



SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: MSU /BZ CLASSROOM IMPROVEMENTS

PPA No: 23-0828

Location: BOZEMAN , MT

Owner: MONTANA STATE UNIVERSITY

Bidder (Sub-):

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

Table with 3 columns: SECTION, PARAGRAPH, SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows: TYPES EX AND T1

- What are the differences between the specified material, system, or equipment and the proposed substitution? NOTHING
Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N)
Does the proposed substitution require changes to the Work of other trades? (Y/N)
Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

NORTHERN ROCKIES AGENCY REP. KIT STEVCO 1/13/25
SUBMITTED BY (BIDDER / SUB-BIDDER) AUTHORIZED AGENT DATE

Received: DATE

Architect's Action: [] Rejected

[] Rejected - For reasons as follows:

[] Approved

[x] Approved as noted:

EX is approved. T1 needs to meet 3500k tunable specification as noted in specs and by Blacksheep Engineering.

1.14.25

REVIEWED BY (ARCHITECT)

AUTHORIZED AGENT



SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: MSU Classroom Improvements PPA No: 23-0828
Location: Bozeman, MT
Owner: MONTANA STATE UNIVERSITY Bidder (Sub-):

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

Table with 3 columns: SECTION, PARAGRAPH, SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT. Row 1: 233700, 2.02, Rectangular Ceiling Diffusers

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows: Price Industries

- What are the differences between the specified material, system, or equipment and the proposed substitution? None
Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N)
Does the proposed substitution require changes to the Work of other trades? (Y/N)
Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

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Vemco, Inc. Chad Fry 1/7/2025
SUBMITTED BY (BIDDER / SUB-BIDDER) AUTHORIZED AGENT DATE

Received: DATE

Architect's Action: [] Rejected

[] Rejected - For reasons as follows:

[x] Approved

[] Approved as noted:

1.14.2025

REVIEWED BY (ARCHITECT) AUTHORIZED AGENT DATE



SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: MSU Classroom Improvements PPA No: 23-0828
Location: Bozeman, MT
Owner: MONTANA STATE UNIVERSITY Bidder (Sub-):

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

The material, system, or equipment defined by this Substitution Request is proposed as a replacement for the material, system, or equipment originally specified and defined as follows:

Table with 3 columns: SECTION, PARAGRAPH, SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT. Row 1: 238200, 2.01, Unit Ventilators

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows: Daikin Applied model UVAS unit ventilator with face & bypass and steam coil.

- What are the differences between the specified material, system, or equipment and the proposed substitution? None
Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N)
Does the proposed substitution require changes to the Work of other trades? (Y/N)
Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

Vemco, Inc. Chad Fry 1/7/2025
SUBMITTED BY (BIDDER / SUB-BIDDER) AUTHORIZED AGENT DATE

Received:
DATE

Architect's Action: [] Rejected

[] Rejected - For reasons as follows:

[x] Approved

[] Approved as noted:

1.14.2025

REVIEWED BY (ARCHITECT) AUTHORIZED AGENT DATE



SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: MSU /BZ CLASSROOM IMPROVEMENTS PPA No: 23-0828
Location: BOZEMAN , MT
Owner: MONTANA STATE UNIVERSITY Bidder (Sub-):

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

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Table with 3 columns: SECTION, PARAGRAPH, SPECIFIED MATERIAL, SYSTEM, OR EQUIPMENT

PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:
TYPES EX AND T1

- What are the differences between the specified material, system, or equipment and the proposed substitution? NOTHING
Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N)
Does the proposed substitution require changes to the Work of other trades? (Y/N)
Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N)

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

NORTHERN ROCKIES AGENCY REP. KIT STEVCO 1/13/25
SUBMITTED BY (BIDDER / SUB-BIDDER) AUTHORIZED AGENT DATE

Received:
DATE

- Architect's Action: [] Rejected [] Rejected - For reasons as follows:
[] Approved [x] Approved as noted:

EX is approved. T1 needs to meet 3500k tunable specification as noted in specs and by Blacksheep Engineering.

REVIEWED BY (ARCHITECT) AUTHORIZED AGENT DATE



SUBSTITUTION REQUEST (PRIOR APPROVAL)

Project Title: _____

PPA No: __ - ____

Location: _____

Owner: MONTANA STATE UNIVERSITY Bidder (Sub-): _____

This request is submitted for the approval of the Architect. Bidder / Sub-Bidder shall submit one request in accordance with Bidders' Instructions and Information for each proposed substitution. All blanks are to be completed.

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PROPOSED SUBSTITUTION: The material, system, or equipment being proposed is defined as follows:

• What are the differences between the specified material, system, or equipment and the proposed substitution?

• Does the proposed substitution require dimensional changes on the Construction Drawings? (Y/N)

• Does the proposed substitution require changes to the Work of other trades? (Y/N)

• Is the warranty for the proposed substitution comparable with that of the specified product? (Y/N)

*Sky Acoustics offer a Standard 2 Year Warantee

By signing and submitting this request, the Bidder / Sub-Bidder represents that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified material, system, or equipment.

By signing and submitting this request, the Bidder / Sub-Bidder agrees to pay all costs, including architectural and engineering fees, associated with the incorporation of the proposed substitution into the Project.

SUBMITTED BY (BIDDER / SUB-BIDDER)

AUTHORIZED AGENT

DATE

Received: 1.10.25 DATE

Architect's Action: [] Rejected

[] Rejected - For reasons as follows:

[x] Approved

[x] Approved as noted:

REVIEWED BY (ARCHITECT)

AUTHORIZED AGENT

DATE

NEXUS

ACOUSTICAL WALL PANEL

Nexus Panels are a custom manufactured wall panel system. Nexus can be built in standard sizes such as 4' X 6' or 4' X 8' or be manufactured in any custom size catering to your design needs.

WALLS

FEATURES

- Available in 3 different finishes
- Multiple thickness's available 1" (25mm), 2" (50mm), 3" (76mm), 4" (101mm)
- 4 Different impact resistant layers available

BENEFITS

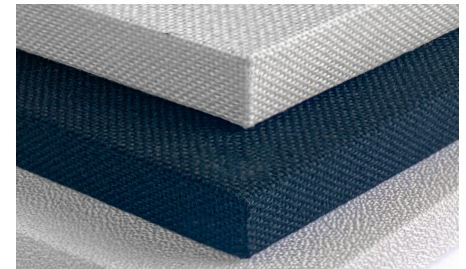
- Highly customizable to your design
- High sound absorption
- Excellent resistance to impact in abusive environments

AVAILABLE FINISHES



COATED FINISH

Smooth monolithic finish in our standard AURA White or any custom color!



FABRIC

Many fabrics, vinyls and felt available from Guilford of Maine, FilzFelt, Knoll, Design Tex, Maharam, Carnegie, Omnova and many more.

AVAILABLE IMPACT LAYERS

STANDARD

Panel Composition
 . Medium Density Fiberglass Core 6-7 PCF
 . Choice of finish
Recommended Use:
 . Areas where panels are not likely to receive abuse or impact.

HIGH IMPACT

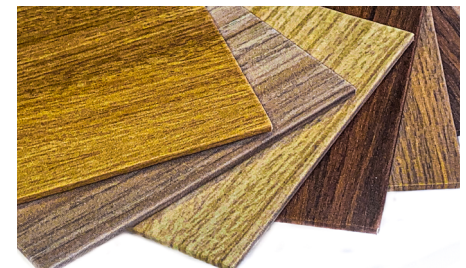
Panel Composition
 . Medium Density Fiberglass Core 6-7 PCF
 . **High Density Fiberglass Face (HDF)**
 . Choice of finish
Recommended Use:
 . Added protection to panels
 . Areas where slight abuse or impact may occur.
 . Tackability
 Adds 1/8" (3mm)

HIGH IMPACT ULTIMATE

Panel Composition
 . Medium Density Fiberglass Core 6-7 PCF
 . **High Density Sorim**
 . Choice of finish
Recommended Use:
 . Gymnasium

NOVA

Panel Composition
 . Medium Density Fiberglass Core 6-7 PCF
 . Perforated Co-polymer
 . Choice of finish
Recommended Use:
 - Gymnasium



FINTO FINISH

High resolution printed wood grain fabric available in many species, and shades.

