio-based product[3)] | | -98.0 | -66.2 | -41.5 |
| Removals associated with biogenic carbon content of the bio-based packaging[3)] | | -40.9 | -40.9 | -40.9 |

Table Notes:

[1)] Calculated as per U.S EPA TRACI 2.1, v1.05, SimaPro v 9.2.0.2. $GWP_{100}$, excludes biogenic $CO_2$ removals and emissions; 100-year time horizon GWP factors are provided by the IPCC 2013 Fifth Assessment Report (AR5), TRACI 2.1, with AR5, v1.05.

[2)] Calculated as per CML-IA Baseline V3.05, SimaPro v 9.2.0.2.

[3)] Calculated as per ACLCA ISO 21930 Guidance, respective sections 6.2 to 10.8.

[4)] Applicable for Portland cement only, used in manufacturing of the GCPAT SFRM [11].

## 6.2 INTERPRETATION

The cradle-to-gate manufacture of **standard density SFRM** embodies about 4 GJ of primary energy (LHV) and emits 210 kg CO2 eq of greenhouse gases per ton of product. Around 96% of the total primary energy input is derived from non-renewable primary energy resources. Across the three standard density production information modules, Module A1 extraction and upstream production contributes the largest share of the LCIA and energy indicator results – accounting for between 60% ($NRPR_E$) and 54% (GWP-100) of the potential environmental burdens. Module A3 Manufacturing is generally the second largest contributor to the overall potential environmental impacts – accounting for 32% and 29% of GWP and non-renewable energy use, respectively. Except for acidification (26%) and smog potential impacts (35%), Module A2 Transportation is generally a minor contributor (<15%) to the overall potential environmental impacts of standard density SFRM production.

The cradle-to-gate manufacture of **medium density SFRM** embodies about 5.5 GJ of primary energy (LHV) and emits 493 kg CO2 eq of greenhouse gases per ton of product. About 93% of the total primary energy input is derived from non-renewable primary energy resources. Across the three medium density production information modules, Module A1 extraction and upstream production contributes the largest share of the LCIA and energy indicator results – accounting for 82% (GWP-100), 72% (NRPRE) and over 50% of both acidification and smog formation burdens. Unlike standard density SFRM, Module A3 Manufacturing is a more minor contributor to the overall potential environmental impacts of medium density SFRM – accounting for 17% of $NRPR_E$ and 9% of GWP-100. Module A2 Transportation is a significant contributor to SFP (37%), AP (27%) and GWP (9%) to the overall potential environmental impacts of medium density SFRM manufacture.

The cradle-to-gate manufacture of **high and ultra-high density SFRM** embodies about 6.3 GJ of primary energy (LHV) and emits 621 kg CO2 eq of greenhouse gases per ton of product. Almost 93% of the total primary energy input is derived from non-renewable primary energy resources. Across the three high and ultra-high density production information modules, Module A1 extraction and upstream production contributes the largest share of the key LCIA and energy indicator results – accounting for 80% (GWP-100), 67% (NRPRE) and 78% of eutrophication potential burden. Similar to medium density SFRM, Module A3 Manufacturing is a more minor contributor to the overall potential environmental impacts of high and ultra-high density SFRM – accounting for 15% of NRPRE and 13% of GWP-100. Module A2 Transportation is a significant contributor to SFP (53%), AP (39%) and GWP (9%) to the overall potential environmental impacts of high and ultra-high density SFRM manufacture.

## 7 ADDITIONAL ENVIRONMENTAL INFORMATION

Standard, medium and high & ultra-high density SFRMs use between 2% to 7% recovered materials (hammermilled newsprint and post-industrial polystyrene).

## 8 DECLARATION TYPE

GCPAT SFRM EPD is categorized as follows:
- A corporate specific product EPD, averaged across the manufacturer's plants.
This declaration presents a weighted average EPD for three SFRM North American facilities operated by GCPAT. Product activities covered include the raw material supply, transport and manufacturing (modules A1 to A3). The declaration is intended for Business-to-Business (B-to-B) communication.

## 9 DECLARATION COMPARABILITY LIMITATION STATEMENT

*- Only EPDs prepared from cradle-to-grave life cycle results and based on the same function, RSL, quantified by the same functional unit, and meeting all the conditions for comparability listed in ISO 14025:2006 and ISO 21930:2017 can be used to comparison between products*.

# 10 EPD EXPLANATORY MATERIAL

For any explanatory material, regarding this EPD please contact the program operator.

ASTM International
Environmental Product Declarations
100 Barr Harbor Drive,
West Conshohocken,
PA 19428-2959,
http://www.astm.org

# 11 REFERENCES

1. ISO 14025:2006 Environmental labeling and declarations - Type III environmental declarations - Principles and procedures.
2. ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services.
3. ISO 14040:2006/Amd 1:2020 Environmental management - Life cycle assessment - Principles and framework.
4. ISO 14044:2006/Amd1:2017/Amd2:2020 Environmental management - Life cycle assessment - Requirements and guidelines.
5 ASTM Program Operator Rules. Version: 8.0, Revised 04/29/20.
6 ISO 14021:2016 Environmental labels and declarations - Self-declared environmental claims (Type II environmental labelling).
7. PRé 2019.SimaPro LCA Software v9.2.0.2, 2021, https://simapro.com/
8. LEED v4, *Building Design and Construction Guide (BD+C), MR Credit: Building Product Disclosure and Optimization – Environmental Product Declarations, Option 2 Multi-attribute optimization* (1 point). https://www.usgbc.org/node/2616376?return=/credits/new-construction/v4/material-%26amp%3B-resources.
9. LEED v4.1, Building Design and Construction Guide (BD+C), MR Credit: Building Product Disclosure and Optimization – Environmental Product Declarations, Option 2 Multi-attribute optimization (1 point). https://leeduser.buildinggreen.com/credit/NC-v4.1/MRc2#tab-credit-language.
10. ACLCA 2019, Guidance to Calculating Non-LCIA Inventory Metrics in Accordance with ISO 21930:2017. The American Centre for Life Cycle Assessment. May 2019. https://aclca.org/aclca-iso-21930-guidance/
11. PCA 2021, EPD, Portland Cement- Industry-wide. https://www.astm.org/products-services/certification/environmental-product-declarations/epd-pcr.html
12. Athena 2021, A Cradle-to-Gate Life Cycle Assessment of GCP Applied Technologies Standard, Medium and High & Ultra High-Density Spray-applied Fire-Resistive Materials (SFRMs), Final Report.

# Monokote Z156 by Saint Gobain

**Health Product Declaration v2.3**

created via: HPDC Online Builder

**HPD UNIQUE IDENTIFIER:** 1650309120
**CLASSIFICATION:** 07 81 16 Cementitious Fire Protection
**PRODUCT DESCRIPTION:** MONOKOTE Z-156, MONOKOTE Z-156PC, and MONOKOTE Z-156T are ultra-high density cementitious fireproofing products that have been developed by GCP Applied Technologies to meet specialty, commercial and industrial fireproofing requirements.

