

## ENVIRONMENTAL PRODUCT DECLARATION

# PROTECTONE™ CEILING PANELS

CERTAINTEED

PROTECTONE BAROQUE, PROTECTONE BAROQUE CUSTOMLINE, PROTECTONE CASHMERE, PROTECTONE DIRECTIONAL FISSURED, PROTECTONE FINE FISSURED, PROTECTONE FINE FISSURED CUSTOMLINE, PROTECTONE SCHOOLBOARD, PROTECTONE VANTAGE 10



*Ceiling panel products with enhanced fire performance as well as a range of aesthetic and performance properties to meet your needs in a variety of office, healthcare, and commercial 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>



# ENVIRONMENTAL PRODUCT DECLARATION





Protectone Baroque, Protectone Baroque Customline, Protectone Cashmere, Protectone Directional Fissured, Protectone Fine Fissured, Protectone Fine Fissured Customline, Protectone SchoolBoard, Protectone Vantage 10

According to ISO 14025 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	4788148612.104.1
DECLARED PRODUCT	Protectone™ Ceiling Panels - L'Anse, MI
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	November 17, 2017
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 <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	
	Wade Stout, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	
	Thomas Gloria, Industrial Ecology Consultants



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## Product System Description

### Product Description

The Protectone Ceiling Panel product family is made up of the Protectone Baroque, Protectone Baroque Customline, Protectone Cashmere, Protectone Directional Fissured, Protectone Fine Fissured, Protectone Fine Fissured Customline, Protectone SchoolBoard, and Protectone Vantage 10 products. This Environmental Product Declaration (EPD) is developed for these ceiling panel products only and does not include the ceiling grid.



Figure 1: Example Ceiling Panel

### Features and Benefits

Protectone Ceiling Panel products are ideal for commercial and institutional settings.

- Made in U.S.
- Made with recycled content (GreenCircle Certified)
- Durable, easy to install, zero maintenance
- Contributes to LEED® points

These products are manufactured using mineral fibers with pre-consumer and post-consumer recycled content of at least 45%. The Protectone Ceiling Panel product family has a standard core panel across each of the products within the family and a variety of coatings and finishing options. This Environmental Product Declaration (EPD) examines the Protectone Ceiling Panel core (3/4" thickness) with the highest impact coating option to represent the worst case scenario in the Protectone product family.

This EPD is specific to the Protectone Ceiling Panel products manufactured at the L'Anse, MI facility. The L'Anse manufacturing facility is a model of industrial ecology and product stewardship. The facility receives renewable electricity from the neighboring Warden Electric Biomass power plant, which generates its electricity from waste wood. Excess steam from that same power plant is also channeled to the L'Anse manufacturing facility, reducing the plant's overall natural gas consumption. The result is a manufacturing facility that obtains a large portion of its energy from renewable sources and generates almost zero waste.

### Application

Modular installation of suspended ceilings in commercial buildings.



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## Technical Data

Technical Data	Value
Noise Reduction Coefficient (NRC) <i>Test Method ASTM C423</i>	0.45 - 0.55
Ceiling Attenuation Class (CAC) <i>Test Method ASTM E1414</i>	35 (2x2) 40 (2x4)
Fire Rating <i>Test Method ASTM E84</i>	Class A
Light Reflection <i>Test Method ASTM E1477</i>	0.83

Table 1: Protectone 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 and EN ISO 11654 – sound absorption
- ASTM E1414 and ISO 140-3 – sound insulation
- ASTM C518-10 – Thermal conductivity

## Delivery Status

Characteristics	
Product	Protectone Ceiling Panel Product Family – Mineral Fiber Ceiling Panels
Thickness	5/8" - 3/4"
Density	21 pcf

Table 2: Protectone Ceiling Panel Delivery Status Characteristics



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## Packaging

Ceiling panels are packaged using sleeves made from recycled cardboard and plastic shrink wrap. 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 2: 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.



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### Reference Service Life

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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

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#### 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.

