Environmental Product Declaration

InvisAcoustics™ Ceiling Panels

CEILING PANELS

InvisAcoustics™ Ceiling Panels – Mineral Fiber

Armstrong®
CEILING & WALL SOLUTIONS

Committed to Sustainability.

Armstrong World Industries is committed to delivering solutions that reduce the environmental impact of the buildings you create; from product design and raw material selection, to how our products are produced and delivered.

Now we provide Environmental Product Declarations (EPDs) to document the sustainability of our products. Inside this UL Environment certified ISO compliant EPD you will find:

- Performance features like acoustics, light reflectance, and durability
- Product application and use
- Product ingredients and their sources
- Information on how a ceiling system is produced
- Life Cycle Assessment (LCA) results including global warming potential and primary energy usage
- Total impacts over the life cycle of the product

InvisAcoustics™ Ceiling Panels provide excellent acoustical absorption while fading into the background of exposed structure spaces. Hidden sound absorption that maintains the integrity of exposed structure designs.

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

1. General Information

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	Armstrong
DECLARATION NUMBER	4786828541.102.1
DECLARED PRODUCT	InvisAcoustics™ Ceiling Panels
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	October 11, 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 ☐ INTERNAL ☒ 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

2. Product System Documentation

2.1 Product Description

Armstrong® InvisAcoustics™ Ceiling Panels are wet-formed mineral fiber acoustical ceiling panels, featuring a fine textured, non-directional visual. InvisAcoustics™ Ceiling Panels are manufactured by Armstrong World Industries in Pensacola, FL (32505).

2.2 Application

Commercial Interior Finish. Acoustical Ceiling System. The ceiling system must be installed in accordance with the Armstrong installation guidelines. For installation instructions visit armstrongceilings.com/invisacoustics

2.3 Technical Data

There are different levels of performance associated with mineral fiber ceiling panels. Performance information is included in this EPD to provide a total understanding of this product and its performance attributes.

Performance of InvisAcoustics™ Ceiling Panels

Items Included in this EPD	Attributes		
InvisAcoustics™ Basics direct attach Mineral Fiber Panels		NRC*	CAC**
	Direct Attach	0.75	NA
	*For information on other InvisAcoustics™ Ceiling Panels, visit http://www.armstrongceilings.com/invisacoustics.		

2. Product System Documentation (continued)

2.4 Placing On the Market/Application Rules

The respective standard is listed in the table in Section 2.3 above for each attribute of the declared product.

EN ISO 14025:2006, Environmental labels and declarations – Type III – environmental declarations – Principles and procedures

EN 14040 ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework

EN 14044 ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines

ASTM E1264-08e1 Standard Classification for Acoustic Ceiling Products

ASTM E84-12 Standard Test Method for Surface Burning Characteristics of Building Materials

ASTM C518-10 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

ASTM C636 / C636M-08 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels

ASTM C423-09a Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

ASTM E1414 / E1414M-11a Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

ASTM E1110-06 (2011) Standard Classification for Determination of Articulation Class

ASTM E1111 (2007) Test Method for Measuring the Interzone Attenuation of Ceiling Systems

2.5 Delivery Status

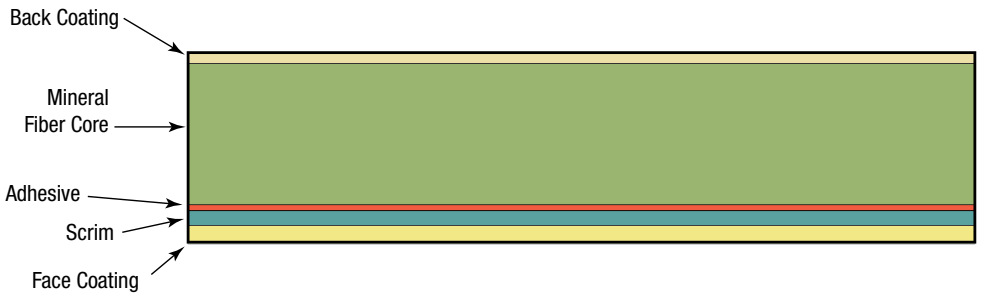
Armstrong® ceiling panels are well packaged in a variety of recyclable corrugated sleeves and box styles. Wooden pallets are used to protect unit loads during shipping.