## Section 1: Summary

**Nested 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
- ( ) Other

**Residuals/Impurities Evaluation**
Completed in 3 of 3 Materials

**Explanation(s) provided for Residuals/Impurities?**
- (•) Yes ( ) No

*For all contents above the threshold, the manufacturer has:*

**Characterized** (•) Yes ( ) No
*Provided weight and role.*

**Screened** (•) Yes ( ) No
*Provided screening results using HPDC-approved methods.*

**Identified** (•) Yes ( ) No
*Provided name and CAS RN or other identifier.*

### 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.

**NESTED MATERIAL** | **MATERIAL OR SUBSTANCE** | *RESIDUAL OR IMPURITY*
GREENSCREEN SCORE | HAZARD TYPE

**STRUCTURAL LAYER [ PORTLAND CEMENT** LT-P1 | CAN | END | MAM **ALUMINUM OXIDE** BM-2 | MAM **CALCIUM CARBONATE** BM-3dg **FULLERS EARTH** LT-1 | CAN | MAM | EYE **WATER** BM-4 **GYPSUM** BM-3dg | MAM **CELLULOSIC FIBER** NoGS **TITANIUM DIOXIDE** BM-1 | CAN | END | MAM **DIIRON TRIOXIDE** BM-1 | CAN | MAM **CALCIUM OXIDE** BM-2 | SKI | MAM | EYE *QUARTZ* BM-1 | CAN | MAM | GEN **]**
**APPLICATION AID [ EXPANDED POLYSTYRENE** LT-UNK **CHOPPED GLASS FIBER** LT-UNK **SULFURIC ACID MONODODECYL ESTER SODIUM SALT** BM-2 | MUL | EYE | SKI | MAM | AQU **CELLULOSE, 2-HYDROXYPROPYL METHYL ETHER** LT-UNK **GRAPHITE** LT-UNK **WATER** BM-4 **] STABILITY COMPONENTS [ NITROUS ACID, CALCIUM SALT** LT-P1 | MAM | AQU | PHY **NITRIC ACID, CALCIUM SALT** LT-UNK | MAM **]**

Number of Greenscreen BM-4/BM3 contents ... 4

Contents highest-concern GreenScreen score(s) (BM-1, LT-1, LT-P1) ... LT-P1, LT-1, BM-1

Nanomaterial ... No

**INVENTORY AND SCREENING NOTES:**

Antimicrobial Pesticides Reporting: This product does not contain substance(s) that are intentionally added above the [Product - 1,000 ppm] threshold to act as antimicrobials.

All materials have been screened through the HPD tool. All residuals and impurities have been considered and noted when applicable.

### 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: CDPH Standard Method - Not tested

### CONSISTENCY WITH OTHER PROGRAMS

Pre-checked for LEED v4 Option 1.

Third Party Verified?
- ( ) Yes
- (•) No

PREPARER: Self-Prepared
VERIFIER:
VERIFICATION #:

SCREENING DATE: 2025-07-11
PUBLISHED DATE: 2025-07-11
EXPIRY DATE: 2028-07-11

## Section 2: Content in Descending Order of Quantity

*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 2.3, available on the HPDC website at: www.hpd-collaborative.org/hpd-2-3-standard*

**STRUCTURAL LAYER** **%: 95.0000 - 99.0000**

PRODUCT THRESHOLD: 1000 ppm RESIDUALS AND IMPURITIES EVALUATION COMPLETED: Yes MATERIAL TYPE: Other: Not Set

RESIDUALS AND IMPURITIES NOTES: Residuals and impurities have been considered and noted within the 1000 ppm reporting threshold.

OTHER MATERIAL NOTES: The range of the raw material is directly dependent on the thickest and dimensions of the ceiling tile and the applicable paint formulation. All residuals and impurities are considered and noted when applicable to the guidelines in the HPD Builder Standard.

### PORTLAND CEMENT

ID: **65997-15-1**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:27**

%: **36.0000 - 50.0000** GreenScreen: **LT-P1** RC: **None** NANO: **No** SUBSTANCE ROLE: **Structure component**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| CAN | MAK | Carcinogen Group 3B - Evidence of carcinogenic effects but not sufficient for classification |
| END | TEDX - Potential Endocrine Disruptors | Potential Endocrine Disruptor |
| MAM | GHS - Japan | H335 - May cause respiratory irritation [Specific target organ toxicity - Single exposure - Category 3] |
| MAM | GHS - Japan | H372 - Causes damage to organs through prolonged or repeated exposure [Specific target organs/systemic toxicity following repeated exposure - Category 1] |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| None found | | No listings found on Additional Hazard Lists |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

### ALUMINUM OXIDE

ID: **1344-28-1**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:27**

%: **26.0000 - 35.0000** GreenScreen: **BM-2** RC: **None** NANO: **No** SUBSTANCE ROLE: **Filler**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| MAM | GHS - Japan | H335 - May cause respiratory irritation [Specific target organ toxicity - Single exposure - Category 3] |
| MAM | GHS - Japan | H372 - Causes damage to organs through prolonged or repeated exposure [Specific target organs/systemic toxicity following repeated exposure - Category 1] |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| RESTRICTED LIST | Cradle to Cradle Products Innovation Institute (C2CPII) | C2C Certified v4.0 Product Standard Restricted Substances List (RSL) - Effective July 1, 2022<br><br>Biological and Environmentally Released Materials |
| RESTRICTED LIST | Cradle to Cradle Products Innovation Institute (C2CPII) | C2C Certified v4.0 Product Standard Restricted Substances List (RSL) - Effective July 1, 2022<br><br>Children's Products |
| RESTRICTED LIST | Cradle to Cradle Products Innovation Institute (C2CPII) | C2C Certified v4.1 Product Standard Restricted Substances - Effective July 1, 2025<br><br>Children's Toy Products |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## CALCIUM CARBONATE

ID: **1317-65-3**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:28**

%: **0.0000 - 7.5000** GreenScreen: **BM-3dg** RC: **None** NANO: **No** SUBSTANCE ROLE: **Filler**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| None found | | No warnings found on HPD Priority Hazard Lists |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| None found | | No listings found on Additional Hazard Lists |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## FULLERS EARTH

ID: **12174-11-7**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:28**

%: **2.0000 - 7.0000** GreenScreen: **LT-1** RC: **None** NANO: **No** SUBSTANCE ROLE: **Filler**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| CAN | CA EPA - Prop 65 | Carcinogen - specific to chemical form or exposure route |
| CAN | IARC | Group 2b - Possibly carcinogenic to humans |
| CAN | MAK | Carcinogen Group 2 - Considered to be carcinogenic for man |
| CAN | GHS - New Zealand | Carcinogenicity category 2 |
| CAN | GHS - Japan | H351 - Suspected of causing cancer [Carcinogenicity - Category 2] |
| MAM | GHS - Japan | H372 - Causes damage to organs through prolonged or repeated exposure [Specific target organs/systemic toxicity following repeated exposure - Category 1] |
| EYE | GHS - Japan | H319 - Causes serious eye irritation [Serious eye damage / eye irritation - Category 2A] |
| CAN | GHS - Australia | H351 - Suspected of causing cancer [Carcinogenicity - Category 2] |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| None found | | No listings found on Additional Hazard Lists |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## WATER

ID: **7732-18-5**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:28**

%: **1.0000 - 4.0000** GreenScreen: **BM-4** RC: **None** NANO: **No** SUBSTANCE ROLE: **Diluent**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| None found | | No warnings found on HPD Priority Hazard Lists |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| EXEMPT | European Union / European Commission (EU EC) | EU - REACH Exemptions<br><br>Exempted from REACH Annex IV listing due to intrinsic safety |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## GYPSUM