GENERAL DATA

- Noise reduction Coefficient (NRC) as tested to ASTM C423 in our 1" meets a 0.90 NRC
- Noise reduction Coefficient (NRC) as tested to ASTM C423 in our 2" meets a 1.05 NRC
- Noise reduction Coefficient (NRC) as tested to ASTM C423 in our 3" + meets a 1.30 NRC
- Fire Performance as tested to ASTM E84 meets a class "A" fire rating w/a Flame spread index of 0 and a smoke Development index of 10
- Our Standard "AURA White" in the coating system has been tested to a ASTM E1477-9a and has a rating of 90% light Reflectance

EDGE DETAILS AVAILABLE



TECHNICAL DATA

FINISH	THICKNESS	FIRE RATING	NRC	CAC	CORE DENSITY	LEED	WARRANTY
COATED	1" (25mm)	CLASS A	0.90	N/A	6-7 PCF	HPD's, EPD's, EDS, CDPH, Recycled Content	2 YEARS
	2" (50mm)	CLASS A	1.05	N/A	6-7 PCF	HPD's, EPD's, EDS, CDPH, Recycled Content	2 YEARS
FABRIC	1" (25mm)	CLASS A	0.90	N/A	6-7 PCF	HPD's, EPD's, EDS, CDPH, Recycled Content	2 YEARS
	2" (50mm)	CLASS A	1.05	N/A	6-7 PCF	HPD's, EPD's, EDS, CDPH, Recycled Content	2 YEARS
LOHA	1" (25mm)	CLASS A	0.90	N/A	6-7 PCF	HPD's, EPD's, EDS, CDPH, Recycled Content	2 YEARS
	2" (50mm)	CLASS A	1.05	N/A	6-7 PCF	HPD's, EPD's, EDS, CDPH, Recycled Content	2 YEARS
FINTO	1" (25mm)	CLASS A	0.90	N/A	6-7 PCF	HPD's, EPD's, EDS, CDPH, Recycled Content	2 YEARS
	2" (50mm)	CLASS A	1.05	N/A	6-7 PCF	HPD's, EPD's, EDS, CDPH, Recycled Content	2 YEARS

2" (51 mm) thick panels have a NRC of up to 1.05

available in 3" and 4" NRC of up to 1.3

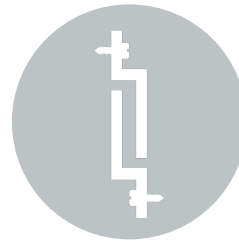
AVAILABLE MOUNTING SYSTEMS CEILING MOUNT & WALL MOUNT



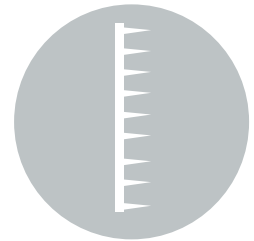
Hook & loop
Velcro



MAGNET



Direct Mount
Wall Z-Clip



Impaling Clip

LEED DATA

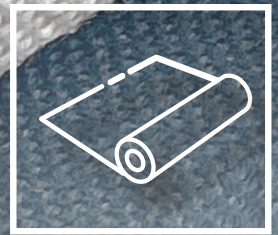
MR - Materials and Resources

- 1 Point - Building Product Disclosure and Optimization - EPD
- 1 Point - Building Product Disclosure and Optimization - HPD
- 1 Point - Leadership Extraction Practices - Recycled Content

IEQ-Indoor Environmental Quality(Prerequisite)

- 1-2 Point - Interior Lighting/Surface Reflectivity (AURA WHITE FINISH) E1477-9
- 1-3 Points - Low Emitting Materials (CDPH) Must use our "G" Series Core





FABRIC

CUSTOM FABRIC WRAP

Sky Acoustics fabric wrapped panels add an element of texture and color to any project. Whether you're looking to match with the furniture or add a contrasting aesthetic detail, fabrics are a great design medium.

KEY FACTORS:

Acoustically

Transparent: Is the fabric going to allow for the sound waves to travel through it ?


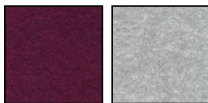
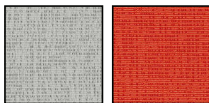
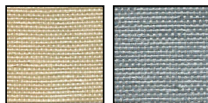
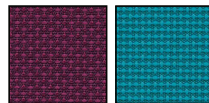
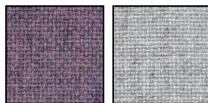
Wrap-ability: Does the fabric wrap well, what requirements are needed to get crisp folds?

Sagging: What is the fabric made of, is it sensitive to elements such as humidity?


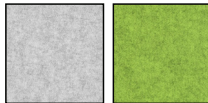
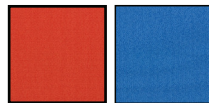
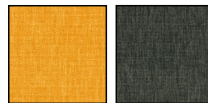


TYPICALLY USED FABRICS:

Contact Sky Acoustics or your local rep for more options.


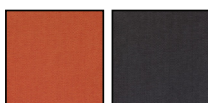
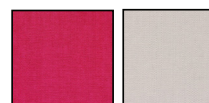

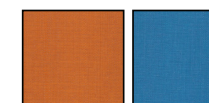

GUILFORD OF MAINE

<p>Anchorage</p>  <p>For more colors visit GUILFORD's website</p>	<p>Felt - 9900</p>  <p>For more colors visit GUILFORD's website</p>	<p>Marin</p>  <p>For more colors visit GUILFORD's website</p>	<p>Whisper</p>  <p>For more colors visit GUILFORD's website</p>	<p>Quadrille</p>  <p>For more colors visit GUILFORD's website</p>	<p>FR701</p>  <p>For more colors visit GUILFORD's website</p>
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MAHARAM

<p>Emit</p>  <p>For more colors visit MAHARAM's website</p>	<p>Flock</p>  <p>For more colors visit MAHARAM's website</p>	<p>Meld</p>  <p>For more colors visit MAHARAM's website</p>	<p>Metaphor</p>  <p>For more colors visit MAHARAM's website</p>	<p>Massenger</p>  <p>For more colors visit MAHARAM's website</p>	<p>Tek-wall</p>  <p>For more colors visit MAHARAM's website</p>
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CARNEGIE

<p>Xorel</p>  <p>For more colors visit CARNEGE's website</p>	<p>Xorel</p>  <p>For more colors visit CARNEGE's website</p>	<p>Xorel</p>  <p>For more colors visit CARNEGE's website</p>	<p>Xorel</p>  <p>For more colors visit CARNEGE's website</p>	<p>Xorel</p>  <p>For more colors visit CARNEGE's website</p>	<p>Xorel</p>  <p>For more colors visit CARNEGE's website</p>
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FABRIC

CLEANING INSTRUCTIONS

FABRIC WRAPPED PANEL

HANDLING

Wearing white cotton gloves while handling acoustical panels prevents the transfer of natural skin oils, dirt, and grime, which can cause unsightly marks and degrade the material. This practice helps maintain the panels' pristine appearance, ensuring they blend seamlessly into their environment as intended.

DUST REMOVAL OPTIONS

Soft Vacuum Attachment: Use a vacuum cleaner equipped with a soft brush attachment to effectively and gently remove dust from the panels. This method ensures thorough cleaning without scratching or damaging the surface.

Compressed Air Technique: Utilize compressed air to dust the panels, maintaining a safe distance to avoid harming their integrity. This technique is particularly useful for reaching difficult or intricate areas without direct contact.

Gentle Manual Brushing: Employ a soft, hand-held brush for manual dusting, taking care to use gentle strokes. This approach is ideal for delicate or finely detailed panels, ensuring they remain clean without risk of abrasion.