2. Product System Documentation (continued)

2.6 Material Content

- **Back Coating** – A coating applied to the back of the product.
- **Mineral Fiber Core** – Consists of fibers, perlite, recycled newspaper, and corn starch
- **Scrim** – A non-woven facing attached to the mineral fiber core with a latex adhesive
- **Face Coating** – Durable, highly light-reflectant finish paint coating applied to the scrim

Figure 1. Composition of an InvisAcoustics™ Ceiling Panel – Mineral Fiber



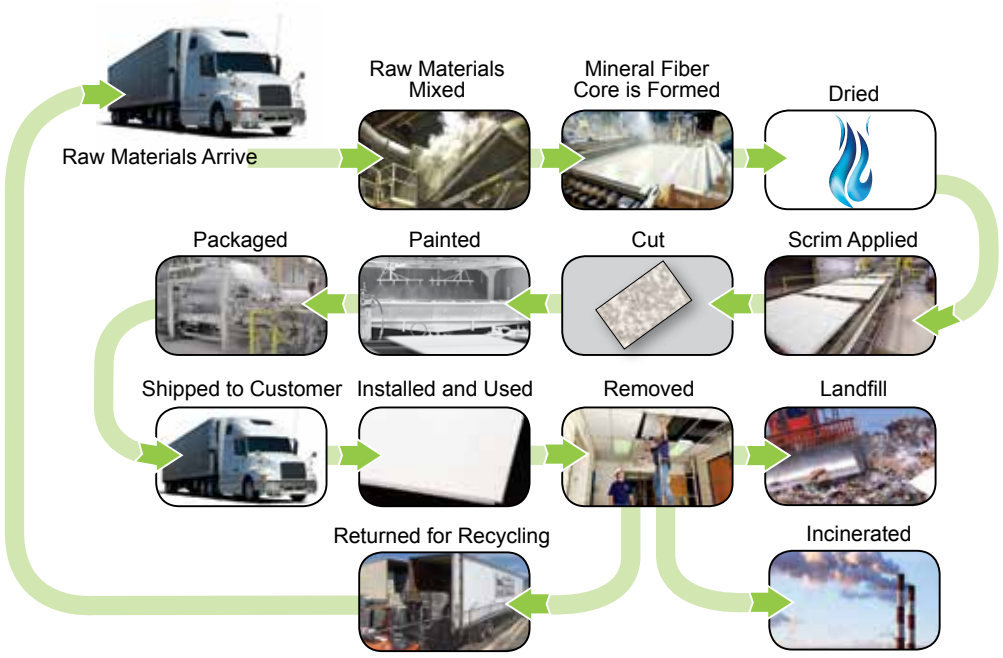
Material Content of InvisAcoustics™ Ceiling Panels

Mineral Fiber Core	FUNCTION	QUANTITY (PERCENT BY WEIGHT)	RECYCLED MINERAL RESOURCE	MINERAL RESOURCE	NON-RENEW-ABLE	RENEW-ABLE	ABUNDANT	RECYCLED MATERIAL	ORIGIN	TRANS-PORTATION MODE	TRANS-PORTATION MILES
Fibers	Acoustics	60-80%	■	■	■		■	■	Global	Truck/Rail	750-1400
Perlite	Filler	15-30%		■	■		■		Global	Truck/Ship	8000-9000
Starch	Binder	5-10%				■	■		U.S.	Truck	1200-1300
Recycled Ceiling Panels	Filler	0-5%						■	U.S.	Truck	500-700
Recycled Paper	Filler	5-10%				■	■	■	U.S.	Truck	100-200
Coating	Finish	10-20%		■	■				U.S.	Truck/Rail	400-4000
Scrim	Finish	1-5%	■	■	■		■		Global	Truck/Ship	6000-7000
Adhesive	Finish	0.05-1.5%			■				U.S.	Truck	<500