ID: **13397-24-5**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:29**

%: **0.0000 - 3.0000** GreenScreen: **BM-3dg** RC: **None** NANO: **No** SUBSTANCE ROLE: **Structure component**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| MAM | GHS - Japan | H335 - May cause respiratory irritation [Specific target organ toxicity - Single exposure - Category 3] |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| None found | | No listings found on Additional Hazard Lists |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## CELLULOSIC FIBER

ID: **65996-61-4**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:28**

%: **1.0000 - 3.0000** GreenScreen: **NoGS** RC: **None** NANO: **No** SUBSTANCE ROLE: **Filler**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| None found | | No warnings found on HPD Priority Hazard Lists |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| EXEMPT | European Union / European Commission (EU EC) | EU - REACH Exemptions<br><br>Exempted from REACH Annex IV listing due to intrinsic safety |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## TITANIUM DIOXIDE

ID: **13463-67-7**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:29**

%: **1.0000 - 2.0000** GreenScreen: **BM-1** RC: **None** NANO: **No** SUBSTANCE ROLE: **Brightener**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| CAN | US CDC - Occupational Carcinogens | Occupational Carcinogen |
| CAN | CA EPA - Prop 65 | Carcinogen - specific to chemical form or exposure route |
| CAN | IARC | Group 2B - Possibly carcinogenic to humans - inhaled from occupational sources |
| CAN | MAK | Carcinogen Group 3A - Evidence of carcinogenic effects but not sufficient to establish MAK/BAT value |
| END | TEDX - Potential Endocrine Disruptors | Potential Endocrine Disruptor |
| CAN | MAK | Carcinogen Group 4 - Non-genotoxic carcinogen with low risk under MAK/BAT levels |
| CAN | IARC | Group 2b - Possibly carcinogenic to humans |
| CAN | EU - GHS (H-Statements) Annex 6 Table 3-1 | H351 - Suspected of causing cancer [Carcinogenicity - Category 2] |
| CAN | GHS - Japan | H351 - Suspected of causing cancer [Carcinogenicity - Category 2] |
| MAM | GHS - Japan | H372 - Causes damage to organs through prolonged or repeated exposure [Specific target organs/systemic toxicity following repeated exposure - Category 1] |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| RESTRICTED LIST | Cradle to Cradle Products Innovation Institute (C2CPII) | C2C Certified v4.0 Product Standard Restricted Substances List (RSL) - Effective July 1, 2022<br><br>Children's Products |
| RESTRICTED LIST | Cradle to Cradle Products Innovation Institute (C2CPII) | C2C Certified v4.0 Product Standard Restricted Substances List (RSL) - Effective July 1, 2022<br><br>Formulated Consumer Products |
| RESTRICTED LIST | Cradle to Cradle Products Innovation Institute (C2CPII) | C2C Certified v4.0 Product Standard Restricted Substances List (RSL) - Effective July 1, 2022<br><br>Cosmetics & Personal Care Products |
| POSITIVE LIST | US Environmental Protection Agency (US EPA) | US EPA - DfE Safer Chemicals Ingredients list (SCIL)<br><br>Colorants - Green Circle (Verified Low Concern) |
| RESTRICTED LIST | Cradle to Cradle Products Innovation Institute (C2CPII) | C2C Certified v4.1 Product Standard Restricted Substances - Effective July 1, 2025<br><br>Cosmetics and Personal Care Products |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

**DIIRON TRIOXIDE** ID: **1309-37-1**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:30**

%: **0.4000 - 1.0000** GreenScreen: **BM-1** RC: **None** NANO: **No** SUBSTANCE ROLE: **Flux**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| CAN | MAK | Carcinogen Group 3B - Evidence of carcinogenic effects but not sufficient for classification |
| MAM | GHS - Japan | H372 - Causes damage to organs through prolonged or repeated exposure [Specific target organs/systemic toxicity following repeated exposure - Category 1] |
| MAM | GHS - Japan | H370 - Causes damage to organs [Specific target organs/systemic toxicity following single exposure - Category 1] |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| None found | | No listings found on Additional Hazard Lists |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## CALCIUM OXIDE

ID: **1305-78-8**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:30**

%: **0.0000 - 1.0000** GreenScreen: **BM-2** RC: **None** NANO: **No** SUBSTANCE ROLE: **Processing regulator**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| SKI | GHS - Australia | H315 - Causes skin irritation [Skin corrosion/irritation - Category 2] |
| MAM | GHS - Japan | H372 - Causes damage to organs through prolonged or repeated exposure [Specific target organs/systemic toxicity following repeated exposure - Category 1] |
| MAM | GHS - Japan | H370 - Causes damage to organs [Specific target organs/systemic toxicity following single exposure - Category 1] |
| SKI | GHS - New Zealand | Skin corrosion category 1C |
| EYE | GHS - New Zealand | Serious eye damage category 1 |
| EYE | GHS - Japan | H318 - Causes serious eye damage [Serious eye damage / eye irritation - Category 1] |
| SKI | GHS - Japan | H315 - Causes skin irritation [Skin corrosion / irritation - Category 2] |
| EYE | GHS - Australia | H318 - Causes serious eye damage [Serious eye damage/eye irritation - Category 1] |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| RESTRICTED LIST | Green Science Policy Institute (GSPI) | GSPI - Six Classes Precautionary List<br><br>Antimicrobials |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## QUARTZ

ID: **14808-60-7**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:29**

%: **0.0000 - 0.7500** GreenScreen: **BM-1** RC: **None** NANO: **No** SUBSTANCE ROLE: **Impurity/Residual**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| CAN | US CDC - Occupational Carcinogens | Occupational Carcinogen |
| CAN | CA EPA - Prop 65 | Carcinogen - specific to chemical form or exposure route |
| CAN | US NIH - Report on Carcinogens | Known to be Human Carcinogen (respirable size - occupational setting) |
| CAN | MAK | Carcinogen Group 1 - Substances that cause cancer in man |
| CAN | IARC | Group 1 - Agent is carcinogenic to humans - inhaled from occupational sources |
| CAN | IARC | Group 1 - Agent is Carcinogenic to humans |
| CAN | US NIH - Report on Carcinogens | Known to be a human Carcinogen |
| CAN | GHS - Japan | H350 - May cause cancer [Carcinogenicity - Category 1A] |
| CAN | GHS - Australia | H350i - May cause cancer by inhalation [Carcinogenicity - Category 1A or 1B] |
| CAN | GHS - New Zealand | Carcinogenicity category 1 |
| MAM | GHS - Japan | H372 - Causes damage to organs through prolonged or repeated exposure [Specific target organs/systemic toxicity following repeated exposure - Category 1] |
| GEN | GHS - Japan | H341 - Suspected of causing genetic defects [Germ cell mutagenicity - Category 2] |
| MAM | GHS - Australia | H372 - Causes damage to organs through prolonged or repeated exposure [Specific target organ toxicity - repeated exposure - Category 1] |
| MAM | GHS - New Zealand | Specific target organ toxicity - repeated exposure category 1 |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| None found | | No listings found on Additional Hazard Lists |

SUBSTANCE NOTES: This material is intrinsically bound within the layer, under normal use no release is anticipated.

**APPLICATION AID** **%: 3.0000 - 5.0000**

PRODUCT THRESHOLD: 1000 ppm RESIDUALS AND IMPURITIES EVALUATION COMPLETED: Yes MATERIAL TYPE: Other: Not Set

RESIDUALS AND IMPURITIES NOTES: Residuals and impurities have been considered and noted within the 1000 ppm reporting threshold.