Lint Rolling: Use a soft, hand-held lint roller for dust removal, taking care to apply gentle pressure. This method is ideal for delicate or finely detailed panels, ensuring thorough cleaning without the risk of abrasion. The adhesive surface of the lint roller effectively captures dust and debris, maintaining the panel's pristine condition.

DIFFICULT STAINS

Damp Cloth: For light stains, use a slightly damp, soft, lint-free cloth to gently wipe the stained area. This method is effective for minor blemishes without causing any damage to the panel's surface.

Soap and Water: For stubborn stains, mix a small amount of mild soap with water. Lightly dampen a soft, lint-free cloth with this solution and gently wipe the stain. Avoid soaking the panel to prevent water damage. Rinse the cloth with clean water and wipe the area again to remove any soap residue, ensuring the panel stays in good condition.

ADDITIONAL CARE TIPS

Consistent cleaning helps maintain the aesthetic appeal and longevity of acoustic panels. Periodically vacuum the panels using a soft brush attachment to remove dust and debris.

Avoid Abrasive Tools: Refrain from using steel wool, abrasive brushes, or harsh chemicals that can damage the surface of the panels. Instead, opt for gentle cleaning methods.

Spot Cleaning: For spot cleaning, use a soft, damp cloth to gently wipe the stained area. Avoid soaking the panel to prevent water damage.

Chemical Use: Ensure any cleaning chemicals used are compatible with the panel's material.

Protection from Sunlight: To prevent discoloration, protect acoustic panels from prolonged direct sunlight. While not a cleaning method, this practice helps maintain the panels' visual integrity over time.



**Aura, Nexus,
SuperCluster, Baffles,
Legno, Loha and Stratus
Acoustical Panels**



Sky Acoustics Inc.

ENVIRONMENTAL PRODUCT DECLARATION

ISO 14025:2006 and ISO 21930:2017

SkyAcoustics Inc. is pleased to present this Environmental Product Declaration (EPD) for Aura, Nexus Supercluster, Baffles, Legno, Loha and Stratus Acoustical Panels. This EPD was developed in compliance with ISO 14025 and ISO 21930 and has been verified by Lindita Bushi, Ph.D., Athena Sustainable Material Institute.

The LCA and the EPD were prepared by Vertima Inc. The EPD includes cradle-to-gate life cycle assessment (LCA) results.

For more information about Sky Acoustics, visit

www.sky-acoustics.com

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

1. GENERAL INFORMATION

PCR GENERAL INFORMATION			
Reference PCR	Part B: Non-Metal Ceiling and Interior Wall Panel EPD Requirements UL Environment April 13, 2021 to April 13, 2026		
The PCR review was conducted by:	<i>Dr. Lindita Bushi</i> Senior Research Associate ATHENA Sustainable Materials Institute lindita.bushi@athenasmi.org	<i>Dr. Tom Gloria</i> Industrial Ecology Consultants t.gloria@industrial-ecology.com	<i>Olivia Palmer</i> Simpson Gumpertz & Heger ohpalmer@sgh.com
EPD GENERAL INFORMATION			
Program Operator	ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428 www.astm.org		
Declared Product	Aura Panels Nexus Acoustical Panels Nexus High Impact Panels Nexus High Impact Ultimate Panels Nexus Nova Panels	Supercluster Panels Baffle Panels Legno Panels Loha Panels Stratus Panels	
EPD Registration Number 344	EPD Date of Issue September 27, 2022	EPD Period of Validity September 27, 2022 - September 26, 2027	
EPD Recipient Organization	Sky-Acoustics Inc. 55 Bradwick Drive Concord (Ontario) L4K 1K5 Canada www.sky-acoustics.com		
EPD Type/Scope and Declared Unit Product-specific cradle-to-gate EPD with declared unit of 0.093 m ² (1 ft ²) of acoustical panel			Year of Reported Manufacturer Primary Data 2021
Geographical Scope North America	LCA Software OpenLCA v1.10.3	LCI Databases US LCI and ecoinvent 3.8	LCIA Methodology TRACI 2.1
This LCA and EPD were prepared by:		Chantal Lavigne, M.A.Sc. Vertima Inc. www.vertima.ca	
<p>This EPD and LCA were independently verified in accordance with ISO 14025:2006, ISO 14040:2006 and ISO 14044:2006, as well as the UL Environment PCR "Part B: Non-Metal Ceiling and Interior Wall Panel EPD Requirements, second edition, which is based on ISO 21930:2017. The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report, v3.2" serves as the core PCR.</p> <p><input type="checkbox"/> Internal <input checked="" type="checkbox"/> External</p>		 Lindita Bushi, Ph.D. Athena Sustainable Materials Institute	



LIMITATIONS

Environmental declarations from different programs (ISO 14025) may not be comparable.[1]

Full conformance with the PCR for North American Non-Metal Ceiling and Wall System Products [2] allows EPD comparability only when all stages of the product life cycle have been considered. However, variations and deviations are possible. For example, different LCA software and background LCI datasets may lead to differences in results upstream or downstream of the life cycle stages declared.

Comparison of the environmental performance of non-metal ceiling and wall system products using the EPD information taken from this study is not permitted since the product's use and impacts at the building level are excluded from the study.



2. PRODUCT SYSTEM DESCRIPTION

2.1. DESCRIPTION OF THE ORGANIZATION

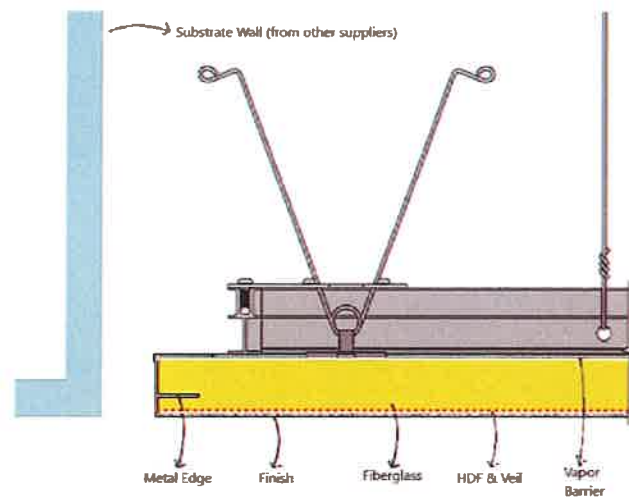
Sky Acoustics Inc., whose manufacturing facility is based in Concord (Ontario), is a premier manufacturer of architectural acoustical panel systems. From ceiling to wall panels offered in a range of materials and coatings, a full suite of products is available for all types of projects.

2.2. PRODUCT DESCRIPTION

All of Sky Acoustics’ acoustical ceiling and wall panels are made with a fiberglass core panel. Panels are available with different face finishes, including fabric, veneer, a perforated aluminum sheet or coated with a smooth monolithic fine-texture paint finish, available in standard Aura White (90% light reflectance) or any custom color match.

Aura, Legno and Loha¹ panels are fiberglass core panels framed with an aluminum extrusion. Aura ceiling panels have a paint-coated finish, while Legno and Loha wall and ceiling panels are respectively finished with wood veneer and a perforated aluminum sheet.

Nexus² wall panels are fabric-finished panels available in five different impact levels. Only four impact levels are considered in this EPD: Nexus Acoustical, Nexus High Impact, Nexus High Impact Ultimate and Nexus Nova. Nexus panels are typically used for wall applications and have resin-hardened edges. Nexus Acoustical panels are recommended for areas where panels are not likely to receive abuse or impact, while Nexus High Impact, Nexus High Impact Ultimate and Nexus Nova panels have an additional layer of protection for use in areas where low to high impact resistance is needed. These panels respectively have an added layer of high-density fiberglass facer, high-density scrim and perforated copolymer.



Representations of the Aura panel with a custom Aptus grid system (Aptus grid system excluded from the EPD).

