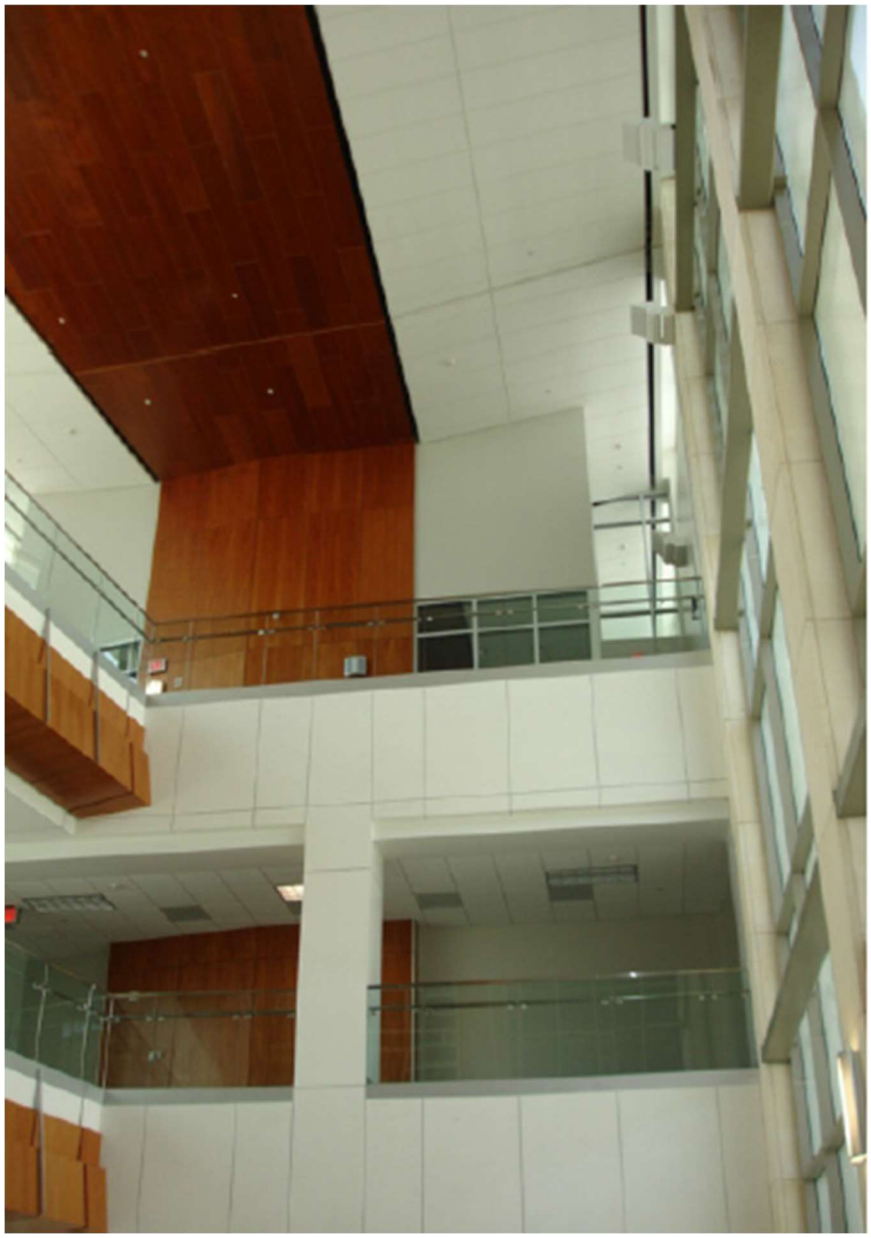
ENVIRONMENTAL PRODUCT DECLARATION

SYMPHONY® f and Rx SYMPHONY® f CEILING PANELS

CERTAINTEED (PLYMOUTH, WI)
FIBERGLASS CEILING TILES



The Symphony® f and Rx Symphony® f family of products have a clean monolithic appearance with a balanced mix of acoustical, performance and environmental properties to meet your needs in office, healthcare and education buildings.