2. Product System Documentation (continued)

2.7 Manufacture

Figure 3: Process for Manufacturing InvisAcoustics™ Ceiling Panels



InvisAcoustics™ mineral fiber ceiling panels are manufactured using a wet-formed process. After arriving at the Armstrong Ceilings facility, the raw materials are mixed, water is added, and the mixture is formed into panels which are then dried. The panels are finished by application of back and prime coats, punching, lamination of scrim, final painting, cutting to size, and addition of edge detail. After packaging, the material is shipped and installed. At the end of its useful life, the ceiling panel can then be recycled, sent to a landfill, or incinerated. Recycled ceilings can be returned to Armstrong World Industries as part of our closed loop recycling process as a raw material for new ceiling panels.

2.8 Health, Safety, and Environmental Aspects During Manufacturing

Armstrong World Industries has a comprehensive environmental, health, and safety management program. Risk reduction begins in the product design process. All products go through a safety, health, and environmental review prior to sale. Armstrong World Industries also has a long standing commitment to the safety and health of all our employees. The company's safety management program is considered to be World Class. Our OSHA recordable incident rate is below 1.0, meaning that there is less than one injury per 100 employees per year. All employees view safety as a key responsibility of their jobs. In 2010, Armstrong World Industries was named one of "America's Safest Companies" by EHS Today.

Armstrong World Industries is equally committed to reducing our environmental impact. As with safety goals, each manufacturing facility has environmental initiatives focused on responsible use of energy and water, and on waste reduction.

2.9 Installation of Ceiling Systems

The ceiling system must be installed in accordance with Armstrong World Industries installation guidelines. Our ceiling system installation brochure, "Installing Suspended Ceilings", is a general application overview, covering essential steps of a basic suspended ceiling installation.

You can reference this document at http://www.armstrongceilings.com/common/c2002/content/files/15994.pdf.

In addition, specific instructions are available for the different InvisAcoustics™ Ceiling Panels on the product page. These documents can be referenced at: http://www.armstrongceilings.com/invisacoustics

2. Product System Documentation (continued)

2.10 Packaging

Armstrong® ceiling panels are well packaged in a variety of recyclable corrugated sleeves and box styles. Wooden pallets are used to protect unit loads during shipping.

2.11 Condition of Use

It is very important that InvisAcoustics™ ceiling materials be allowed to reach room temperature and have a stabilized moisture content for a minimum of 72 hours before installation. The panels should not, however, be installed in spaces where the temperature or humidity conditions vary greatly from the temperatures and conditions that will be normal in the occupied space. Relative humidity shall not fall below 25% or exceed 55%.

2.12 Health, Safety, and Environmental Aspects During Installation

Sawing, sanding, and machining wood products can produce dust. Airborne wood dust can cause respiratory, eye, and skin irritation. The International Agency for Research on Cancer (IARC) has classified wood dust as a nasal carcinogen in humans.

Precautionary Measures: If power tools are used, they should be equipped with a dust collector. If high dust levels are encountered, use an appropriate NIOSH-designed dust mask. Avoid dust contact with eyes and skin.

First Aid Measure in Case of Irritation: Flush eyes or skin with water for at least 15 minutes.

Installers should wear appropriate personal protective equipment, such as gloves and safety glasses, to minimize exposure to dust and the potential for skin irritation.

2.13 Reference Service of Life

The system is warranted for 10 years; however, ceiling panels can last as long as the building's useful life if properly installed and maintained. The useful life indicated in the PCR for ceiling panels is 75 years. Warranty details can be found on each product page at http://www.armstrongceilings.com/InvisAcoustics™

2.14 Extraordinary Effects

- **Fire Performance**

  ASTM E84 surface burning characteristics, HPVA Certified with audit program per ASTM E84. Flame Spread Index 25 or less. Smoke Developed Index 50 or less.

  CAN/ULC S102 surface burning characteristics. Flame Spread Rating 25 or less. Smoke Developed Classification 50 or less.