¹ Aura panels are classified under the United Nations Standard Products and Services Code (UNSPSC) 30161602 and 30161601, and the Construction Specification Institute (CSI) MasterFormat code 09 51 13 and 09 51 23. Legno and Loha panels are classified as Aura panels, but can also be found under the UNSPSC code 30161505 and CSI MasterFormat code 09 84 33.

² Nexus panels are classified under the United Nations Standard Products and Services Code (UNSPSC) 30161505, and the Construction Specification Institute (CSI) MasterFormat code 09 84 33.

Stratus³ panels are traditional lay-in ceiling tiles designed to work with a traditional T-bar ceiling grid. They are finished either with a painted pre-coated fiberglass veil or with a choice of fabrics.

Supercluster³ ceiling panels are custom-manufactured in a wide variety of shapes and sizes. The fiberglass core panels have resin-hardened edges and are finished with a painted pre-coated fiberglass veil.

Baffles³ are linear acoustical panel systems that can run vertically or horizontally and be applied to ceilings and/or walls. Baffles are available in three different finish options including micro-perforated wood veneer, fabric and paint-coated.

2.3. MATERIAL COMPOSITION

The raw material inputs are presented for 1" panels and for 2" panels in the tables below. For details on material content, please refer to the Health Product Declaration (HPD[®]) available at <http://www.hpd-collaborative.org/hpd-public-repository/>



³ Stratus, Supercluster and Baffle panels are classified under the United Nations Standard Products and Services Code (UNSPSC) 30161602 and 30161601, and the Construction Specification Institute (CSI) MasterFormat code 09 51 13 and 09 51 23.



Material composition of Sky Acoustics' 1" panels per declared product

Materials/Components	Aura 1" Panels	Nexus and Stratus - Fabric Finish 1"			Stratus - Coated Finish 1" Panels	SuperCluster and Baffles - Veneer or Coated Finish and Legno 1" Panels			Loha 1" Panels
	%	% weighted average	% min	% max	%	% weighted average	% min	% max	%
Fiberglass	44.09%	64.59%	(53.89% - 71.68%)	78.66%	44.12%	(37.32% - 49.91%)	33.07%		
High-density fiberglass (HDF)	8.82%	3.36%	(0.00% - 11.31%)	0.00%	14.78%	(9.04% - 19.96%)	0.00%		
Adhesive	18.08%	8.96%	(5.79% - 12.86%)	8.65%	17.61%	(11.94% - 21.43%)	5.42%		
Resin spot	0.07%	5.17%	(0.00% - 5.52%)	0.00%	1.15%	(0.00% - 3.62%)	2.65%		
Vapor barrier	0.28%	0.00%	(0.00% - 0.45%)	0.49%	0.09%	(0.00% - 0.28%)	0.21%		
Metal extrusion	21.17%	0.00%	(0.00% - 0.00%)	0.00%	9.71%	(0.00% - 21.69%)	15.87%		
Pre-coated veil	3.97%	2.79%	(0.00% - 3.23%)	3.54%	2.44%	(0.00% - 4.18%)	0.00%		
Resin edge	0.00%	3.88%	(3.23% - 4.30%)	4.72%	4.61%	(0.00% - 9.95%)	0.00%		
High-density scrim	0.00%	0.00%	(0.00% - 7.88%)	0.00%	0.00%	(0.00% - 0.00%)	0.00%		
Perforated co-polymer	0.00%	1.21%	(0.00% - 24.36%)	0.00%	0.00%	(0.00% - 0.00%)	0.00%		
Plastic spline	0.00%	0.00%	(0.00% - 0.00%)	0.00%	0.00%	(0.00% - 0.00%)	0.00%		
Adhesive #2	0.00%	0.37%	(0.34% - 0.45%)	0.00%	0.18%	(0.00% - 0.60%)	0.45%		
Face finish - paint	2.20%	0.00%	(0.00% - 0.00%)	3.93%	2.98%	(0.00% - 4.99%)	0.00%		
Face finish - fabric	0.00%	7.75%	(6.47% - 8.60%)	0.00%	0.00%	(0.00% - 0.00%)	0.00%		
Face finish - wood veneer	0.00%	0.00%	(0.00% - 0.00%)	0.00%	1.15%	(0.00% - 14.93%)	0.00%		
Face finish - metal	0.00%	0.00%	(0.00% - 0.00%)	0.00%	0.00%	(0.00% - 0.00%)	41.34%		
Clear lacquer	0.00%	0.00%	(0.00% - 0.00%)	0.00%	0.57%	(0.00% - 2.61%)	0.00%		
Hardware (steel)	1.32%	1.94%	(0.00% - 2.07%)	0.00%	0.62%	(0.00% - 1.36%)	0.99%		
TOTAL	100.00%	100.00%		100.00%	100.00%		100.00%		



Material composition of Sky Acoustics' 2" panels per declared product

Materials/Components	Aura 2" Panels	Nexus and Stratus - Fabric Finish 2" Panels			Baffles - Fabric Finish 2" Panels	SuperCluster and Baffles - Veneer or Coated Finish 2" Panels		
	%	% weighted average	% min	% max	%	% weighted average	% min	% max
Fiberglass	57.72%	74.33%	(66.62% - 79.96%)	42.90%	47.53%	(46.95% - 64.28%)		
High-density fiberglass (HDF)	6.27%	3.04%	(0.00% - 7.48%)	9.33%	10.33%	(10.21% - 13.97%)		
Adhesive	12.86%	6.17%	(3.89% - 8.50%)	18.65%	15.25%	(10.21% - 16.54%)		
Resin spot	0.05%	3.23%	(0.00% - 3.40%)	0.00%	0.00%	(0.00% - 0.00%)		
Vapor barrier	0.20%	0.00%	(0.00% - 0.27%)	0.00%	0.00%	(0.00% - 0.00%)		
Metal extrusion	17.57%	0.60%	(0.00% - 0.60%)	9.33%	10.25%	(0.00% - 10.34%)		
Pre-coated veil	2.82%	1.82%	(0.00% - 1.96%)	1.87%	1.66%	(0.00% - 3.14%)		
Resin edge	0.00%	5.05%	(4.53% - 5.43%)	8.86%	9.75%	(2.10% - 9.82%)		
High-density scrim	0.00%	0.00%	(0.00% - 4.94%)	0.00%	0.00%	(0.00% - 0.00%)		
Perforated co-polymer	0.00%	0.00%	(0.00% - 16.36%)	0.00%	0.00%	(0.00% - 10.00%)		
Plastic spline	0.00%	0.00%	(0.00% - 0.00%)	2.80%	0.00%	(0.00% - 0.00%)		
Adhesive #2	0.00%	0.30%	(0.27% - 0.33%)	0.37%	0.08%	(0.00% - 0.41%)		
Face finish - paint	1.57%	0.00%	(0.00% - 0.00%)	0.00%	2.41%	(0.00% - 3.93%)		
Face finish - fabric	0.00%	4.85%	(4.34% - 5.21%)	5.60%	0.00%	(0.00% - 0.00%)		
Face finish - wood veneer	0.00%	0.00%	(0.00% - 0.00%)	0.00%	2.04%	(0.00% - 10.21%)		
Face finish - metal	0.00%	0.00%	(0.00% - 0.00%)	0.00%	0.00%	(0.00% - 0.00%)		
Clear lacquer	0.00%	0.00%	(0.00% - 0.00%)	0.00%	0.36%	(0.00% - 1.79%)		
Hardware (steel)	0.94%	1.21%	(0.00% - 1.27%)	0.31%	0.34%	(0.00% - 0.34%)		
TOTAL	100.00%	100.00%		100.00%	100.00%			



2.4. PRODUCT APPLICATION

Sky Acoustics' acoustical panels are used as ceiling or wall panels in commercial applications and occasionally in residential applications. More precisely, Aura and Stratus panels are designed for ceiling applications, while Nexus panels are designed to be used as wall panels. Loha panels are used as wall or ceiling panels. Baffles and Supercluster panels, on the other hand, are designed to be used as baffles and/or clouds. Finally, Legno panels can be used in all types of applications.