CertainTeed Corporation, a subsidiary of Saint-Gobain, is a leading North American manufacturer of interior building materials including gypsum, ceilings, and insulation as well as exterior building materials which include roofing, vinyl siding, trim, fence, railing and decking. CertainTeed respects the environment through the responsible development of sustainable building products and systems.

Architects, contractors and manufacturers continue to look for ways to reduce our industry's impact on the environment while meeting customer demand for products that deliver beauty, comfort, and performance. CertainTeed Ceilings' respect for the environment is reflected in our ongoing emphasis on sustainable building products and systems. Open sharing of the data we gather on these effects – as embodied in Environmental Product Declarations – is central to the process, and sets CertainTeed Ceilings apart.

For more information visit:

http://www.certainteed.com

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

Symphony® *f* and Rx Symphony® *f* Fiberglass Ceiling Tiles

According to ISO14025 and EN 15804

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	CertainTeed Ceilings
DECLARATION NUMBER	4788148612.106.1
DECLARED PRODUCT	Symphony® *f* and Rx Symphony® *f* Fibergalss Ceiling Tile
REFERENCE PCR	PCR Guidance for Building Related Products and Services, From the range of Environmental Product Declarations of UL Environment: "Part B: Non-Metal Ceiling Panel EPD Requirements", October 2015v1.
DATE OF ISSUE	March 5, 2018
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacture Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications

The PCR review was conducted by:	Review Panel
	Dr. Lindita Bushi
	epd@ul.com
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	Grant R. Martin
	Grant R. Martin, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas Gloria
	Thomas Gloria, Industrial Ecology Consultants

This EPD conforms with EN 15804

ENVIRONMENTAL PRODUCT DECLARATION

Symphony® *f* and Rx Symphony® *f* Fiberglass Ceiling Tiles

According to ISO14025 and EN 15804

Product System Description

Product Description

The Symphony *f* and Rx Symphony f products have a standard fiberglass (glass wool) core with a reinforced mat and finish coatings. The products are available in ¾", 1", and 1 ½" thicknesses. This Environmental Product Declaration (EPD) examines the 1 ½" thickness fiberglass core product in order to represent the highest impacts of the ceiling tiles, as a thinner ceiling tile will have lower environmental impacts.

The coatings modeled include the back, primer, edge and top coatings of paint that are specific for the Symphony *f* product line.

The Symphony *f* and Rx Symphony *f* products are manufactured using fiberglass with post-consumer recycled content of at least 31%. This EPD is specific to the Symphony *f* and Rx Symphony *f* Ceiling Panel products manufactured at the Plymouth, WI facility.

Application

Modular installation of suspended ceilngs in commercial buildings.

Features and Benefits

- Outstanding sound absorption (NRC 0.9 – 1.00)
- Inorganic substrate is naturally resistive to mold and mildew growth and is sag and moisture resistive
- Superior stain resistance and water repellency (Rx Symphony *f*)
- Chemically cleanable surface to a range of 1000-2000 wash cycles
- ISO Class 4 clean room component (Symphony *f*)
- Satisfies USDA/FSIS Guidelines for sanitary applications (Rx Symphony *f*
- High light reflectancy (LR 0.90)

Technical Data

Technical Data	Value
Noise Reduction Coefficient (NRC) *Test Method ASTM C423*	0.90 – 1.00
Ceiling Attenuation Class (CAC) *Test Method ASTM E1414*	N/A
Fire Rating *Test Method ASTM E84*	Class A
Light Reflection *Test Method ASTM E1477*	0.90

Table 1: Symphony *f* Ceiling Panel Technical Data

Placing on the Market

- ASTM E1264 – Classification for Acoustic Ceilings
- ASTM E84 – Surface Burning Characteristics; pursuant to test certificate
- ASTM C423 – sound absorption
- ASTM E1111 – Interzone Attenuation of Open Office Components
- ASTM E1477 – Luminous Reflectance of Acoustical Materials
- ASTM E1414 – Airborne Sound Attenuation
- ISO 14644 – Clean Room Standard

Delivery Status

Characteristics	
Product	Symphony *f* and Rx Symphony *f* – Fiberglass Ceiling Panels
Thickness	1.5”
Density	4 pcf

Table 2: Symphony *f* Ceiling Panel Delivery Status Characteristics

Packaging

Ceiling panels are packaged using sleeves made from recycled cardboard and plastic shrink wrap and stacked on pallets which are wrapped in shrink wrap before shipping. These packaging materials are recommended to be recycled if recycling infrastructure exists. The packaging was modeled and included in the life cycle impacts of the EPD.