### End-of-Life

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This product was modeled as being disposed of in a landfill at the end of its life. However, CertainTeed Ceilings has developed a ceiling panel take back and recycling program which allows recovery of ceiling panels from construction sites. The recovered ceiling panels are then used to manufacture new ceiling panels. As this program expands, it has the opportunity to significantly reduce environmental impacts associated with raw materials extraction and processing and processing by offsetting virgin raw material demand. Information on CertainTeed's Ceiling Recycling Program can be found at [www.certainteed.com/products/ceilings](http://www.certainteed.com/products/ceilings).



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## Material Content

### Primary Products

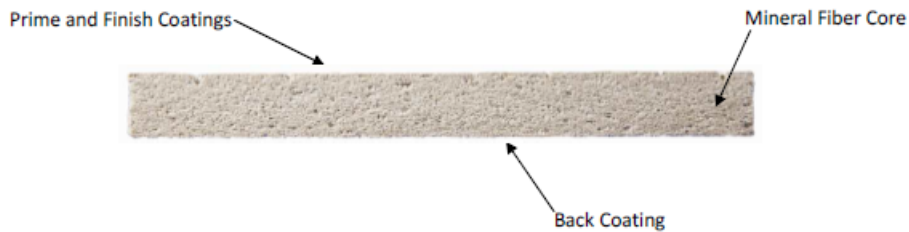


Figure 3: Diagram of Protectone Product Family Construction

### Material Definitions

The mineral fiber core consists of 4 raw materials including: mineral wool, perlite, newspaper, and starch. A mixture of those raw materials with the same ratio of “dry broke” is recovered within the manufacturing process.

- Mineral wool is a pre-consumer material produced from slag, a by-product of smelting iron ore. Slag is a secondary material that is modeled as being produced without environmental burden. Raw materials in mineral wool include 10% rock, 12% coke, and 78% slag. Most of the slag used by the industry is generated by integrated iron and steel plants as a blast furnace byproduct from pig iron production. Other sources of slag include the copper, lead, and phosphate industries. The slag in this analysis is assumed to come from iron production only. The mineral wool used in this product is sourced within the United States.
- Perlite is an abundant, naturally occurring mineral that is mined and then expanded during the ceiling panel manufacturing process. The perlite used in this product is sourced within the United States.
- Newspaper is a post-consumer raw material. Newspaper is a renewable resource, as it is plant-based. The recovered newspaper is collected, bundled, and transported directly to the L’Anse manufacturing facility for use in the production of mineral fiber ceiling panels. The recovered newspaper is mixed with water on-site to create a wet pulp mixture. The newspaper used in this product is sourced within the United States.
- Starch is a rapidly renewable resource made from the corn refining process. The starch used in this product is sourced within the United States.
- Clay is an abundant, naturally occurring aluminum silicate composed of fine-grained minerals and is refined before the ceiling panel manufacturing process. The clay used in this product is sourced within the United States.

The coating consists of a mixture of additional materials and is applied to the surface of the panel. The various coatings available for the product consist primarily of varying percentages of limestone, kaolin, feldspar, and titanium dioxide, along with other smaller amounts of additives. The coating modeled and used in the results for this EPD is the mixture with the highest environmental impacts.



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Component	Weight Percent	Recycled Resource	Mineral Resource	Renewable Resource	Origin
<b>Core</b>					
Mineral Wool	40-45%	Y	Y		United States
Perlite	20-25%		Y		United States
Clay	20-25%		Y		United States
Newspaper	5-10%	Y			United States
Starch	5-10%			Y	North America
<b>Coating</b>					
Limestone	2-5%				United States
Feldspar	2-5%				United States
Titanium Dioxide	2-5%				United States
Kaolin	2-5%				United States
Auxiliary Substances	1-3%				United States

Table 3: Material Content of the Protectone Ceiling Panel Final Product

## Manufacture

### Production Process

To produce ceiling tiles, the raw materials for the core component are mixed together. The resulting slurry of raw materials is then filtered and processed to remove any impurities. The processed slurry is then sent to the board machine, where the wet mixture is formed into boards with the excess water drained. The board sections are then dried in a large oven heated with natural gas and waste steam from the nearby biomass power plant.