2.5. TECHNICAL DATA AND PLACING ON THE MARKET

Sky Acoustics' panels have been tested according to different test methods listed below.

Test Method	Aura	Nexus	Stratus	SuperCluster	Baffles	Legno	Loha
Noise Reduction Coefficient (ASTM C423)	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Luminous Reflectance (ASTM E1477-98a) Panels with Aura white paint only	90%	n/a	90%	90%	90%	n/a	n/a
Flame Spread Rating (CAN/ULC-S102:2018)	25	25	25	25	25	Test underway	0
Smoke Development Classification (CAN/ULC-S102:2018)	40	40	40	40	40	Test underway	30
Fire Rating (ASTM E84)	Class A	Class A	Class A	Class A	Class A	Class A	Class A

2.6. PROPERTIES OF THE DECLARED PRODUCT AS DELIVERED

Panels can be customized to any size, but are available in a maximum size of 60" x 120" (1524 mm x 3048 mm) for Aura panels, 48" x 96" (1219 mm x 2438 mm) for Nexus Acoustical, Nexus High Impact, Nexus High Impact Ultimate, Nexus Nova, Supercluster, Legno and Loha panels, 48" x 60" (1219 mm x 1524 mm) for Stratus panels and 24" x 96" (609 mm x 2438 mm) for Baffles. Panels are available either in 1" or 2" thicknesses, except for Legno and Loha panels which are only available in 1" thick panels. Actual panel thickness for 1" and 2" panels vary from 1" to 1-1/8" and from 2" to 2-1/8", respectively.

Various mounting systems are available depending on the panel type and installation requirements.

More details are available at www.sky-acoustics.com.

2.7. MANUFACTURING

To prepare the acoustical ceiling and wall panels, Sky Acoustics first laminates the supplied fiberglass to the appropriate material, before cutting the panels to size. Additional panel material is installed prior to framing the panels with structural edges. Then, the panels are finished and the face finish is applied whether it is paint, fabric, veneer or a metal cover. Finally, the mounting hardware is installed and the panels are packaged to be ready for shipment.

2.8. PRODUCT INSTALLATION

Products should be processed and installed according to industry standards and according to applicable building codes.

2.9. PACKAGING

Panels are packaged in wooden crates fabricated from 1"x2" pine boards and 1/8" MDF-lined with 1/2" Styrofoam. Each panel is wrapped in a thin polystyrene foam and placed in the crate face-to-face and back-to-back. Any gaps between the panels and the crate are supported by Styrofoam to eliminate any movement. The crate is assembled using wood screws and secured using 1/2" metal strapping.

2.10. REFERENCE SERVICE LIFE AND CONDITION OF USE

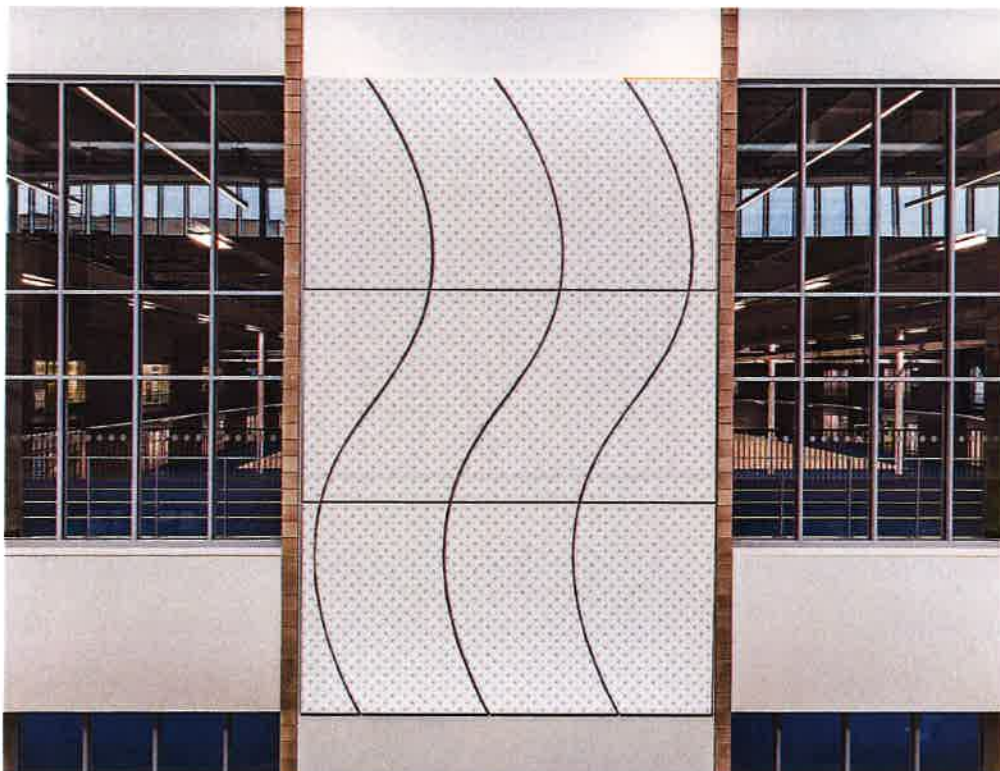
For this EPD, the system boundaries encompass a cradle-to-gate scope. Environmental impacts of products in the use phase are excluded from this declaration, per PCR Part B: Non-Metal Ceiling and Interior Wall Panel EPD Requirements.

2.11. RE-USE PHASE

The product may be re-used if still in good condition.

2.12. DISPOSAL

At their end-of-life, panels are sent to landfill.



3. LCA CALCULATION RULES

3.1. DECLARED UNIT

The selected declared unit (DU) for this study is 0.093 m² (1 ft²) of acoustical wall and/or ceiling panels.

Declared Unit of studied products, panel thickness, surface weight and density

	Unit	Aura 1" Panels	Nexus and Stratus - Fabric Finish 1" Panels*	Stratus - Coated Finish 1" Panels	SuperCluster and Baffles - Veneer or Coated Finish and Legno 1" Panels*	Loha 1" Panels
Declared unit (DU)	m ²	0.093	0.093	0.093	0.093	0.093
	(ft ²)	(1)	(1)	(1)	(1)	(1)
Declared thickness	cm	2.70	2.59	2.70	2.65	2.54
	(inches)	1 1/16	1 1/64	1 1/16	1 3/64	1
Surface weight per declared unit	kg/m ²	6.10	4.17	3.42	6.10	8.14
	kg/0.093 m ²	0.568	0.387	0.318	0.567	0.757
Density per declared unit	(lbs/ft ²)	1.250	0.853	0.701	1.249	1.667
	kg/m ³	226	161	127	230	320
	(lbs/ft ³)	14.12	10.03	7.91	14.35	20.00

*: weighted average

Declared Unit of studied products, panel thickness, surface weight and density (cont'd)

	Unit	Aura 2" Panels	Nexus and Stratus - Fabric Finish 2" Panels*	Baffles - Fabric Finish 2" Panels	SuperCluster and Baffles - Veneer or Coated Finish 2" Panels*
Declared unit (DU)	m ²	0.093	0.093	0.093	0.093
	(ft ²)	(1)	(1)	(1)	(1)
Declared thickness	cm	5.24	5.14	5.08	5.08
	(inches)	2 1/16	2 1/64	2 1/16	2
Surface weight per declared unit	kg/m ²	8.58	6.66	11.54	10.42
	kg/0.093 m ²	0.798	0.620	1.073	0.969
Density per declared unit	(lbs/ft ²)	1.757	1.364	2.364	2.133
	kg/m ³	164	130	227	205
	(lbs/ft ³)	10.22	8.09	14.18	12.79

*: weighted average

3.2. PRODUCTION AVERAGE

In this EPD, some products were grouped as they were similar in their composition and/or their impact results. This was done to protect the confidentiality of the product’s detail composition even though the environmental impact indicators resulted, in some instances, in differences greater than ±10%.