  ASTM E1264 Classification: Composite – Fire Class A.

- **Seismic Performance**

  Seismic Categories C, D, E, and F
  ICC-ES ESR-1308 –
  see http://www.armstrongceilings.com/seismicRX

2. Product System Documentation (continued)

2.15 Disposal

Disposal in municipal landfill or commercial incineration facilities is permissible and should be done in accordance with local, state, and federal regulations.

3. Life Cycle Assessment

This study provides life cycle inventory and environmental impacts relevant to Armstrong® InvisAcoustics™ ceilings. This LCA was conducted to 1) better understand the environmental impacts of the life cycle of ceilings and walls; 2) learn how the impacts of raw material selection, product formulation, and manufacturing process influence the life cycle impacts of ceilings.

The methods for conducting the life cycle assessments used for this project were consistent with ISO 14040, 14044 and EN15804. This report is intended to fulfill the reporting requirements in Section 5 of ISO 14044 and Product Category Rules Guidance for Building-Related Products and Services Part B: Non-Metal Ceiling Panel EPD Requirements.

3.1 Declared and Functional Unit

The declared unit for this EPD is 1 ft^2 of InvisAcoustics™ ceiling panels in use over 75 years.

InvisAcoustics™ 2.0 Inch Board	
Declared Unit	ft^2
DeclaredThickness (inches)	0.75
Surface Weight (lb/ft^2)	1.1
Declared Unit	m^2
DeclaredThickness (cm)	1.905
Surface Weight (kg/m^2)	5.381

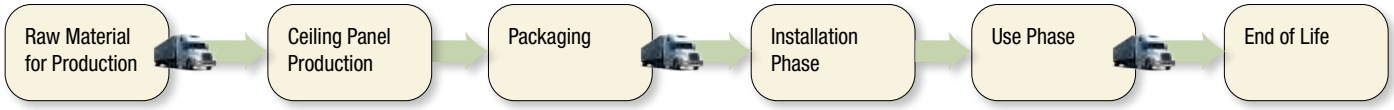
3. Life Cycle Assessment (continued)

3.2 System Boundaries:

The system boundaries studied as part of this life cycle assessment include extraction of primary materials, raw materials manufacture, panel production, installation, and end of life.

The phases below outline a “cradle-to-grave” life cycle assessment for ceiling panels.

Ceiling Panels:



The Cradle-to-Grave Assessment Includes:

– Raw materials production including substrate, coating, and packaging materials for ceiling panels
– Transportation of raw materials to a InvisAcoustics™® manufacturing facility
– Manufacturing of the ceiling panels at a InvisAcoustics™® manufacturing facility
– Packaging of finished products including energy to operate packaging equipment
– Transportation from manufacturing facility to distribution centers, retailers, and job site (assumed to be 500 miles by truck)
– Use phase covers a useful life of 75 years as suggested in the PCR and includes the transportation and installation of the system
– End of life includes landfill disposal of ceiling panels with assumed 50 miles truck transport from job site to landfill

The Cradle-to-Grave Assessment Excludes:

– Overhead energy usage (heating, lighting) of manufacturing facilities
– Maintenance and operation of support equipment

3.3 Assumptions:

There are no specific assumptions to list that are not dealt with in the appropriate section. When an assumption is made it will be described within the specific stage of the report. As an example a 7% waste factor was utilized for the waste generated during the installation of the product. This is described in more detail within the installation section of the report.