The panel sections of the mineral fiber board are then trimmed, cut to size, and further finished with various fissuring or texturing options. The coatings are then applied to the entire surface of the boards, and heated a second time to cure the coating.

Any process in the manufacturing of the mineral wool ceiling panels that produces wet or dry scrap is collected and reused. The dry dust and trimmings as well as the wet scrap are mixed with water and pulped to produce “broke” which is then added to the mix tank along with the other raw materials.

The L’Anse manufacturing facility receives all of its electricity from a nearby biomass power plant and waste steam from that power plant is also used to replace some of the natural gas used to heat the curing ovens. Wastewater from the manufacturing process, along with the impurities from the mix tank, is transferred to a settling pond. The water from the settling pond is used to irrigate fields on site and the solid waste from the settling pond is used as land applied fertilizer in the fields.





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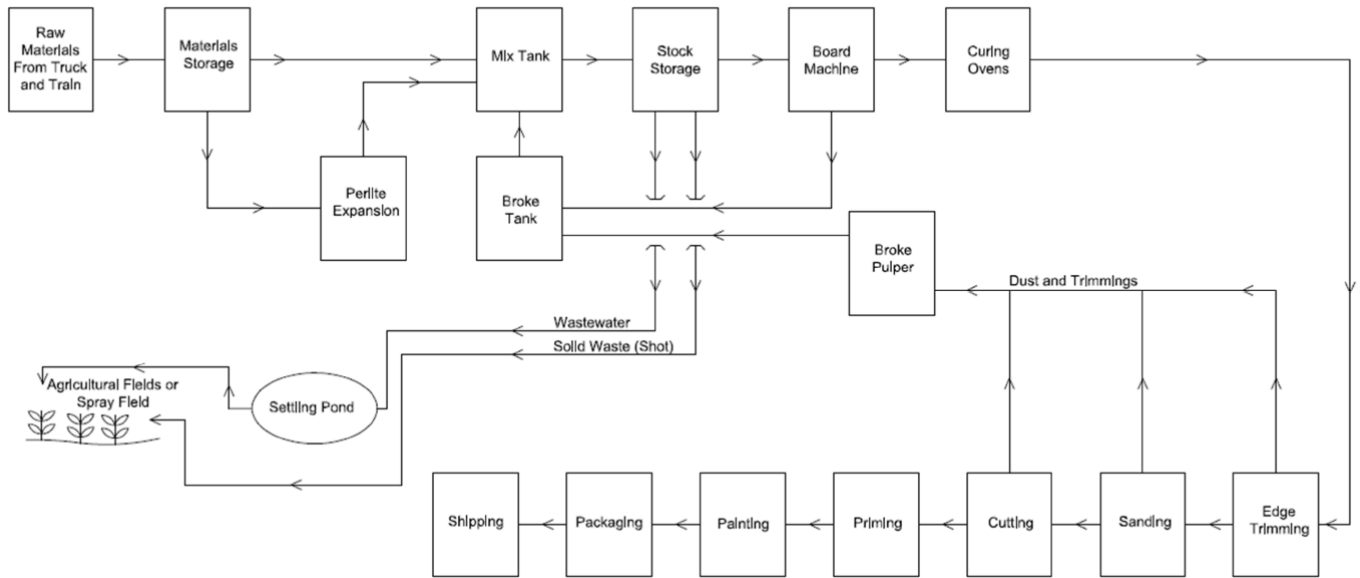


Figure 4: Diagram of L'Anse Manufacturing Facility Ceiling Panel Production Process

## 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. In addition, this plant is zero discharge to Publicly Owned Treatment Works (POTWs). The water system utilizes a settling pond on-site and discharges the remaining water to a spray field rather than a sewer system.



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## 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 <sup>2</sup>
Declared thickness	3/4	inches
Surface weight per declared unit	1.677	lb/ft <sup>2</sup>

Table 4: Protectone 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			Constructi on 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 5: Protectone Ceiling Panel Life Cycle Assessment System Boundary



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## Assumptions

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The life cycle analysis for the mineral fiber ceiling panels assumed a final product transportation of 2105 km (1308 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

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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

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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

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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.