OTHER MATERIAL NOTES: The range of the raw material is directly dependent on the thickest and dimensions of the ceiling tile and the applicable paint formulation. All residuals and impurities are considered and noted when applicable to the guidelines in the HPD Builder Standard.

## EXPANDED POLYSTYRENE

ID: **9003-53-6**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:30**

%: **25.0000 - 40.0000** GreenScreen: **LT-UNK** RC: **None** NANO: **No** SUBSTANCE ROLE: **Abrasive**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| None found | | No warnings found on HPD Priority Hazard Lists |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| RESTRICTED LIST | Perkins+Will (P+W) | P&W - Precautionary List<br><br>Precautionary list of substances recommended for avoidance |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## CHOPPED GLASS FIBER

ID: **65997-17-3**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:30**

%: **30.0000 - 40.0000** GreenScreen: **LT-UNK** RC: **None** NANO: **No** SUBSTANCE ROLE: **Structure component**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| None found | | No warnings found on HPD Priority Hazard Lists |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| EXEMPT | European Union / European Commission (EU EC) | EU - REACH Exemptions<br><br>Exempted from REACH Annex V listing due to intrinsic safety |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## SULFURIC ACID MONODODECYL ESTER SODIUM SALT

ID: **151-21-3**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:31**

%: **14.0000 - 25.0000** GreenScreen: **BM-2** RC: **None** NANO: **No** SUBSTANCE ROLE: **Emulsifier**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| MUL | German FEA - Substances Hazardous to Waters | Class 3 - Severe Hazard to Waters |
| EYE | GHS - New Zealand | Eye irritation category 2 |
| SKI | GHS - Australia | H315 - Causes skin irritation [Skin corrosion/irritation - Category 2] |
| MAM | GHS - Japan | H370 - Causes damage to organs [Specific target organs/systemic toxicity following single exposure - Category 1] |
| EYE | GHS - Japan | H318 - Causes serious eye damage [Serious eye damage / eye irritation - Category 1] |
| SKI | GHS - Japan | H315 - Causes skin irritation [Skin corrosion / irritation - Category 2] |
| AQU | GHS - Japan | H400 - Very toxic to aquatic life [Hazardous to the aquatic environment (acute) - Category 1] |
| MAM | GHS - New Zealand | Acute dermal toxicity category 3 |
| EYE | GHS - Australia | H318 - Causes serious eye damage [Serious eye damage/eye irritation - Category 1] |
| MAM | GHS - Japan | H310 - Fatal in contact with skin [Acute Toxicity (dermal) - Category 2] |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| RESTRICTED LIST | Green Science Policy Institute (GSPI) | GSPI - Six Classes Precautionary List<br><br>Antimicrobials |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

**CELLULOSE, 2-HYDROXYPROPYL METHYL ETHER** ID: **9004-65-3**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:30**

%: **13.0000 - 25.0000** GreenScreen: **LT-UNK** RC: **None** NANO: **No** SUBSTANCE ROLE: **Binder**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| None found | | No warnings found on HPD Priority Hazard Lists |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| None found | | No listings found on Additional Hazard Lists |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## GRAPHITE

ID: **7782-42-5**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:31**

%: **0.0000 - 2.0000** GreenScreen: **LT-UNK** RC: **None** NANO: **No** SUBSTANCE ROLE: **Pigment**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| None found | | No warnings found on HPD Priority Hazard Lists |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| None found | | No listings found on Additional Hazard Lists |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## WATER

ID: **7732-18-5**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:31**

%: **0.0000 - 2.0000** GreenScreen: **BM-4** RC: **None** NANO: **No** SUBSTANCE ROLE: **Solvent**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| None found | | No warnings found on HPD Priority Hazard Lists |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| EXEMPT | European Union / European Commission (EU EC) | EU - REACH Exemptions<br><br>Exempted from REACH Annex IV listing due to intrinsic safety |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations from the raw material supplier.

## STABILITY COMPONENTS

**%: 1.0000 - 3.0000**

PRODUCT THRESHOLD: 1000 ppm RESIDUALS AND IMPURITIES EVALUATION COMPLETED: Yes MATERIAL TYPE: Other: Not Set

RESIDUALS AND IMPURITIES NOTES: Residuals and impurities have been considered and noted within the 1000 ppm reporting threshold.

OTHER MATERIAL NOTES: The range of the raw material is directly dependent on the thickest and dimensions of the ceiling tile and the applicable paint formulation. All residuals and impurities are considered and noted when applicable to the guidelines in the HPD Builder Standard.

## NITROUS ACID, CALCIUM SALT

ID: **13780-06-8**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:32**

%: **92.0000 - 94.0000** GreenScreen: **LT-P1** RC: **None** NANO: **No** SUBSTANCE ROLE: **Corrosion inhibitor**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| MAM | GHS - Japan | H372 - Causes damage to organs through prolonged or repeated exposure [Specific target organs/systemic toxicity following repeated exposure - Category 1] |
| MAM | GHS - Japan | H370 - Causes damage to organs [Specific target organs/systemic toxicity following single exposure - Category 1] |
| AQU | GHS - Korea | H400 - Very toxic to aquatic life [Hazardous to the aquatic environment (acute) - Category 1] |
| MAM | GHS - Korea | H301 - Toxic if swallowed [Acute toxicity (oral) - Category 3] |
| PHY | GHS - Korea | H272 - May intensify fire; oxidizer [Oxidizing solids - Category 2] |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| None found | | No listings found on Additional Hazard Lists |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations and tape dimensions as well as ranges identified from the raw material supplier.

## NITRIC ACID, CALCIUM SALT

ID: **10124-37-5**

HAZARD DATA SOURCE: **Pharos Chemical and Materials Library** HAZARD SCREENING DATE: **2025-07-11 6:55:32**

%: **3.0000 - 4.0000** GreenScreen: **LT-UNK** RC: **None** NANO: **No** SUBSTANCE ROLE: **Corrosion inhibitor**

| HAZARD TYPE | LIST NAME AND SOURCE | WARNINGS |
|---|---|---|
| MAM | GHS - Japan | H372 - Causes damage to organs through prolonged or repeated exposure [Specific target organs/systemic toxicity following repeated exposure - Category 1] |
| MAM | GHS - Japan | H370 - Causes damage to organs [Specific target organs/systemic toxicity following single exposure - Category 1] |

| ADDITIONAL LISTINGS | LIST NAME AND SOURCE | NOTIFICATION |
|---|---|---|
| None found | | No listings found on Additional Hazard Lists |

SUBSTANCE NOTES: The raw material range is based on content percent from a range of manufacturing locations and tape dimensions as well as ranges identified from the raw material supplier.

## 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 | CDPH Standard Method - Not tested | |
|---|---|---|
| CERTIFYING PARTY: Self-declared<br>APPLICABLE FACILITIES: none<br>CERTIFICATE URL: | ISSUE DATE: 2025-06-26 00:00:00<br>EXPIRY DATE: | CERTIFIER OR LAB: None |

CERTIFICATION AND COMPLIANCE NOTES:

## 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

All CertainTeed Fireproofing Products should be handled and installed per the requirements of the manufacturers SDS. For complete Safety and installation information on any and all CertainTeed Products please see https://gcpat.com/en/products/monokote-fireproofing . Additional Transparency documentation can be found at https://saintgobain.ecomedes.com .