3.4 Cut-off Criteria:

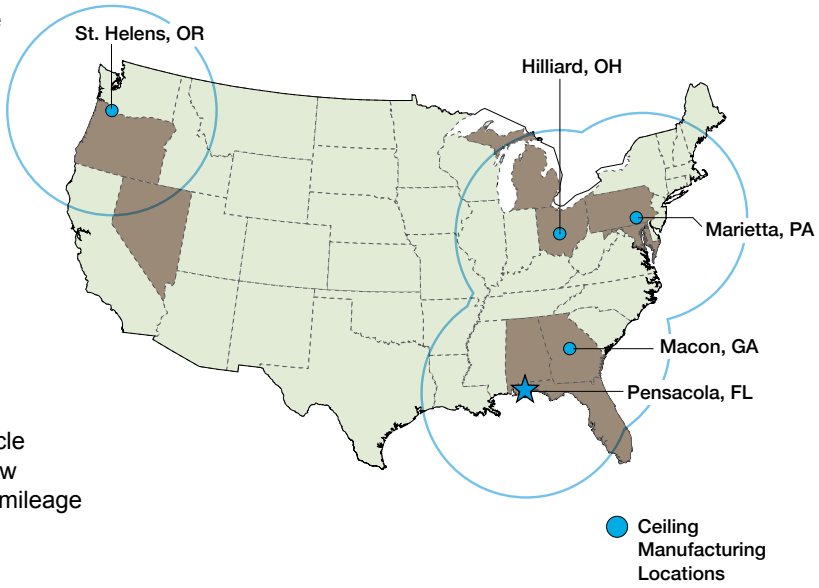
– Mass – If a flow is less than 1% of the cumulative mass of the model, it is excluded, providing its environmental relevance is not a concern.
– Energy – If a flow is less than 1% of the cumulative energy of the model, it is excluded, providing its environmental relevance is not a concern.
– Environmental relevance – If a flow meets the above criteria for exclusion, yet is believed to potentially have a significant environmental impact, it is included.

3.Life Cycle Assessment (continued)

3.5 Background Data:

All data is reported as a North American weighted average across our ceiling plant locations. The majority of Armstrong® ceiling products are distributed within 500 miles of the respective manufacturing plants. The same distribution trucks that take material to distribution centers backhaul post-consumer recycled ceiling panels to the manufacturing plants as part of our closed loop reclamation program. If product is not recycled, disposal transportation at end of life is assumed to be 50 miles.

This map shows the location of Armstrong Ceilings manufacturing facilities with a circle denoting a 500-mile radius from each location.



Transportation emissions and fuels throughout the life cycle phases are included. All transportation associated with raw materials reflects the actual modes of transportation and mileage with the exception of recycled ceilings which assumes a transportation distance of 500 miles by truck.

3.6 Data Quality:

Data for the InvisAcoustics™ panel was provided by our manufacturing location and is believed to be high quality and consistent with industry data.

The LCA model was created using the GaBi Software system for life cycle engineering, developed by Think Step. The GaBi database provides the life cycle inventory data for several of the raw and process materials obtained from the background system. The data quality is considered to be good to high quality. With the exception of supplier specific data, all other relevant background data was taken from the GaBi database software.

All gate-to-gate, primary foreground data was collected for the ceiling panels manufacturing process. Background data was collected from suppliers or generic data was used. When generic data was used, it was verified and triangulated against several sources.

3.7 Period Under Review

Calendar year 2015 manufacturing data was used to create the LCA model.

3.Life Cycle Assessment (continued)

3.8 Allocation:

No allocation was performed within the modeling of Armstrong World Industries unit processes for InvisAcoustics™ panels. Credits for electricity and heat gained from thermal recycling of waste and packaging in a solid waste incinerator and/or landfill were not taken in this study.

4. LCA: Scenarios and Additional Technical Information

- **Ceiling Panel Impacts:**

  The majority of the environmental impacts for this product occur during the extraction and processing of raw materials detailed in the Production Stage. For most ceiling panels, the opportunity for reduction is in the manufacturing process as well as reductions associated with raw materials.

- **Use Stage:**

  Although Armstrong World Industries provides a 10-year ceiling system warranty, the use stage is defined in the PCR at 75 years and this is what was used in the LCA. The assumption is that the ceiling system requires no cleaning or maintenance so the impact is very small.

- **End of Life Impacts:**

  End of Life impacts associated with landfilling and/or incineration of InvisAcoustics™ ceiling panels range from .4% to 35% of all impact categories. For example, End of Life represented approximately 19% of the overall Global Warming Potential impacts for an InvisAcoustics™ ceiling tile.