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## 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 L'Anse, Michigan manufacturing facility for the production year 2016. In addition to the Protectone product family, 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	2105	km
Capacity utilization (including empty runs)	85	%
Gross density of products transported	167.87	kg/m <sup>3</sup>

Table 6: Protectone Ceiling Panel Transport to the Building Site



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## Installation into the Building

Name	Unit	Value
Auxiliary	kg	0
Water consumption	m <sup>3</sup>	0
Other resources	kg	0
Electricity consumption	kWh	0
Other energy carriers	MJ	0
Material loss	kg	0.053
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 7: Protectone Ceiling Panel Installation into the Building

## Use

Name	Unit	Value
RSL	Years	75
VOC	kg	0.00004

Table 8: Protectone Ceiling Panel Use



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## End of Life

Name	Unit	Value
Collected separately	kg	0
Collected as mixed construction waste	kg	0.707
Reuse	kg	0
Recycling	kg	0
Energy recovery	kg	0
Landfill	kg	0.707

Table 9: Protectone Ceiling Panel End of Life



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## Life Cycle Assessment Results

### Life Cycle Impact Assessment

The environmental impacts listed below were assessed throughout the life cycle of the Protectone Ceiling Panel product family 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
<b>Raw Materials</b>	5.89E-01	1.02E-07	7.77E-03	1.27E-03	8.99E-02	7.24E-01
<b>Raw Materials Transportation</b>	5.29E-02	2.02E-12	5.00E-04	2.92E-05	1.51E-02	1.02E-01
<b>Manufacture</b>	6.60E-01	2.82E-10	3.95E-04	4.13E-05	3.71E-02	5.86E-01
<b>Final Product Shipping</b>	1.26E-01	4.82E-12	7.54E-04	4.20E-05	2.06E-02	2.42E-01
<b>Installation</b>	9.68E-03	1.51E-10	5.83E-05	3.57E-06	1.60E-03	1.92E-02
<b>Use</b>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>End of Life</b>	1.46E-02	2.00E-09	9.46E-05	9.46E-06	2.61E-03	3.69E-02
<b>Total</b>	1.45E+00	1.04E-07	9.57E-03	1.39E-03	1.67E-01	1.71E+00

Table 10: TRACI Environmental Impact Potentials for Protectone Ceiling Panels per ft<sup>2</sup> (North America)