Installation

Figure 1: Example Ceiling Panel Installation

The ceiling panels must be installed in accordance with all applicable CertainTeed installation guidelines applicable at the time of installation. Approved installation procedures described in the Ceiling Systems Handbook published by the Ceilings & Interior Systems Construction Association must be followed.

Installation of CertainTeed products is accomplished by manual labor and typically does not require any additional materials. If necessary, cutting is done by hand using hand held cutting tools.

There are no apparent risks involved with the installation of ceiling panels since no additional coating or finishing is required. The installer should wear safety glasses while installing the panels to avoid debris from falling into the eyes as well as approved gloves.

Condition of Use

Cleaning and Maintenance

Once installed, ceiling panels typically require no cleaning or maintenance. Maintenance personnel should wear white, clean cotton gloves when handling panels so oils and dirt from hands do not transfer to panels.

Prevention of Structural Damage

To ensure longevity of the product, make sure panels are not exposed to high humidity or high temperatures. Criteria can be found in the CertainTeed Ceilings Warranty information for each specific product.

Environment and Health During Use

Ceiling panels are stationary during typical use and do not emit harmful emissions.

Broken or damaged panels should be picked up and placed in a container. Dust generated from making modifications of the panel should be cleaned by wet wiping or filtered vacuuming. Do not dry sweep or use compressed air to remove dust.

Reference Service Life

The product is warranted for a service life of 1-10 years of use (and up to 15 if used in conjunction with CertainTeed Ceiling Grid System). However, the useful life of ceiling panels can be as long as the buildings' useful life if properly installed and maintained. The useful life of these ceiling panels is considered to be 75 years.

Extraordinary Effects

Fire

ASTM E1264 – Class A
ASTM E84 – Flame spread of 25 or less, smoke developed of 50 or less

Water Damage

This product is subject to water damage. No water or water vapor from sources including, but not limited to, condensation, leaking pipes and/or ducts, or steam must come in contact with the ceiling panels.

Mechanical Damage

This product is intended for commercial applications. Use and Practice information can be found in “Acoustical Ceilings: Use and Practice” published by Ceilings & Interior Systems Construction Association (CISCA). The product should be installed according to CertainTeed Ceilings installation instructions.

Re-Use

At this time there are no re-use scenarios available for Fiber Glass Ceiling Panels.

End-of-Life

This product was modeled as being disposed of in a landfill at the end of its life. Current operations cannot recycle faced fiberglass products such as the Symphony *f* panel product family.

Material Content

Primary Products

Figure2: Diagram of Symphony *f* Ceiling Panel Construction

Material Definitions

The fiberglass core consists of glass fibers and an organic resin.

The paint applied is a durable, high light-reflecting finish paint consisting of a mixture of water, titanium dioxide, limestone, and silica.

Component	Weight Percent	Recycled Resource	Mineral Resource	Renewable Resource	Origin
Fiberglass Board	55-65%				United States
Paint	30-35%				United States
Laminate	5-7%		Y		Netherlands
Glue	2-5%				United States

Table 3: Material Content of the Symphony *f* Ceiling Panel Final Product

Manufacture

Production Process

To produce ceiling tiles, the raw materials and components are shipped to the CertainTeed Plymouth facility. There glue is applied to the fiberglass boards for the laminate (scrim) to adhere to the board. After the laminate is added

to the panel, the paint coating is applied and the panels are put through an oven to dry. The panels are then cut to size, packaged, and shipped.