# Section 6: References

**MANUFACTURER INFORMATION**

MANUFACTURER: **Saint Gobain**
ADDRESS: **20 Moores Rd**
**Malvern, PA 19355**
COUNTRY: **USA**

WEBSITE: **https://gcpat.com/en/products/monokote-fireproofing**
CONTACT NAME: **John Dalton**
TITLE: **Global Technical Services Manager**
PHONE: **1-866-333-3726**
EMAIL: **John.a.dalton@saint-gobain.com**

*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**

**Hazard Types**

**AQU** Aquatic toxicity
**CAN** Cancer
**DEV** Developmental toxicity
**END** Endocrine activity
**EYE** Eye irritation/corrosivity
**GEN** Gene mutation
**GLO** Global warming
**LAN** Land toxicity
**MAM** Mammalian/systemic/organ toxicity
**MUL** Multiple
**NEU** Neurotoxicity
**NF** Not found on Priority Hazard Lists
**OZO** Ozone depletion
**PBT** Persistent, bioaccumulative, and toxic
**PHY** Physical hazard (flammable or reactive)
**REP** Reproductive
**RES** Respiratory sensitization
**SKI** Skin sensitization/irritation/corrosivity
**UNK** Unknown

**GreenScreen (GS)**

**BM-4** Benchmark 4 (prefer-safer chemical)
**BM-3** Benchmark 3 (use but still opportunity for improvement)
**BM-2** Benchmark 2 (use but search for safer substitutes)
**BM-1** Benchmark 1 (avoid - chemical of high concern)
**BM-U** Benchmark Unspecified (due to insufficient data)
**LT-P1** List Translator Possible 1 (Possible Benchmark-1)
**LT-1** List Translator 1 (Likely Benchmark-1)
**LT-UNK** List Translator Benchmark Unknown
**NoGS** No GreenScreen.

GreenScreen Benchmark scores sometimes also carry subscripts, which provide more context for how the score was determined. These are DG (data gap), TP (transformation product), and CoHC (chemical of high concern). For more information, see 2.2.2.4 GreenScreen® for Safer Chemicals, www.greenscreenchemicals.org, and Best Practices for Hazard Screening on the HPDC website (hpd-collaborative.org).

**Recycled Types**

**PreC** Pre-consumer recycled content
**PostC** Post-consumer recycled content
**UNK** Inclusion of recycled content is unknown
**None** Does not include recycled content

**Other Terms:**

**GHS SDS** Globally Harmonized System of Classification and Labeling of Chemicals Safety Data Sheet

**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 nano scale 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.*

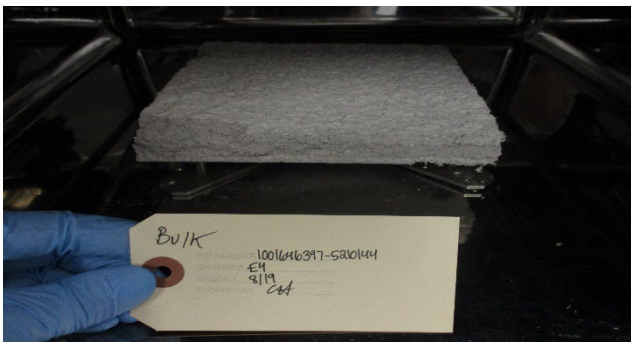
*The product manufacturer and any applicable independent verifier are solely responsible for the accuracy of statements and claims made in this HPD and*

*for compliance with the HPD standard noted.*

# Volatile Organic Compounds (VOCs) Emissions Report

| INDOOR AIR QUALITY EVALUATION FOLLOWING THE REQUIREMENTS OF CDPH/EHLB/STANDARD METHOD | | |
|---|---|---|
| **Product Description** | Monokote Z-146* *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. | |
| **Customer Information** | GCP APPLIED TECHNOLOGIES INC<br>JOHN DALTON<br>FIRE OPERATING UNIT<br>2325 LAKEVIEW PKWY, STE 450<br>ALPHARETTA GA 30009 | |
| **Testing Laboratory** | UL Environment - Marietta, 2211 Newmarket Parkway, Marietta, GA 30067-9399 USA | |
| **Product Category** | Insulation | |
| **Date Received** | August 2, 2022 | |
| **Test Description** | The product was received by UL Environment as packaged and shipped by the customer. The package was visually inspected and stored in a controlled environment immediately following sample check-in. Just prior to loading, the product was unpackaged and prepared for the required loading. The sample was placed inside the environmental chamber and tested according to the specified protocol. | |
| **Test Date** | August 5, 2022 - August 19, 2022 | |
| **Product Area Exposed** | one-sided area = 0.0359 m² | |
| **Environmental Chamber ID and Volume** | SE4 - 0.0861 m³ | |
| **Product Loading Ratio** | 0.42 m²/m³ | |
| **Test Chamber Conditions** | Air change rate: 1.00 ± 0.05 1/h<br>Inlet air flow rate: 0.0861 ± 0.004 m³/h | Temperature: 22.9ºC - 23.8ºC<br>Relative Humidity: 50% RH ± 5% RH |
| **Test Method** | CDPH - CA Section 01350 *Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers* Version 1.2. | |
| **Authorized by** | Allyson McFry<br>Allyson M. McFry<br>Chemistry Laboratory Director | |
| The temperature range specification is 23°C ± 1°. The actual temperature range listed above may vary slightly. If the range is outside this specification, data was reviewed to ensure a negative impact did not occur.<br>This test is accredited and meets the requirements of ISO/IEC 17025 as verified by ANSI National Accreditation Board. Refer to certificate and scope of accreditation AT-1297. | | |

## PHOTOGRAPH OF SAMPLE



## RESULTS SUMMARY

| Product Description | Monokote Z-146* *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. | | | | |
|---|---|---|---|---|---|
| **Environment** | **Product Usage** | **Product Surface Area** | **Room Volume** | **Ventilation Rate (ACH)** | **Product Compliance?** |
| **Classroom** | Ceiling | 89.2 m² | 231 m³ | 0.82 | Yes |
| **Office** | Ceiling | 11.1 m² | 30.6 m³ | 0.61 | Yes |

## PROJECT DESCRIPTION

The product was monitored for emissions of TVOC, individual VOCs, formaldehyde and other aldehydes over the 96-hour test period. Measurements were made and predicted exposures were calculated according to the CA Section 01350 protocol. As specified in this protocol, the results at 96 hours, after 10 days of conditioning, were compared to ½ (one-half) the current Chronic Reference Exposure Levels (CRELs), as adopted from the California OEHHA list. All identified VOCs were also compared to the California-EPA OEHHA Proposition 65 list and the California-EPA Air Resource Board list of Toxic Air Contaminants (TACs).

Report Outline:



Download more information regarding UL's technical references and resources, product evaluation methodologies information, quality control program, and environmental chamber evaluations from our website click here or https://www.ul.com/offerings/greenguard-certification

For RSD, Quality Assurance Report or other quality documents, Request here or contact ULE.