The weighted average profile of the products is calculated based on Sky Acoustics’ 2021 total panel area production. There are four weighted average product groups:

- 1) Nexus Acoustical, Nexus High Impact, Nexus High Impact Ultimate, Nexus Nova and Stratus - Fabric Finish 1” panels
- 2) SuperCluster, Baffles – Coated Finish, Baffles – Wood Veneer Finish and Legno 1” panels
- 3) Nexus Acoustical, Nexus High Impact, Nexus High Impact Ultimate, Nexus Nova and Stratus - Fabric Finish 2” panels
- 4) SuperCluster, Baffles – Coated Finish, Baffles – Wood Veneer Finish and Legno 2” panels

3.3. SYSTEM BOUNDARIES

The system boundaries are **cradle-to-gate**, i.e., only cover the production life cycle stage as illustrated in Table 1. Within this life cycle stage, three (3) modules are considered, namely A-1) Extraction and Upstream Production, A-2) Transport to Factory and A-3) Manufacturing. Construction (A-4; A-5), Use (B-1 to B-7) and End-of-life (C-1 to C-4) stages are not included in this EPD. Figure 1 presents the process flow diagram for Sky Acoustics’ acoustical panels. Neither green power nor CO₂ credits are used in the framework of this project.

Table 1: Description of the system boundary life cycle stages and related information modules

PRODUCTION STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END-OF-LIFE STAGE			
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Extraction and Upstream Production	Transport to Factory	Manufacturing	Transport to Site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction / Demolition	Transport to Waste Processing or disposal	Waste Processing	Disposal of Waste
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Key: X = included; MND = module not declared (excluded)

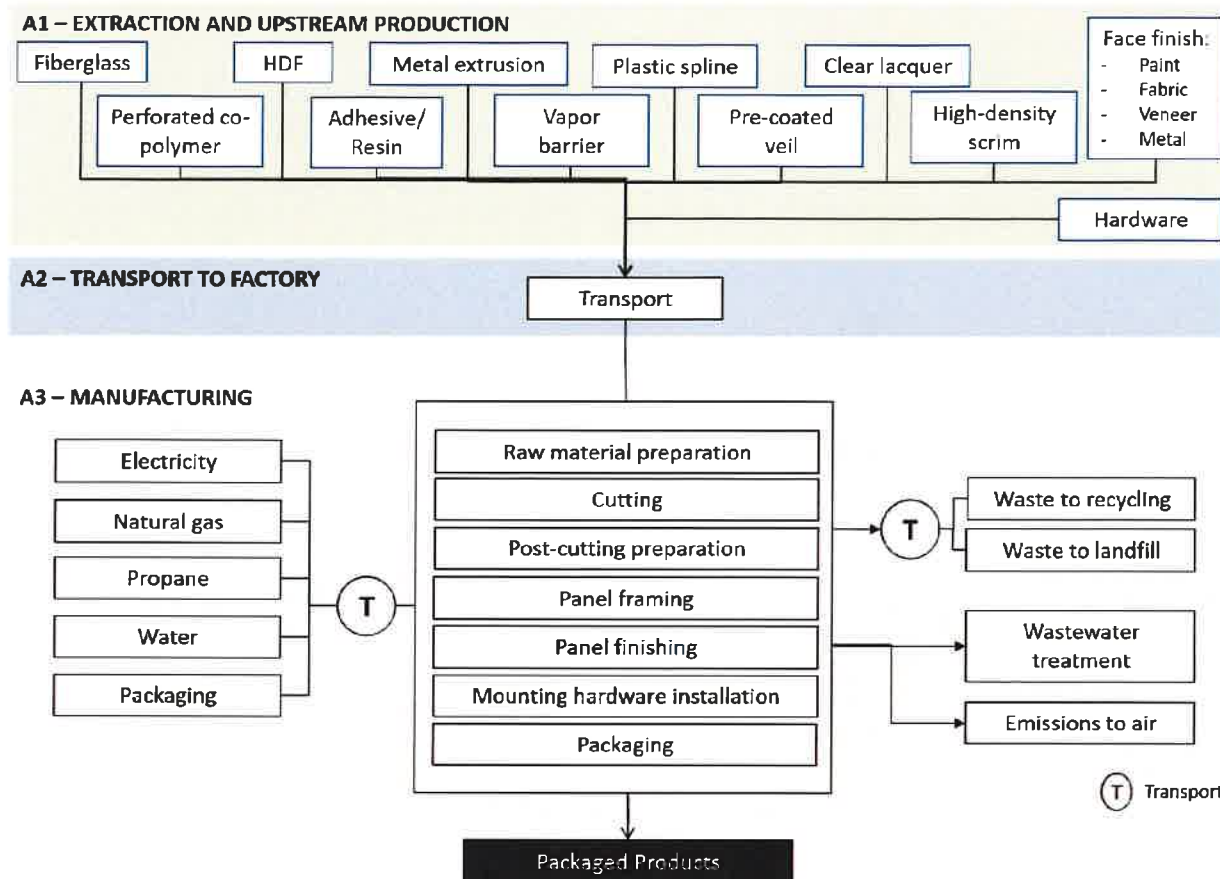


Figure 1: System Boundaries of Cradle-to-Gate LCA of Sky Acoustics' Acoustical Ceiling and Wall Panels.

Extraction and Upstream Production: This module includes the extraction and transformation of raw materials needed to produce the acoustical ceiling and wall panels.

Transport to Factory: This module includes the transportation of raw materials from Sky Acoustics' suppliers to their facility located in Concord (Ontario).

Manufacturing: This stage includes energy (electricity, propane, natural gas) consumption for manufacturing processes and production waste, which is either recycled or sent to landfill. Emissions to air from adhesive application (VOC) have also been considered. There is no water consumption during the production process.

Finally, packaging materials, to make products ready for shipment, as well as their transport to Sky Acoustics' manufacturing plant, are covered by this stage.

3.4. CUT-OFF CRITERIA

No known flows are deliberately excluded from this study.

For this study, no data on the construction, maintenance or dismantling of the capital assets, daily transport of the employees, office work, business trips and other activities from Sky Acoustics' employees was included in the model. The model only takes into account the processes associated with infrastructure that are already included in the *ecoinvent* unit processes.

3.5. ALLOCATION

Data was provided for the whole manufacturing plant; thus, **mass allocation** was used for energy input, water flows, waste flows and packaging.

Waste processing of the material flows undergoing recycling processes are included up to the system boundary of the end-of-waste state.[5] In other words, a **cut-off approach** was used as further processing of the recycled material is part of raw material preparation of another product system (**open-loop recycling**).

3.6. DATA SOURCES AND QUALITY REQUIREMENTS

Data Quality Parameter	Data Quality Discussion
Source of manufacturing data	Manufacturing data was collected from Sky Acoustics’ manufacturing facility located in Concord (Ontario). This data included total annual mass and area of products under study: raw materials entering the production of the products under study, losses of materials, transport distance of materials, energy consumption, water consumption, waste treatment, and packaging for the whole manufacturing facility.
Source of secondary data	Background data were taken from published EPDs, the US LCI database , which is specific to a North American context, or the ecoinvent 3.8 “cut-off” database.[6][7] Datasets or EPDs were selected based on their representativeness of the products’ components. When appropriate for the database dataset, the grid mix was changed for the grid mix of the province or country where production takes places. Otherwise, ecoinvent data representative of the global market or “rest-of-the-world” were selected as proxies.
Geographical representativeness	The manufacturing facility is based in the province of Ontario; hence electricity consumption is based on the consumption ratio of the Ontario grid mix. Geographical correlation of the material supply and the selected datasets are largely representative of the same area. When this was not possible, datasets representing a larger geographical area were taken.
Temporal representativeness	Primary data represents the 2021 production year. Life cycle inventory datasets selected from published EPDs were published within the last ten years, although this is not always the case for ecoinvent and US LCI datasets. Nevertheless, ecoinvent and US LCI remain reference LCI databases.
Technological representativeness	Primary data, obtained from the manufacturer, is representative of the current technologies and materials used by this company.
Completeness	All relevant process steps were considered and modelled to satisfy the goal and scope. No known flows were cut off.