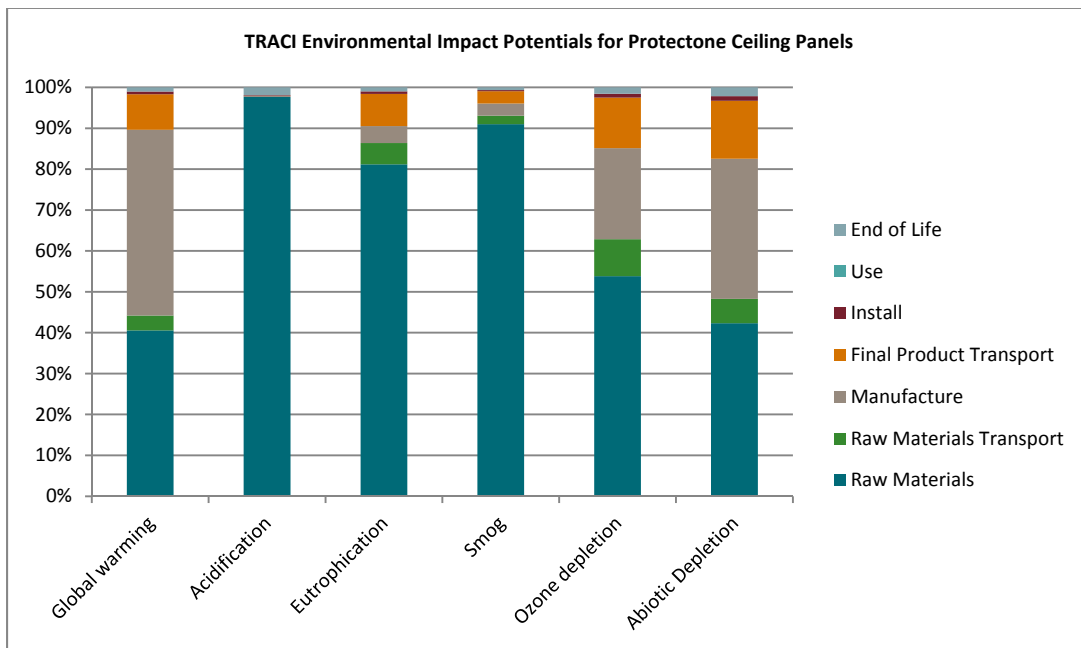


Figure 5: TRACI Environmental Impact Potentials for Protectone Ceiling Panels per ft<sup>2</sup> (North America)



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	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 CO <sub>2</sub> eq	kg CFC-11 eq	kg SO <sub>2</sub> eq	kg (PO <sub>4</sub> ) <sup>3</sup> eq	kg ethene eq	kg Sb eq.	MJ
<b>Raw Materials</b>	5.89E-01	5.66E-08	6.62E-03	9.53E-04	1.23E-03	5.15E-07	9.09E+00
<b>Raw Materials Transportation</b>	5.29E-02	2.00E-12	3.92E-04	8.03E-05	1.24E-05	0.00E+00	7.23E-01
<b>Manufacture</b>	6.60E-01	2.03E-10	3.20E-04	6.13E-05	2.84E-03	1.11E-08	3.94E+00
<b>Final Product Shipping</b>	1.26E-01	4.77E-12	6.22E-04	1.10E-04	2.87E-05	0.00E+00	1.72E+00
<b>Installation</b>	9.68E-03	1.13E-10	4.81E-05	8.65E-06	2.20E-06	4.09E-10	1.37E-01
<b>Use</b>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>End of Life</b>	1.46E-02	1.50E-09	7.76E-05	1.54E-05	3.29E-06	5.43E-09	2.65E-01
<b>Total</b>	1.45E+00	5.84E-08	8.08E-03	1.23E-03	4.11E-03	5.32E-07	1.59E+01

Table 11: CML Environmental Impact Potentials for Protectone Ceiling Panels per ft<sup>2</sup> (Outside North America)