# TABLE 1

| Product Description | Monokote Z-146* *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. |
|---|---|

**COMPARISON OF DATA TO METHOD REQUIREMENTS AT 96 HOURS FOLLOWING 10 DAYS OF CONDITIONING**

| Compound | CAS Number | ½ CREL (µg/m³) | Chamber Concentration (µg/m³) | Emission Factor†† (µg/m²•hr) | Classroom Predicted Concentration (µg/m³)** | Office Predicted Concentration (µg/m³)** | Meets ½ CREL? (Classroom/ Office) |
|---|---|---|---|---|---|---|---|
| Acetaldehyde | 75-07-0 | 70 | 2.2 | 5.3 | 2.5 | 2.8 | Yes |
| Benzene | 71-43-2 | 1.5 | BQL | BQL | BQL | BQL | Yes |
| Carbon disulfide | 75-15-0 | 400 | BQL | BQL | BQL | BQL | Yes |
| Carbon tetrachloride | 56-23-5 | 20 | BQL | BQL | BQL | BQL | Yes |
| Chlorobenzene | 108-90-7 | 500 | BQL | BQL | BQL | BQL | Yes |
| Chloroform | 67-66-3 | 150 | BQL | BQL | BQL | BQL | Yes |
| Dichlorobenzene (1,4-) | 106-46-7 | 400 | BQL | BQL | BQL | BQL | Yes |
| Dichloroethylene (1,1) | 75-35-4 | 35 | BQL | BQL | BQL | BQL | Yes |
| Dimethylformamide (N,N-) | 68-12-2 | 40 | BQL | BQL | BQL | BQL | Yes |
| Dioxane (1,4-) | 123-91-1 | 1,500 | BQL | BQL | BQL | BQL | Yes |
| Epichlorohydrin | 106-89-8 | 1.5 | BQL | BQL | BQL | BQL | Yes |
| Ethylbenzene | 100-41-4 | 1,000 | BQL | BQL | BQL | BQL | Yes |
| Ethylene glycol | 107-21-1 | 200 | BQL | BQL | BQL | BQL | Yes |
| Ethylene glycol monoethyl ether acetate | 111-15-9 | 150 | BQL | BQL | BQL | BQL | Yes |
| Ethylene glycol monoethyl ether | 110-80-5 | 35 | BQL | BQL | BQL | BQL | Yes |

| Product Description | Monokote Z-146* *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. |
|---|---|

**COMPARISON OF DATA TO METHOD REQUIREMENTS AT 96 HOURS FOLLOWING 10 DAYS OF CONDITIONING**

| Compound | CAS Number | ½ CREL (µg/m³) | Chamber Concentration (µg/m³) | Emission Factor†† (µg/m²•hr) | Classroom Predicted Concentration (µg/m³)** | Office Predicted Concentration (µg/m³)** | Meets ½ CREL? (Classroom/ Office) |
|---|---|---|---|---|---|---|---|
| Ethylene glycol monomethyl ether acetate | 110-49-6 | 45 | BQL | BQL | BQL | BQL | Yes |
| Ethylene glycol monomethyl ether | 109-86-4 | 30 | BQL | BQL | BQL | BQL | Yes |
| Formaldehyde | 50-00-0 | 9.0*** | BQL | BQL | BQL | BQL | Yes |
| Hexane (n-) | 110-54-3 | 3,500 | BQL | BQL | BQL | BQL | Yes |
| Isophorone | 78-59-1 | 1,000 | BQL | BQL | BQL | BQL | Yes |
| Isopropanol | 67-63-0 | 3,500 | BQL | BQL | BQL | BQL | Yes |
| Methyl chloroform | 71-55-6 | 500 | BQL | BQL | BQL | BQL | Yes |
| Methyl t-butyl ether | 1634-04-4 | 4,000 | BQL | BQL | BQL | BQL | Yes |
| Methylene chloride | 75-09-2 | 200 | BQL | BQL | BQL | BQL | Yes |
| Naphthalene | 91-20-3 | 4.5 | BQL | BQL | BQL | BQL | Yes |
| Phenol | 108-95-2 | 100 | BQL | BQL | BQL | BQL | Yes |
| Propylene glycol monomethyl ether | 107-98-2 | 3,500 | BQL | BQL | BQL | BQL | Yes |
| Styrene | 100-42-5 | 450 | BQL | BQL | BQL | BQL | Yes |
| Tetrachloroethylene (perchloroethylene) | 127-18-4 | 17.5 | BQL | BQL | BQL | BQL | Yes |
| Toluene | 108-88-3 | 150 | BQL | BQL | BQL | BQL | Yes |
| Trichloroethylene | 79-01-6 | 300 | BQL | BQL | BQL | BQL | Yes |

| Product Description | Monokote Z-146* *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. |
|---|---|

**COMPARISON OF DATA TO METHOD REQUIREMENTS AT 96 HOURS FOLLOWING 10 DAYS OF CONDITIONING**

| Compound | CAS Number | ½ CREL (µg/m³) | Chamber Concentration (µg/m³) | Emission Factor†† (µg/m²•hr) | Classroom Predicted Concentration (µg/m³)** | Office Predicted Concentration (µg/m³)** | Meets ½ CREL? (Classroom/ Office) |
|---|---|---|---|---|---|---|---|
| Vinyl acetate | 108-05-4 | 100 | BQL | BQL | BQL | BQL | Yes |
| Xylenes (m-, o-, p-) | 1330-20-7 | 350 | BQL | BQL | BQL | BQL | Yes |

BQL denotes below quantifiable level of 0.04 µg for individual VOCs, with the exceptions benzene and epichlorohydrin which have a QL of 0.02 µg, based on a standard 18 L air collection volume.

††The emission factor (EF) is calculated from the chamber concentration (CC), the chamber air change rate ($N_C$), the chamber volume ($V_C$), and the product area exposed in the chamber ($A_C$) as: $EF = (CC*V_C*N_C)/A_C$.

**The predicted building exposure concentration (BC) is calculated from the emission factor (EF), the building air change rate ($N_B$), the building room volume ($V_B$), and the product area exposed in the building room ($A_B$) as: $BC = (EF*A_B)/(V_B*N_B)$. For more information on Predicted Concentration modeling parameters, click here.

***Guidance value per CA Standard Method

# TABLE 2

| | |
|---|---|
| **Product Description** | Monokote Z-146* *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. |

**CHAMBER CONCENTRATIONS AND EMISSION FACTORS FOR TVOC AND FORMALDEHYDE AT 24, 48, AND 96 HOURS FOLLOWING 10 DAYS OF CONDITIONING**

| Elapsed Exposure Hour After 10 Days Conditioning | Chamber Concentration (µg/m³) | Emission Factor†† (µg/m²•hr) |
|---|---|---|
| **TVOC†** | | |
| **24** | 2.7 | 6.6 |
| **48** | 2.8 | 6.7 |
| **96** | 2.5 | 5.9 |
| **Formaldehyde‡** | | |
| **24** | BQL | BQL |
| **48** | BQL | BQL |
| **96** | BQL | BQL |

BQL denotes below quantifiable level of 2 µg/m³.

Exposure hours are nominal (± 1 hour).

†Defined as the sum of those VOCs that elute between the retention times of n-hexane ($C_6$) and n-hexadecane ($C_{16}$) on a non-polar capillary GC column quantified based on a toluene response factor.

‡ Compound identified and quantified by DNPH derivitization and HPLC/UV analysis.

††The emission factor (EF) is calculated from the chamber concentration (CC), the chamber air change rate ($N_C$), the chamber volume ($V_C$), and the product area exposed in the chamber ($A_C$) as: $EF = (CC*V_C*N_C)/A_C$.