4. LIFE CYCLE ASSESSMENT RESULTS

4.1. RESULTS TABLES

It should be noted that Life Cycle Impact Assessment (LCIA) results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The LCIA results for 0.093 m² (1 ft²) of acoustical wall and/or ceiling panels using TRACI, as well as primary energy consumption, consumption of renewable and non-renewable materials, water consumption, and waste generation and presented in the tables below. The six TRACI impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, EPD users shall not use additional measures for comparative purposes.



Environmental indicator		Unit
TRACI 2.1		
AP	Acidification potential	kg SO ₂ eq
EP	Eutrophication potential	kg N eq
GWP-AR4	Global warming potential based on IPCC 2007 (AR4)	kg CO ₂ eq
GWP-AR5	Global warming potential based on IPCC 2013 (AR5)	kg CO ₂ eq
ODP	Ozone depletion potential	kg CFC-11 eq
SFP	Smog formation potential	kg O ₃ eq
ADP-f	Abiotic Resource Depletion Potential of Non-renewable (fossil) energy resources	MJ Surplus
Resource use		
RPR _E	Renewable primary resources used as energy carrier (fuel)	MJ, LHV
RPR _M	Renewable primary resources with energy content used as material	MJ, LHV
RPR _T	Total renewable primary resources	MJ, LHV
NRPR _E	Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV
NRPR _M	Non-renewable primary resources with energy content used as material	MJ, LHV
NRPR _T	Total non-renewable primary resources	MJ, LHV
SM	Secondary materials	MJ, LHV
RSF	Renewable secondary fuels	MJ, LHV
NRSF	Non-renewable secondary fuels	MJ, LHV
RE	Recovered energy	MJ, LHV
FW	Use of net fresh water resources	m ³
Output flows and waste categories		
HWD	Hazardous waste disposed	kg
NHWD	Non-hazardous waste disposed	kg
HLRW	High-level radioactive waste, conditioned, to final repository	m ³
ILLRW	Intermediate- and low-level radioactive waste, conditioned, to final repository	m ³
CRU	Components for re-use	kg
MR	Materials for recycling	kg
MER	Materials for energy recovery	kg
EE	Recovered energy exported from the product system	MJ, LHV

LCIA results for 1 ft² of 1" acoustical panels (A1-A3)

Environmental indicator	Unit	Aura 1" Panels	Nexus and Stratus Fabric Finish 1" Panels	Loha Panels	Stratus Coated Finish 1" Panels	Supercluster, Baffles Coated Finish, Baffles Veneer Finish and Legno 1" Panels
		A1-A3 (per ft ²)	A1-A3 (per ft ²)	A1-A3 (per ft ²)	A1-A3 (per ft ²)	A1-A3 (per ft ²)
TRACI 2.1						
AP	kg SO ₂ eq	1.70E-02	1.07E-02	3.16E-02	8.37E-03	1.62E-02
EP	kg N eq	1.55E-03	1.56E-03	1.80E-03	8.19E-04	1.58E-03
GWP-AR4 ⁽¹⁾⁽³⁾	kg CO ₂ eq	3.44E+00	2.40E+00	6.30E+00	1.73E+00	3.38E+00
GWP-AR5 ⁽²⁾⁽³⁾	kg CO ₂ eq	3.49E+00	2.43E+00	6.35E+00	1.76E+00	3.42E+00
ODP	kg CFC-11 eq	2.52E-08	2.84E-08	3.55E-08	1.33E-08	2.82E-08
SFP	kg O ₃ eq	1.82E-01	1.30E-01	3.38E-01	8.70E-02	1.86E-01
ADP fossil fuels	MJ Surplus	5.80E+00	5.08E+00	9.15E+00	3.15E+00	6.07E+00
Resource use						
RPR _E ⁽¹⁾	MJ, LHV	8.41E+00	3.38E+00	2.36E+01	2.69E+00	6.90E+00
RPR _M ⁽²⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.98E-01
RPR _T	MJ, LHV	8.41E+00	3.38E+00	2.36E+01	2.69E+00	7.20E+00
NRPR _E ⁽³⁾	MJ, LHV	6.06E+01	4.49E+01	9.65E+01	3.28E+01	6.78E+01
NRPR _M ⁽⁴⁾	MJ, LHV	1.37E+00	2.97E+00	9.24E-01	6.94E-01	2.12E+00
NRPR _T	MJ, LHV	6.20E+01	4.79E+01	9.75E+01	3.35E+01	7.00E+01
SM	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW ⁽⁵⁾	m ³	2.68E-02	1.91E-02	3.00E-02	1.65E-02	5.53E-02
Output flows and waste categories						
HWD ⁽¹⁾	kg	2.81E-03	3.15E-03	3.07E-03	1.75E-03	3.41E-03
NHWD ⁽²⁾	kg	8.34E-01	1.21E+00	1.53E+00	3.00E-01	6.71E-01
HLRW ⁽³⁾	m ³	2.43E-07	3.36E-07	3.33E-07	1.21E-07	3.73E-07
ILLRW ⁽⁴⁾	m ³	3.88E-08	2.90E-08	4.97E-08	2.26E-08	3.99E-08
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR ⁽⁵⁾	kg	4.79E-03	2.30E-03	0.00E+00	2.40E-03	2.95E-03
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00



LCIA results for 1 ft² of 2'' acoustical panels (A1-A3)

Environmental indicator	Unit	Aura 2'' Panels	Nexus and Stratus Fabric Finish 2'' Panels	Baffles Fabric Finish 2'' Panels	Supercluster, Baffles Coated Finish and Baffles Veneer Finish 2'' Panels
		A1-A3 (per ft ²)	A1-A3 (per ft ²)	A1-A3 (per ft ²)	A1-A3 (per ft ²)
TRACI 2.1					
AP	kg SO ₂ eq	2.37E-02	1.70E-02	2.84E-02	2.59E-02
EP	kg N eq	2.05E-03	2.10E-03	3.39E-03	2.41E-03
GWP-AR4 ⁽¹⁾⁽³⁾	kg CO ₂ eq	4.85E+00	3.74E+00	6.14E+00	5.47E+00
GWP-AR5 ⁽²⁾⁽³⁾	kg CO ₂ eq	4.91E+00	3.79E+00	6.23E+00	5.54E+00
ODP	kg CFC-11 eq	3.16E-08	3.67E-08	1.51E-07	3.48E-08
SFP	kg O ₃ eq	2.52E-01	1.98E-01	3.55E-01	2.94E-01
ADP fossil fuels	MJ Surplus	8.07E+00	7.39E+00	1.23E+01	9.82E+00
Resource use					
RPR _E ⁽¹⁾	MJ, LHV	1.10E+01	5.40E+00	1.19E+01	1.03E+01
RPR _M ⁽²⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	8.20E-01
RPR _T	MJ, LHV	1.10E+01	5.40E+00	1.19E+01	1.11E+01
NRPR _E ⁽³⁾	MJ, LHV	8.56E+01	6.96E+01	1.12E+02	9.97E+01
NRPR _M ⁽⁴⁾	MJ, LHV	1.37E+00	3.27E+00	9.65E+00	3.87E+00
NRPR _T	MJ, LHV	8.69E+01	7.29E+01	1.22E+02	1.04E+02
SM	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW ⁽⁵⁾	m ³	3.68E-02	2.95E-02	4.81E-02	1.12E-01
Output flows and waste categories					
HWD ⁽¹⁾	kg	3.65E-03	3.94E-03	7.58E-03	5.78E-03
NHWD ⁽²⁾	kg	9.93E-01	1.34E+00	2.79E+00	9.69E-01
HLRW ⁽³⁾	m ³	2.62E-07	4.09E-07	7.39E-07	6.29E-07
ILLRW ⁽⁴⁾	m ³	5.52E-08	4.59E-08	7.74E-08	6.65E-08
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR ⁽⁵⁾	kg	4.79E-03	2.40E-03	4.26E-03	3.43E-03
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table Notes – TRACI 2.1