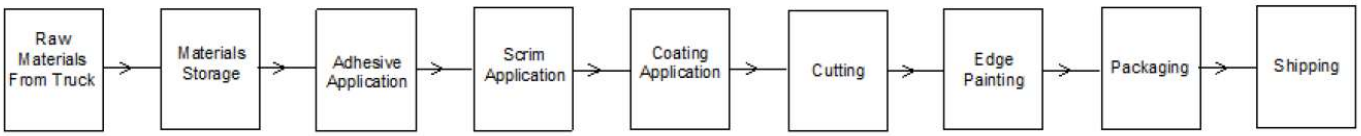


Figure 3: Diagram of Symphony *f* Production Process

Environment and Health During Manufacture

CertainTeed has well-established Environmental, Health, and Safety (EHS) and product stewardship programs which help to enforce proper evaluation and monitoring of chemicals that are chosen to manufacture products. These programs ensure that all environmental and OSHA requirements are met or exceeded to ensure the health and safety of all employees and contractors.

Life Cycle Assessment Calculation Rules

Functional Unit

The functional unit for this study is one square foot of ceiling panel for use of 75 years. The use stage is considered to be 75 years of service life, though based on typical operational data, this product does not require any inputs during the Use Phase.

Name	Value	Unit
Declared unit	1	ft^2
Declared thickness	1 ½	inches
Surface weight per declared unit	0.534	lb/ft^2

Table 5: Symphony *f* Ceiling Panel Declared Unit Details

System Boundary

The life cycle analysis for the production of ceiling panels comprises the life cycle phases from cradle to grave. The analysis includes the raw material extraction and processing, raw material transportation to the manufacturing site, manufacturing, packaging, final product shipping, installation, use, and end of life.

Description of the System Boundary (X=included in LCA: MND=module not declared)				
Product Stage	Construction Process Stage	Use Stage	End of Life Stage	Benefits & Loads Beyond System Boundaries

Raw Material Supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	De-construction demolition	Transport	Waste Processing	Disposal	Reuse-Recover-Recycling Potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	MND

Table 6: Symphony *f* Ceiling Panel Life Cycle Assessment System Boundary

Assumptions

The life cycle analysis for the Symphony *f* and Rx Symphony *f* ceiling panels assumed a final product transportation of 2841 km (1765 miles).

Packaging waste in the manufacturing process for this analysis was assumed to be 2%.

As required by the Product Category Rule (PCR), an installation waste of 7% was also assumed for this study, which then requires an assumed 93% end of life disposal.

Cut-off Criteria

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible.

For Hazardous Substances – as defined by the U.S. Occupational Health and Safety Act the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No processes were neglected or excluded. Capital items for the production processes (machines, buildings, etc.) were not taken into consideration.

Background Data

For life cycle modeling the SimaPro v8.1 Software System for Life Cycle Engineering, a recognized LCA modeling software program, was used. All background data sets relevant for production and disposal were taken from this software except for the mineral wool model, which was created based on data provided by industry experts and AP-42, Compilation of Air Pollutant Emission Factors.

Data Quality

For the data used in this LCA, the data quality is considered to be good to high quality. The data and data sets cover all relevant process steps and technologies over the supply chain of the represented ceiling panel products. The majority of secondary data sets are from the SimaPro v8.1 database and wherever secondary data are used, the study adopts critically reviewed data wherever possible for consistency, precision, and reproducibility to limit uncertainty. The data used are complete and representative of North America in terms of the geographic and technological coverage and is of a recent vintage, i.e. less than ten years old.

Period Under Review

The data used for the Life Cycle Assessment refer to the production processes of the 2016 calendar year. The quantities of raw materials, energies, auxiliary materials, and supplies used have been ascertained as average annual values.

Allocation

The LCI data was collected from the Plymouth, WI manufacturing facility for the production year 2016. In addition to the Symphony *f* products, this facility produces several other product families of ceiling panels. The manufacturing for all products made at this facility have similar energy, waste, and water input requirements. Allocation was done on a mass basis.

Comparability

Comparison of EPD data of ceiling panel products is only permissible if all data sets to be compared are created according to EN 15804 and are considered in a whole building context or utilize identical defined use stage scenarios. Comparisons are only allowable when EPDs report cradle-to-grave information using a function unit.