# TABLE 3

| | |
|---|---|
| **Product Description** | Monokote Z-146* *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. |

**TEN MOST ABUNDANT IDENTIFIED INDIVIDUAL VOLATILE ORGANIC COMPOUNDS (VOCs) AND/OR ALDEHYDES AT 96 HOURS FOLLOWING 10 DAYS OF CONDITIONING**

| CAS Number | Compound | Chamber Concentration (µg/m³) | Emission Factor†† (µg/m²•hr) | Calculated Predicted Exposure Concentration** (µg/m³) | |
|---|---|---|---|---|---|
| | | | | Classroom | Office |
| **---** | **TVOC‡‡** | **2.5** | **5.9** | **2.8** | **3.1** |
| 98-86-2 | Acetophenone (Ethanone, 1-phenyl)*† | 3.1 | 7.3 | 3.4 | 3.9 |
| 75-07-0 | Acetaldehyde‡ | 2.2 | 5.3 | 2.5 | 2.8 |

Exposure hours are nominal (± 1 hour).

VOC data obtained by scanning GC/MS; identification of compound made by retention time and mass spectral characteristics.

†Quantified using multipoint authentic standard curve. Other VOCs quantified relative to toluene.

*Identification based on NIST mass spectral database only.

‡Compound identified and quantified by DNPH derivitization and HPLC/UV analysis.

††The emission factor (EF) is calculated from the chamber concentration (CC), the chamber air change rate ($N_C$), the chamber volume ($V_C$), and the product area exposed in the chamber ($A_C$) as: $EF = (CC*V_C*N_C)/A_C$.

‡‡Defined as the sum of those VOCs that elute between the retention times of n-hexane ($C_6$) and n-hexadecane ($C_{16}$) on a non-polar capillary GC column quantified based on a toluene response factor.

**The predicted building exposure concentration (BC) is calculated from the emission factor (EF), the building air change rate ($N_B$), the building room volume ($V_B$), and the product area exposed in the building room ($A_B$) as: $BC = (EF*A_B)/(V_B*N_B)$. For more information on Predicted Concentration modeling parameters, click here.

# TABLE 4

| Product Description | Monokote Z-146* *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. |
|---|---|

**VOC PREDICTED AIR CONCENTRATIONS AND REGULATORY INFORMATION AT 96 HOURS FOLLOWING 10 DAYS OF CONDITIONING**

| CAS Number | Compound | Chamber Concentration (µg/m³) | Emission Factor†† (µg/m²•hr) | Predicted Exposure Concentration** (µg/m³) | | ✓ Indicates Presence On List | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Classroom | Office | CA PROP 65 | CA AIR TOXIC | CREL |
| 75-07-0 | Acetaldehyde | 2.2 | 5.3 | 2.5 | 2.8 | ✓(1) | ✓(IIA) | ✓ |
| 98-86-2 | Acetophenone (Ethanone, 1-phenyl)† | 3.1 | 7.3 | 3.4 | 3.9 | | ✓(IVA) | |

†Quantified using multipoint authentic standard curve. Other VOCs quantified relative to toluene.

‡Compound identified and quantified by DNPH derivitization and HPLC/UV analysis.

††The emission factor (EF) is calculated from the chamber concentration (CC), the chamber air change rate ($N_C$), the chamber volume ($V_C$), and the product area exposed in the chamber ($A_C$) as: $EF = (CC*V_C*N_C)/A_C$.

**The predicted building exposure concentration (BC) is calculated from the emission factor (EF), the building air change rate ($N_B$), the building room volume ($V_B$), and the product area exposed in the building room ($A_B$) as: $BC = (EF*A_B)/(V_B*N_B)$. For more information on Predicted Concentration modeling parameters, click here.

CAL Prop. 65: California Health and Welfare Agency, Proposition 65 Chemicals
1 = known to cause cancer
2 = known to cause reproductive toxicity

CAL Toxic Air Contaminant:

I) Substances identified as Toxic Air Contaminants, known to be emitted in California, with a full set of health values reviewed by the Scientific Review Panel.

IIA) Substances identified as Toxic Air Contaminants, known to be emitted in California, with one or more health values under development by the Office of Environmental Health Hazard Assessment for review by the Scientific Review Panel.

IIB) Substances NOT identified as Toxic Air Contaminants, known to be emitted in California, with one or more health values under development by the Office of Environmental Health Hazard Assessment for review by the Scientific Review Panel.

III) Substances known to be emitted in California, and are NOMINATED for development of health values or additional health values.

IVA) Substance identified as Toxic Air Contaminants, known to be emitted in California, and are TO BE EVALUATED for entry into Category III.

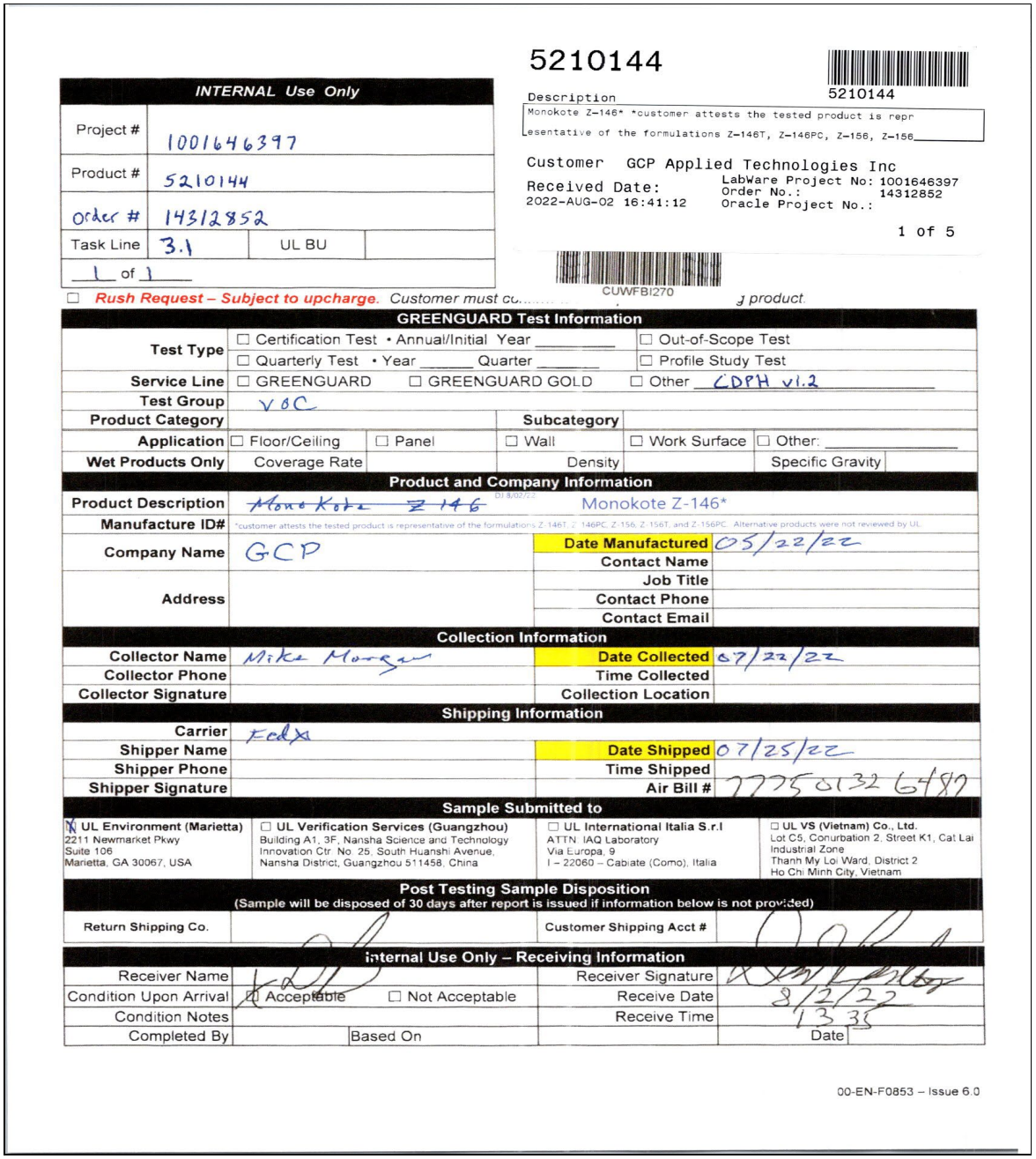
IVB) Substance NOT identified as Toxic Air Contaminants, known to be emitted in California, and are TO BE EVALUATED for entry into Category III.