Transport To The Building Site (A4)

Name	Unit	InvisAcoustics™
Liters of fuel	l/100km	3412.556
Transport distance	km	805
Capacity utilization (including empty runs)	%	67
Gross density of products transported	kg/m^3	1.05
Capacity utilization volume factor	–	1

4. LCA: Scenarios and Additional Technical Information (continued)

Installation Into The Building (A5)

Parameter	Unit	1 m^2	1 ft^2
Auxiliary	kg	0	0
Water Consumption	m3	0	0
Other Resources	kg	0	0
Electricity Consumption	kWh	0	0
Other Energy Carriers	MJ	0	0
Material Loss	kg	0.3767	0.0349
Ceililing Panel Mounting System (CPMS)	kg	1.1230	0.1043
Ceililing Panel Mounting System (CPMS)	%	17%	17%
Output substances following waste treatment on site	kg	0.0000	0.0000
Dust in air	kg	negligible	negligible
VOC in Air	kg	negligible	negligible

Installation Into the Building

There is no energy or water use required for the ceiling system installation. For suspended ceiling systems, a 7% waste factor was assumed on site during construction. This value is based on historic internal studies which have documented the quantity of scrap that are generated at the job site due to needed cuts (to allow for the installation of sprinkler heads, for example) or mistakes. It is assumed that all of the on-site scrap material will be sent to a landfill located within 50 miles of the jobsite. The Prelude® suspension was considered as part of the ceiling panel mounting system (CPMS).

The values in the table are based on a Prelude® system used to install 2' x 2' square tiles at a typical depth of 4 feet from the deck. Hanger wires are every 4 feet and assumed that 6 foot long 12 gauge wire was utilized.

End of Life

The end of life phase for the ceiling tiles was included in the study. End of life impacts include disposal of ceiling panels, scap, and packaging at the end of installation. Armstrong offers our ceiling recycling program as a closed loop end of life solution instead of landfill or alternative disposal methods. Although the ceiling recycling is a successful program, the volume does vary from year to year so a conservative approach was taken within the study to not include the recycle program but to rather consider that all tiles are landfilled or incinerated. The study was also conservative in the fact that it did not take credit for any energy that was recovered in the incineration of landfill process.

Reuse, Recovery and/or Recycling Potentials (D), Relevant Scenario Information

Armstrong offers our ceiling recycling program as a closed loop end of life solution instead of landfill or alternative disposal methods. Although the ceiling recycling is a successful program, the volume does vary from year to year so a conservative approach was taken within the study to not include the recycle program but to rather consider that all tiles are landfilled or incinerated. The study was also conservative in the fact that it did not take credit for any energy that was recovered in the incineration of landfill process.

5. LCA: Results

The Life Cycle Assessment (LCA) was performed according to ISO 14040 and follows the PCR instructions. The cradle-to-grave LCA encompasses raw material production; transport of raw materials to production facility; manufacturing of ceiling panels; packaging; transportation to job site; use phase; and end of life including disposal or recycling.

Table 1. 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 and Loads Beyond the System Boundaries	
	Raw Material supply	Transport	Manufacturing	Transport from gate site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling potential	RSL
EPD type	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**	
Cradle to grave – m^2																		
	All A – C modules mandatory																	75 Yrs
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Life Cycle Environmental Impact Results: 1 m^2 InvisAcoustics™ Panel

Declared Unit: 1 m^2 of panels for use over 75 years, impacts based on U.S. EPA TRACI 2.1 Impact Factors

Table 2. North American LCA Environmental Impact Results

Parameter	Parameter	Unit	1 m^2	1 ft^2
GWP	Global warming potential	kg CO2- Eq.	12.0230	1.1174
ODP	Stratospheric ozone layer depletion	kf CFC-11 Eq.	0.0000	0.0000
AP	Acidification potential	kg SO2- Eq.	0.0413	0.0038
EP	Eutrophication potential	kg N- Eq.	0.0052	0.0005
POCP	Photochemical ozone creation potential	kg O3- Eq.	0.4257	0.0396
ADP	Abiotic resource depletion potential – fossil fuels	Surplus energy per extracted MJ, kg or m3 fossil fuel as a result of lower quality resources	7.4140	0.6890