Additional LCA Technical Information

Transport to the Building Site

Name	Value	Unit
Liters of fuel	-	l/100 km

Transport distance	2841	km
Capacity utilization (including empty runs)	85	%
Gross density of products transported	68.431	kg/m^3

Table 7: Symphony *f* Ceiling Panel Transport to the Building Site

Installation into the Building

Name	Unit	Value
Auxiliary	kg	0
Water consumption	m^3	0
Other resources	kg	0
Electricity consumption	kWh	0
Other energy carriers	MJ	0
Material loss	kg	0.017
Ceiling Panel Mounting System (CPMS)	kg	N/A
Output substance following waste treatment on site	kg	0
Dust in the air	kg	0
VOC in the air	kg	0

Table 8: Symphony *f* Ceiling Panel Installation into the Building

Use

Name	Unit	Value
RSL	Years	75
VOC	kg	0.00001

Table 9: Symphony *f* Ceiling Panel Use

End of Life

Name	Unit	Value
Collected separately	kg	0
Collected as mixed construction waste	kg	0.225
Reuse	kg	0
Recycling	kg	0
Energy recovery	kg	0
Landfill	kg	0.225

Table 10: Symphony *f* Ceiling Panel End of Life

Life Cycle Assessment Results

Life Cycle Impact Assessment

The environmental impacts listed below were assessed throughout the life cycle of the Symphony *f* Ceiling Panel product including production, final product shipping, installation, and end-of-life as defined above.

	Impact Category (TRACI)					
	Global Warming Potential	Ozone Depletion Potential	Acidification Potential	Eutrophication Potential	Smog Creation Potential	Abiotic Resource Depletion Potential
	kg CO2 eq	kg CFC-11 eq	kg SO2 eq	kg N eq	kg O3 eq	MJ
Raw Materials	6.15E-01	2.99E-08	3.30E-03	1.05E-03	3.90E-02	1.21E+00
Raw Materials Transportation	9.84E-03	3.76E-13	5.88E-05	3.28E-06	1.61E-03	1.89E-02
Manufacture	9.21E-02	1.82E-10	4.57E-04	1.20E-05	4.47E-03	1.22E-01
Final Product Shipping	1.38E-02	4.79E-10	6.38E-05	2.78E-05	1.05E-03	3.29E-02
Installation	5.42E-02	2.07E-12	3.24E-04	1.80E-05	8.86E-03	1.04E-01
Use	9.40E-03	4.82E-11	5.63E-05	3.24E-06	1.54E-03	1.82E-02
End of Life	1.10E-02	6.36E-10	6.79E-05	5.11E-06	1.86E-03	2.38E-02
Total	8.05E-01	3.12E-08	4.33E-03	1.12E-03	5.84E-02	1.53E+00

Table 11: TRACI Environmental Impact Potentials for Symphony *f* Ceiling Panels per ft^2 (North America)