V) Substance identified as Toxic Air Contaminants, and NOT KNOWN TO BE EMITTED from stationary source facilities in California based on information from the AB 2588 Air Toxic "Hot Spots" Program and the California Toxic Release Inventory.

VI) Substances identified as Toxic Air Contaminants, NOT KNOWN TO BE EMITTED from stationary source facilities in California, and are active ingredients in pesticides in California.

| | |
|---|---|
| **Product Description** | Monokote Z-146* *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. |

**CHAIN OF CUSTODY**



5210144

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Description
Monokote Z-146* *customer attests the tested product is repr
esentative of the formulations Z-146T, Z-146PC, Z-156, Z-156

Customer GCP Applied Technologies Inc
Received Date: 2022-AUG-02 16:41:12
LabWare Project No: 1001646397
Order No.: 14312852
Oracle Project No.:

1 of 5

CUVWFBI270

☐ Rush Request – Subject to upcharge. Customer must co... ...g product.

| INTERNAL Use Only | | | |
|---|---|---|---|
| Project # | 1001646397 | | |
| Product # | 5210144 | | |
| order # | 14312852 | | |
| Task Line | 3.1 | UL BU | |
| 1 of 1 | | | |

**GREENGUARD Test Information**

| | | | | |
|---|---|---|---|---|
| Test Type | ☐ Certification Test • Annual/Initial Year _____ | | ☐ Out-of-Scope Test | |
| | ☐ Quarterly Test • Year _____ Quarter _____ | | ☐ Profile Study Test | |
| Service Line | ☐ GREENGUARD ☐ GREENGUARD GOLD ☐ Other CDPH v1.2 | | | |
| Test Group | VOC | | | |
| Product Category | | Subcategory | | |
| Application | ☐ Floor/Ceiling ☐ Panel | ☐ Wall | ☐ Work Surface | ☐ Other: |
| Wet Products Only | Coverage Rate | Density | | Specific Gravity |

**Product and Company Information**

| | | | |
|---|---|---|---|
| Product Description | ~~Mono Kote Z 146~~ DJ 8/02/22 Monokote Z-146* | | |
| Manufacture ID# | *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. | | |
| Company Name | GCP | Date Manufactured | 05/22/22 |
| | | Contact Name | |
| Address | | Job Title | |
| | | Contact Phone | |
| | | Contact Email | |

**Collection Information**

| | | | |
|---|---|---|---|
| Collector Name | Mike Morgan | Date Collected | 07/22/22 |
| Collector Phone | | Time Collected | |
| Collector Signature | | Collection Location | |

**Shipping Information**

| | | | |
|---|---|---|---|
| Carrier | FedEx | | |
| Shipper Name | | Date Shipped | 07/25/22 |
| Shipper Phone | | Time Shipped | |
| Shipper Signature | | Air Bill # | 7775 0132 6487 |

**Sample Submitted to**

| | | | |
|---|---|---|---|
| ☒ UL Environment (Marietta)<br>2211 Newmarket Pkwy<br>Suite 106<br>Marietta, GA 30067, USA | ☐ UL Verification Services (Guangzhou)<br>Building A1, 3F, Nansha Science and Technology Innovation Ctr. No. 25, South Huanshi Avenue, Nansha District, Guangzhou 511458, China | ☐ UL International Italia S.r.l<br>ATTN: IAQ Laboratory<br>Via Europa, 9<br>I – 22060 – Cabiate (Como), Italia | ☐ UL VS (Vietnam) Co., Ltd.<br>Lot C5, Conurbation 2, Street K1, Cat Lai Industrial Zone<br>Thanh My Loi Ward, District 2<br>Ho Chi Minh City, Vietnam |

**Post Testing Sample Disposition**
(Sample will be disposed of 30 days after report is issued if information below is not provided)

| | | | |
|---|---|---|---|
| Return Shipping Co. | | Customer Shipping Acct # | |

**Internal Use Only – Receiving Information**

| | | | |
|---|---|---|---|
| Receiver Name | | Receiver Signature | |
| Condition Upon Arrival | ☒ Acceptable ☐ Not Acceptable | Receive Date | 8/2/22 |
| Condition Notes | | Receive Time | 13:35 |
| Completed By | Based On | | Date |

00-EN-F0853 – Issue 6.0

# VOC EMISSION RESULTS COMPARISON TO STANDARD

Standard referenced: *CDPH/EHLB/Standard Method V1.2 (January 2017) "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers" (aka CA Section 01350).*

## PRODUCT SAMPLE INFORMATION

| | |
|---|---|
| **Manufacturer** | GCP Applied Technologies Inc |
| **Product Description** | Monokote Z-146* *customer attests the tested product is representative of the formulations Z-146T, Z-146PC, Z-156, Z-156T, and Z-156PC. Alternative products were not reviewed by UL. |
| **Product Type** | Insulation |
| **UL Sample Identification** | 1001646397-5210144 |
| **Manufactured Date** | May 22, 2022 |
| **Test Completed Date** | August 19, 2022 |
| **UL Report #** | 1001646397-5210144 |
| **Report Date** | August 24, 2022 |

## TEST RESULTS COMPARISON TO STANDARD CRITERIA

| **Environment** | **Classroom** | | **Office** | |
|---|---|---|---|---|
| **Surface Area** | 89.2 m² | | 11.1 m² | |
| | **Criterion** | **Meets?** | **Criterion** | **Meets?** |
| **Individual VOC** | ≤ ½ CREL | Yes | ≤ ½ CREL | Yes |
| **Formaldehyde** | ≤ 9.0 µg/m³ | Yes | ≤ 9.0 µg/m³ | Yes |

| **Environment** | **Classroom** | **Office** |
|---|---|---|
| **Surface Area** | 89.2 m² | 11.1 m² |
| **TVOC** | 0.5 mg/m³ or less | 0.5 mg/m³ or less |

TVOC comparison is based on LEED BD+C: New Construction v4 (LEED v4), Indoor environmental quality (EQ) category/Low-emitting materials credit/Emissions and content requirements/General emissions evaluation.
http://www.usgbc.org/node/2614095?return=/credits/new-construction/v4/indoor-environmental-quality

| | |
|---|---|
| **Authorized by** | Allyson McFry<br>Chemistry Laboratory Manager |

Complete testing and data results are presented in UL Environment Report