5. LCA: Results (continued)

Table 3. LCA Results: Resource Use

LCA RESULTS – RESOURCE USE 1 m² INVISACOUSTICS™				
Parameter	**Parameter**	**Unit**	**1 m²**	**1 ft²**
PERE	Renewable primary energy as energy carrier	MJ, LHV	101.5256	9.435466
PERM	Renewable primary energy resources as material utilization	MJ, LHV	15.5368	1.44394
PERT	Total use of renewable primary energy resources	MJ, LHV	117.0624	10.87941
PENRE	Non-renewable primary energy as energy carrier	MJ, LHV	110.7982	10.29723
PENRM	Non-renewable primary energy as material utilization	MJ, LHV	0	0
PENRT	Total use of non-renewable primary energy resources	MJ, LHV	110.7982	10.29723
SM	Use of secondary material	MJ, LHV	0.442842	0.041156
RSF	Use of renewable secondary fuels	MJ, LHV	0	0
NRSF	Use of non-renewable secondary fuels	MJ, LHV	0	0
FW	Use of net fresh water	m^3	0.000704	6.55E-05

Table 4. LCA Results: Output Flows and Waste Categories

LCA RESULTS: OUTPUT FLOWS AND WASTE CATEGORIES 1 m² INVISACOUSTICS™				
Parameter	**Parameter**	**Unit**	**1 m²**	**1 ft²**
HWD	Hazardous waste disposed	kg	0.0000	0.0000
NHWD	Non-hazardous waste disposed	kg	0.8883	0.1819
RWD	Radioactive waste disposed	kg	0.0000	0.0000
CRU	Components for re-use	kg	0.0000	0.0000
MFR	Materials for recycling*	kg	0.0000	0.0000
MER	Materials for energy recovery	kg	0.0000	0.0000
EE	Exported energy	MJ, LHV	0.0000	0.0000

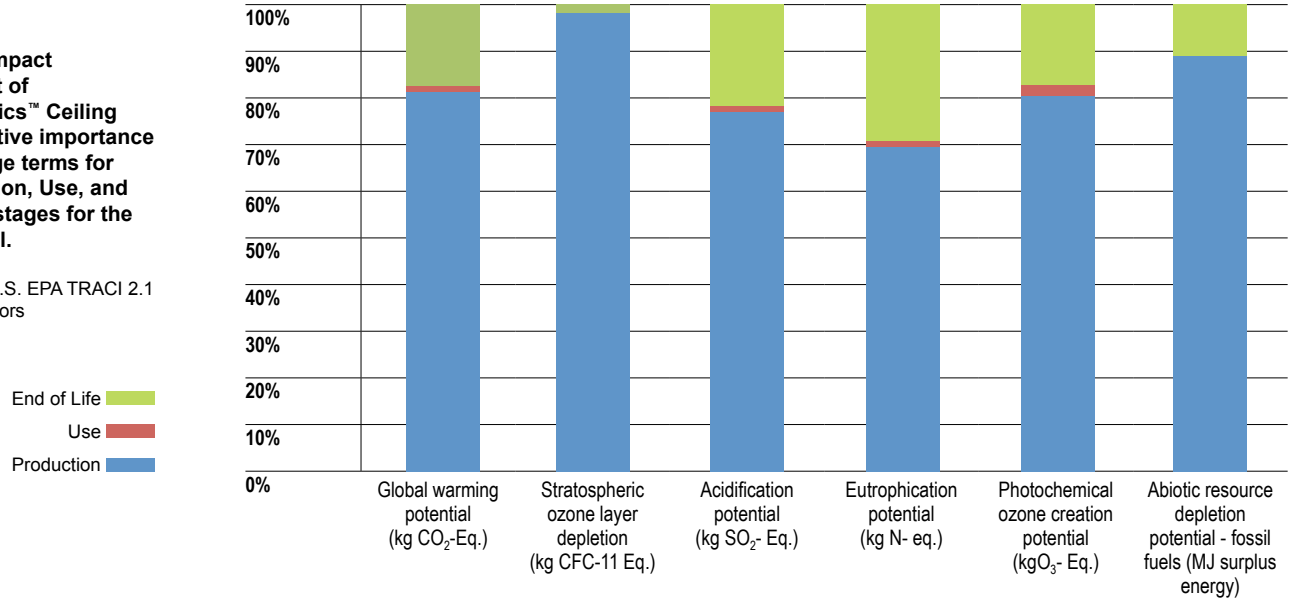
HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use;
MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy