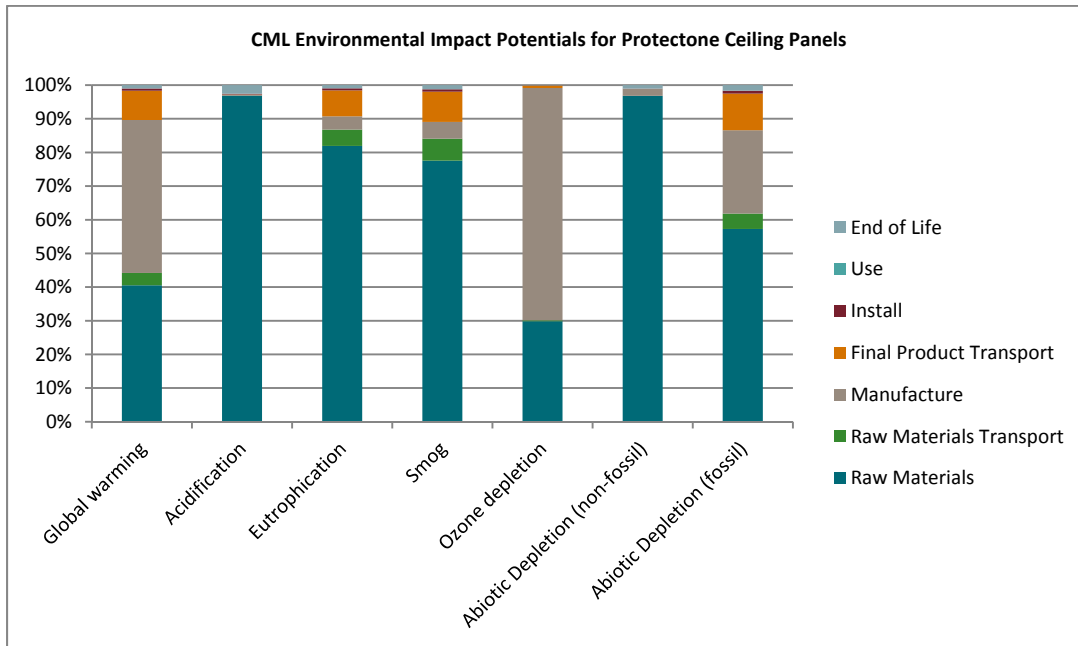


Figure 6: CML Environmental Impact Potentials for Protectone Ceiling Panels per ft<sup>2</sup> (Outside North America)





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## Resource Use

Parameter		Unit	Protectone
Renewable primary energy as energy carrier	PERE	MJ	1.21E+00
Renewable primary energy resources as material utilization	PERM	MJ	0.00E+00
Total use of renewable primary energy resources	PERT	MJ	1.21E+00
Non-renewable primary energy as energy carrier	PENRE	MJ	1.64E+01
Non-renewable primary energy as material utilization	PENRM	MJ	0.00E+00
Total use of non-renewable primary energy resources	PENRT	MJ	1.64E+01
Use of secondary material	SM	MJ	1.01E-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 <sup>3</sup>	1.58E-03

Table 12: Resource Use for Protectone Ceiling Panels per ft<sup>2</sup>

## Output Flows and Waste Categories

Parameter		Unit	Protectone
Hazardous waste disposed	HWD	kg	2.45E-05
Non-hazardous waste disposed	NHWD	kg	8.23E-01
Radioactive waste disposed	RWD	kg	5.38E-06
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 13: Output Flows and Waste Categories for Protectone Ceiling Panels per ft<sup>2</sup>



# ENVIRONMENTAL PRODUCT DECLARATION



Protectone Baroque, Protectone Baroque Customline, Protectone Cashmere, Protectone Directional Fissured, Protectone Fine Fissured, Protectone Fine Fissured Customline, Protectone SchoolBoard, Protectone Vantage 10

According to ISO 14025 and EN 15804

## Primary Energy Demand

Primary Energy Source	Unit	Protectone Ceiling Panels
<b>Nonrenewable</b>		
Fossil Oil	MJ-Eq	5.40E+00
Coal	MJ-Eq	4.61E+00
Natural Gas	MJ-Eq	4.25E+00
Uranium	MJ-Eq	5.22E-01
<b>Renewable</b>		
Wind Power	MJ-Eq	7.25E-03
Solar Power	MJ-Eq	9.23E-05
Geothermal	MJ-Eq	0.00E+00
Hydro Power	MJ-Eq	9.54E-02
Biomass	MJ-Eq	1.10E+00

Table 14: Total Primary Energy Detail by Source Type for Protectone Ceiling Panels per ft<sup>2</sup>