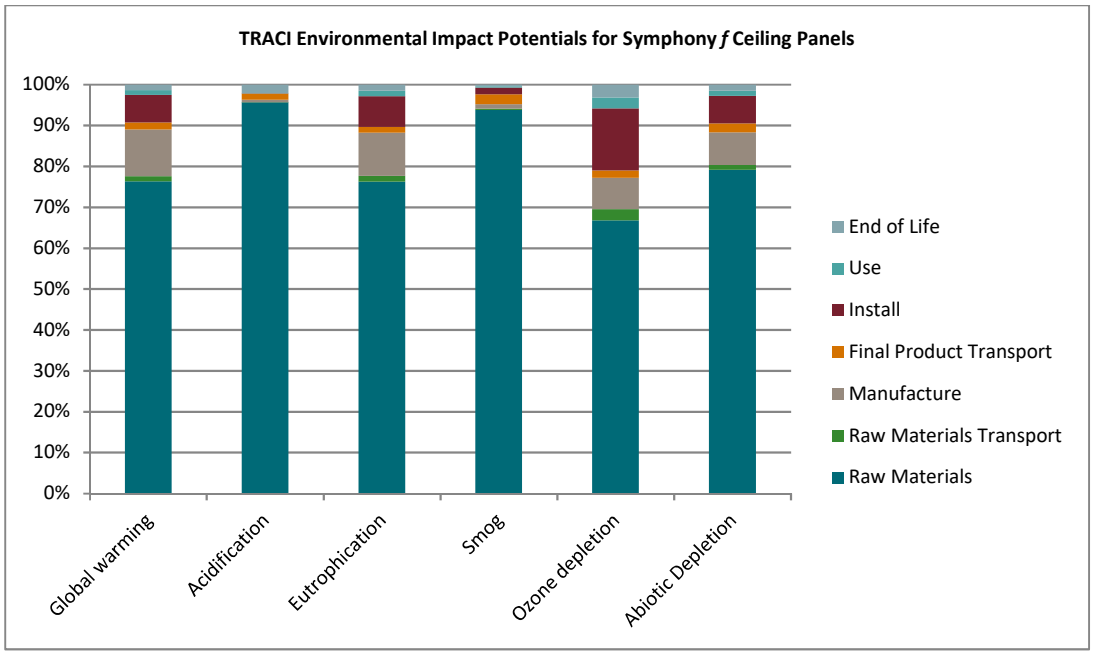


Figure 4: TRACI Environmental Impact Potentials for Symphony *f* Ceiling Panels per ft^2 (North America)

	Impact Category (CML)						
	Global Warming Potential	Stratospheric Ozone Depletion Potential	Acidification Potential	Eutrophication Potential	Tropospheric Ozone Formation Potential	Abiotic Depletion Potential (non-fossil resources)	Abiotic Depletion Potential (fossil resources)
	kg CO2 eq	kg CFC-11 eq	kg SO_2 eq	kg $(PO_4)^3$ eq	kg ethene eq	kg Sb eq.	MJ
Raw Materials	6.15E-01	2.26E-08	3.33E-03	6.21E-04	1.75E-04	9.63E-07	9.83E+00
Raw Materials Transportation	9.84E-03	3.72E-13	4.85E-05	8.59E-06	2.24E-06	0.00E+00	1.34E-01
Manufacture	9.21E-02	1.34E-10	4.70E-04	2.48E-05	1.95E-05	1.92E-09	1.35E+00
Final Product Shipping	1.38E-02	3.47E-10	6.05E-05	1.68E-05	3.38E-06	1.43E-08	2.66E-01
Installation	5.42E-02	2.05E-12	2.67E-04	4.73E-05	1.23E-05	0.00E+00	7.39E-01
Use	9.40E-03	3.62E-11	4.64E-05	8.27E-06	2.13E-06	1.30E-10	1.30E-01
End of Life	1.10E-02	4.76E-10	5.58E-05	1.04E-05	2.48E-06	1.73E-09	1.70E-01
Total	8.05E-01	2.36E-08	4.27E-03	7.37E-04	2.17E-04	9.81E-07	1.26E+01

Table 12: CML Environmental Impact Potentials for Symphony *f* Ceiling Panels per ft^2 (Outside North America)