6. LCA: Interpretation

From the results of the InvisAcoustics™ life cycle covered in this study, it was concluded that the panel manufacturing process and raw materials – specifically, mineral wool in the ceiling panel and steel in the suspension systems – have the greatest impact on Primary Energy Demand (PED) and "carbon footprint" (represented by Global Warming Potential [GWP]).

Life Cycle Impact Assessment of InvisAcoustics™ Ceiling Panels[1] relative importance in percentage terms for the Production, Use, and End of Life stages for the ceiling panel.

[1] Based on U.S. EPA TRACI 2.1 Impact Factors



7. References

PCR

UL Environment

UL Environment General Program Instructions April 2015, version 2

Sustainability Reporting Standards

EN 15804: 2012-04 – Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction product.

ISO 14025: 2006 – Environmental labels and declarations – Type III environmental declarations – Principles and procedures

ISO 14040: 2006 – Environmental management – Life cycle assessment – Principles and framework

ISO 14044:2006 – Environmental management – Life cycle assessment – Requirements and guidelines

ISO 14046:2013 – Environmental management – Water footprint – Principles, requirements and guidelines

ISO 15392:2008 – Sustainability in building construction – General principles

ISO 15686-1:2011 – Buildings and constructed assets – Service life planning – Part 1: General principles

ISO 15686-2:2008 – Buildings and constructed assets – Service life planning Part 2: Service life prediction procedures

ISO 15686-7:2008 – Buildings and constructed assets – Service life planning Part 7: Performance evaluation for feedback of service life data from practice

ISO 15686-8:2008 – Buildings and constructed assets – Service life planning Part 8: Reference service life and service life estimation

ISO 21930: 2007 – Sustainability in building construction – Environmental declaration of building products

Testing And Classification References

ASTM C423 – Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

ASTM C636 – Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustic Panel and Lay-in Panels

ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials

ASTM E1110 – Standard Classification for Determination of Articulation Class

ASTM E1111 – Standard Test Method for Measuring the Interzone Attenuation of Open Office Components

ASTM E1264 – Standard Classification for Acoustical Ceiling Products

ASTM E1414 – Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

ASTM E1477 – Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers

ASTM E413 – Classification for Rating Sound Insulation

CA Specification 01350 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers – Version 1.1

7. References (continued)

Relevant Federal Standards and SOPS

Environment Canada, National Pollutant Release Inventory (http://www.ec.gc.ca/inrp-npri/)

EPCRA 313 Toxic Release Inventory Reporting (U.S.) (http://www2.epa.gov/toxics-release-inventory-tri-program)

US EPA, ORD/NRMRL/Sustainable Technology Division, Systems Analysis Branch, SOP No. S-10637- OP-1-0- Tool for the Reduction and Assessment of Chemical and other Environmental Impacts (TRACI), Software Name and Version Number: TRACI version 2.1, USER'S MANUAL, 24 July, 2012

US: Resource Conservation and Recovery Act (RCRA), Clause C (http://www.epa.gov/region6/rcra/)

Relevant PCRs

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.

UL Environment General Program Instructions April 2015, version 2

PCR Part A: UL Environment and Institute of Construction and Environment e.V., Königswinter (pub.): 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

EN 15804: 2012-04 – Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction product.

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