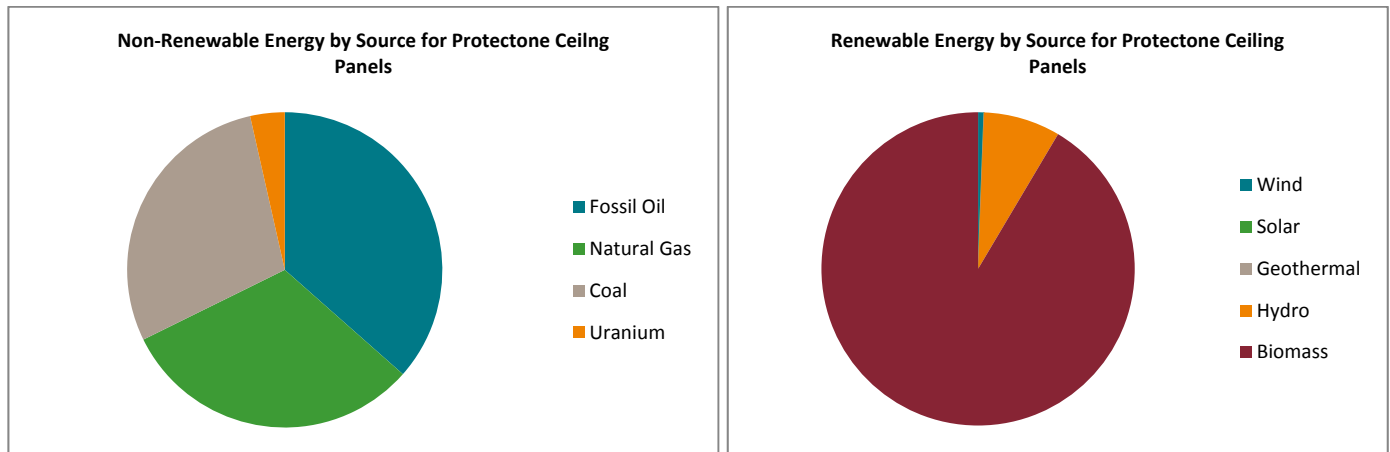


Figure 7: Non-Renewable and Renewable Energy by Source for Protectone Ceiling Panels



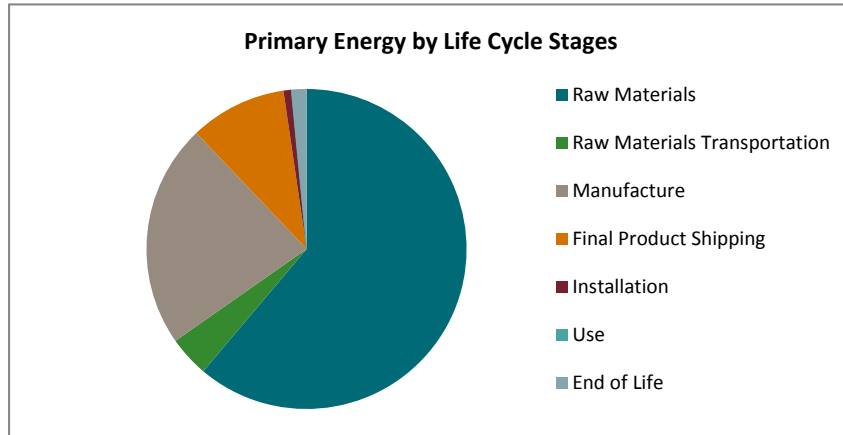


Figure 8: Protectone Ceiling Panel Primary Energy by Life Cycle Stage

## Life Cycle Assessment Interpretation

### Raw Materials

The majority of the environmental impacts occur during the extraction and processing of raw materials. Although mineral wool is a raw material with a high recycled content, the production of mineral wool represents the highest environmental impact potentials of the raw materials used in the ceiling tiles. The transport of the raw materials to the L'Anse manufacturing facility contributes to as much as 20% of the impact potentials for the raw material supply.

### Manufacture

The use of renewable energy and waste steam reduces the impacts of the manufacturing process by approximately 15% compared to typical grid supplied electricity and natural gas.

### Installation and Use Stage

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

End-of-life impacts are a result of landfill disposition. The end-of-life impacts can be significantly reduced by recycling the panels through CertainTeed's Take Back Program.

# ENVIRONMENTAL PRODUCT DECLARATION



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## Additional Information

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### VOC Emissions

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This product meets the testing and product requirements of the California Department of Public Health CDPH/EHLD/Standard Method Version 2.2, 2010 (Emissions Testing Method for CA Specification 01350) Independent test reports are available.

### Optional Information

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- ISO 9001 Quality Management System
- Sustainable Insulation® contains recycled content as independently verify by GreenCircle Certified.
- Certificate of Compliance for VOC Emissions: Berkeley Analytical



### Life Cycle Development

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

### Contact CertainTeed

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



# ENVIRONMENTAL PRODUCT DECLARATION



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According to ISO 14025 and EN 15804

## References

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- 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 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