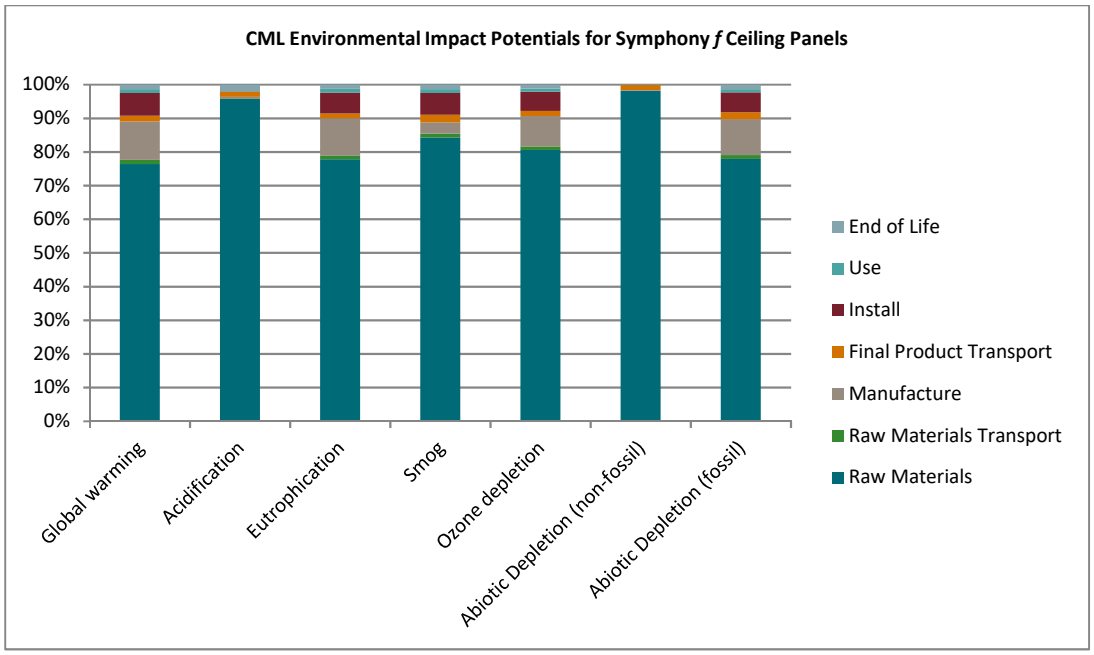


Figure 5: CML Environmental Impact Potentials for Symphony *f* Ceiling Panels per ft^2 (Outside North America)

Resource Use

Parameter		Unit	Symphony *f*
Renewable primary energy as energy carrier	PERE	MJ	3.47E-01
Renewable primary energy resources as material utilization	PERM	MJ	0.00E+00
Total use of renewable primary energy resources	PERT	MJ	3.47E-01
Non-renewable primary energy as energy carrier	PENRE	MJ	1.38E+01
Non-renewable primary energy as material utilization	PENRM	MJ	0.00E+00
Total use of non-renewable primary energy resources	PENRT	MJ	1.38E+01
Use of secondary material	SM	MJ	1.62E-01
Use of renewable secondary fuels	RSF	MJ	0.00E+00
Use of non-renewable secondary fuels	NRSF	MJ	0.00E+00

Use of net fresh water	FW	m^3	9.32E-04

Table 13: Resource Use for Symphony *f* Ceiling Panels per ft^2

Output Flows and Waste Categories

Parameter		Unit	Symphony *f*
Hazardous waste disposed	HWD	kg	2.16E-04
Non-hazardous waste disposed	NHWD	kg	3.49E-01
Radioactive waste disposed	RWD	kg	1.12E-05
Components for re-use	CRU	kg	0.00E+00
Materials for recycling	MFR	kg	0.00E+00
Materials for energy recovery	MER	kg	0.00E+00
Exported energy	EE	MJ	0.00E+00

Table 14: Output Flows and Waste Categories for Symphony *f* Ceiling Panels per ft^2

Primary Energy Demand

Primary Energy Source	Unit	Symphony *f* Ceiling Panels
Nonrenewable		
Fossil Oil	MJ-Eq	3.69E+00
Coal	MJ-Eq	5.64E+00
Natural Gas	MJ-Eq	2.22E+00
Uranium	MJ-Eq	1.21E+00
Renewable		
Wind Power	MJ-Eq	3.29E-02
Solar Power	MJ-Eq	4.40E-04
Geothermal	MJ-Eq	0.00E+00
Hydro Power	MJ-Eq	1.22E-01
Biomass	MJ-Eq	1.89E-01

Table 15: Total Primary Energy Detail by Source Type for Symphony *f* Ceiling Panels per ft^2

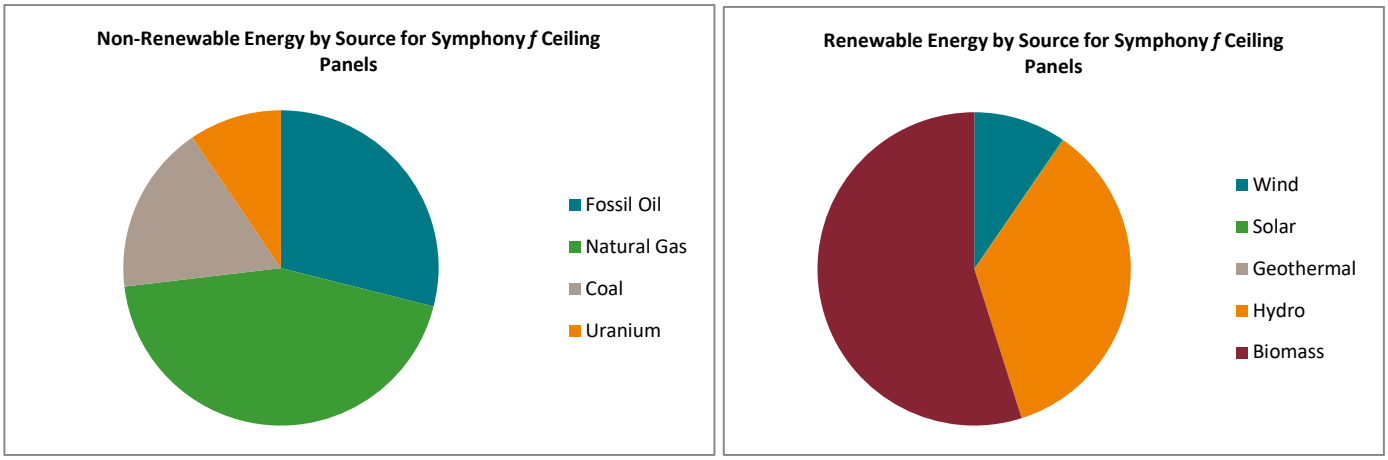


Figure 6: Non-Renewable and Renewable Energy by Source for Symphony *f* Ceiling Panels

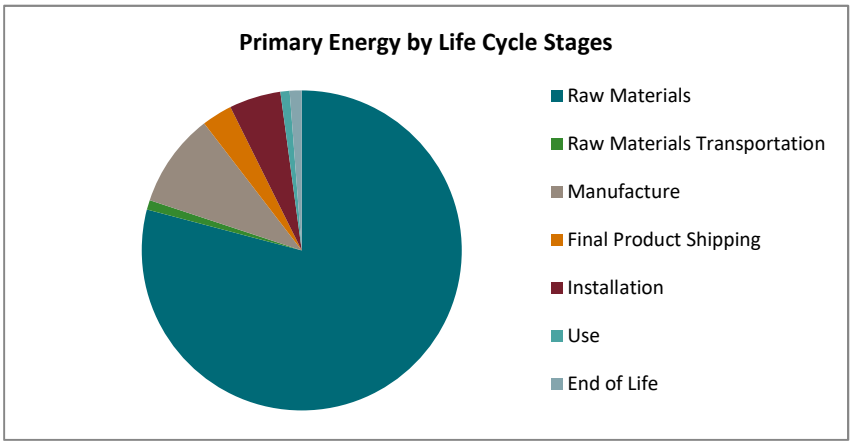


Figure 7: Symphony *f* Ceiling Panel Primary Energy by Life Cycle Stage

Life Cycle Assessment Interpretation

The majority of the environmental impacts occur during the extraction and processing of raw materials.

Installation has minimal impacts due to the modular nature of ceiling panels and minimal energy required for installation. The assumption is that ceiling panels require no cleaning or maintenance so use phase impacts are zero.

End-of-life impacts are a result of landfill disposition.

Additional Information

VOC Emissions

This product meets the testing and product requirements of the California Department of Public Health CDPH/EHLD/Standard Method Version 1.1, 2010 (Emissions Testing Method for CA Specification 01350) Independent test reports are available.

Optional Information

- ISO 9001 Quality Management System
- Recycled content independently verify by GreenCircle Certified.
- Certificate of Compliance for VOC Emissions: Berkeley Analytical

Life Cycle Development

This EPD and the corresponding LCA were prepared by Saint-Gobain Corporation North America in Malvern, Pennsylvania.

Contact CertainTeed

For more information, please visit http://www.certainteed.com/commercial-ceilings.

References

- Product Category Rules for Construction Products from the Range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report, July 2014, version 1.3.
- PCR Guidance for Building Related Products and Services, from the Range of Environmental Product Declarations of UL Environment, Part B: Non-Metal Ceiling Panel EPD Requirements, Version 1, dated October 2015.
- EN 15804: 2012-04 – Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products.
- EN ISO 14040, ISO 14040-2006 Environmental management – Life cycle assessment – Principles and framework
- EN ISO 14040, ISO 14044-2006 Environmental management – Life cycle assessment – Requirements and Guidelines
- Life Cycle Assessment: CertainTeed Ceilings Products Group, Symphony *m* Product Family & Symphony *f* Product Family. November 2017. Saint-Gobain North America