- (1): $RPRE = RPRT - RPRM$, where RPRT is equal to the value for renewable energy obtained using the CED LHV methodology.
- (2): TRACI v2.1 indicator updated with IPCC 2013 (AR5) 100 years.
- (3): Biogenic carbon dioxide emissions and removals are not considered, i.e., their characterization factor is 0 kg CO₂ eq./kg CO₂

Table Notes – Resource use

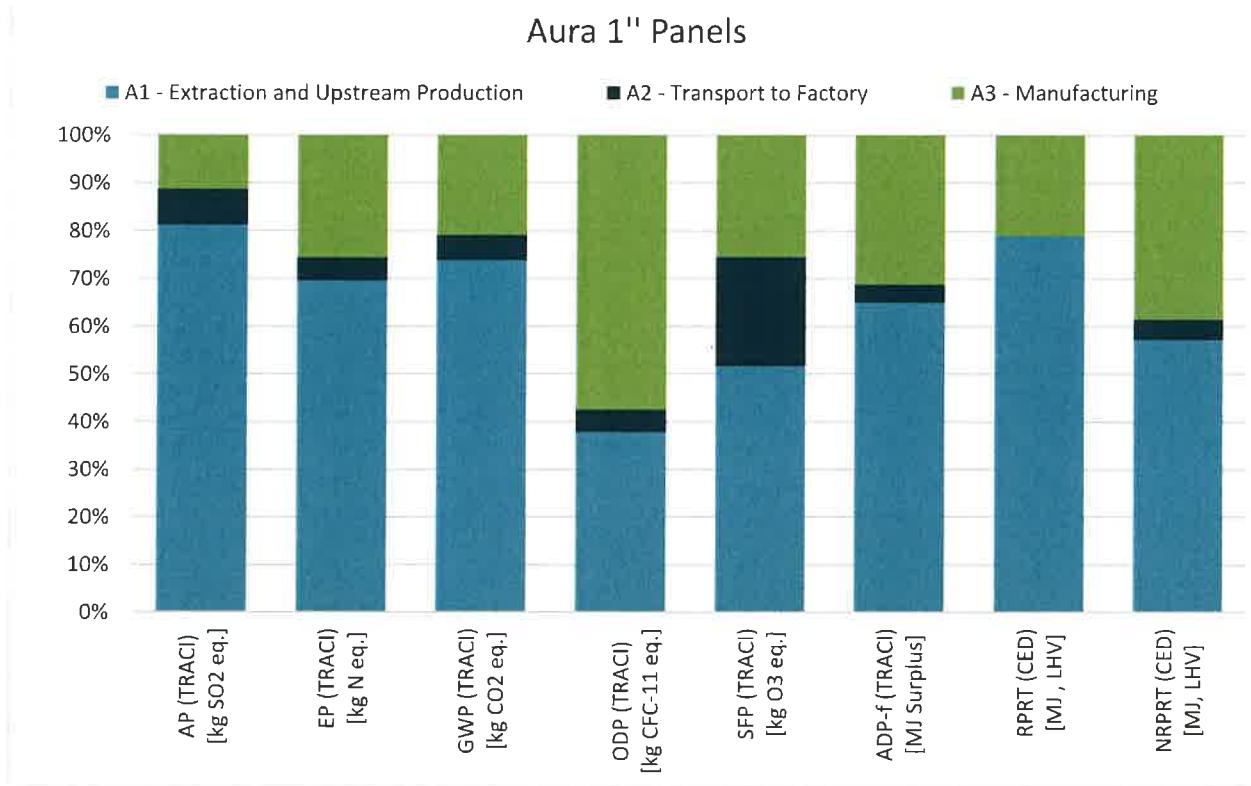
- (1): $RPRE = RPRT - RPRM$, where RPRT is equal to the value for renewable energy obtained using the CED LHV methodology.
- (2): Calculated as per ACLCA ISO 21930 Guidance, 6.2 Renewable primary resources with energy content used as a material, RPRM.
- (3): $NRPRE = NRPRM - NRPRM$, where NRPRM is equal to the value for non-renewable energy obtained using the CED LHV methodology.
- (4): Calculated as per ACLCA ISO 21930 Guidance, 6.4 Non-renewable primary resources with energy content used as a material, NRPRM.
- (5): FW Represents consumption of water and not use. Sky Acoustics does not consume water in its process.

Table Notes – Output flows and waste categories

- (1): Calculated from life cycle inventory results, based on datasets marked as "hazardous" and EPD values.
- (2): Calculated from life cycle inventory results, based on waste that is neither "hazardous" nor "radioactive" and EPD values.
- (3): Calculated from life cycle inventory results, based onecoinvent waste flow "high-level radioactive waste for final repository" and EPD values.
- (4): Calculated from life cycle inventory results, based onecoinvent waste flow "low-level radioactive waste for final repository" and EPD values.
- (5): Calculated based on the amounts leaving the system boundary when they have reached the end-of-waste state.

4.2. CONTRIBUTION ANALYSIS

Whichever the panel type or thickness, Extraction and Upstream Production (A1) is the main contributor to all impact categories and energy consumption, except for ozone layer depletion potential where it is either Extraction and Upstream Production (A1) or Manufacturing (A3) which is the main contributor. It should be noted that Transport to Factory (A2) is a large contributor to smog formation potential as its contribution is almost equal to that of Extraction and Upstream Production (A1) in some cases.



Aura 1" panels contribution of module A1-A3 to the production life cycle stage potential environmental impacts

5. ADDITIONAL ENVIRONMENTAL INFORMATION

5.1. ENVIRONMENT AND HEALTH DURING MANUFACTURING

Safety is a core value at Sky Acoustics. All appropriate equipment is used and in place at the production facility to make sure employees go home each and every night to their loved ones.

5.2. ENVIRONMENT AND HEALTH DURING USE

Sky Acoustics' acoustical panels are not expected to produce any hazard during normal use.

5.3. EXTRAORDINARY EFFECTS

No extraordinary effects are to be reported.

5.4. FURTHER INFORMATION

Sky Acoustics Inc. is a family-run business that knows and understands that how we treat our planet today affects our children tomorrow. Their commitment to making their products greener is in every process and supply chain selection, because ultimately, they understand that these products will be used in areas that we and our children live, work, and play.

In addition, Sky Acoustics is part of a third-party verification process with Vertima Inc. where Sky Acoustics' products and its entire supply chain are assessed. At the end of the process, they will be receiving a Validated Eco-Declaration[®] summarizing verified environmental claims.



Sky Acoustics has also published Health Product Declarations for their products: Aura, Nexus, SuperCluster, Baffles, Legno, Loha and Stratus panels. More details are available on the HPDC public repository: <https://www.hpdcollaborative.org/hpd-public-repository/>.



6. REFERENCES

- [1] International Organization for Standardization (ISO), "ISO 14025 Environmental labels and declarations - Type III environmental declarations - Principles and procedures," 2006.
- [2] UL Environment, "Product Category Rule (PCR) Guidance for Building-Related Products and Services - Part B: Non-Metal Ceiling and Interior Wall Panel EPD Requirements, v. 2.0," 2021[Online]. Available: <https://www.ul.com/services/product-category-rules-pcrs#uledev>.
- [3] UL Environment, "Product Category Rules for Building-Related Products and Services -Part A: Life Cycle Assessment Calculation Rules and Report Requirements Version 3.2," 2018[Online]. Available: <https://www.ul.com/offerings/product-category-rules-pcrs#uledev>.
- [4] International Organization for Standardization (ISO), "ISO 14044:2006/AMD1:2017/AMD 2:2020 Environmental management - Life cycle assessment - Requirements and guidelines," 2006.
- [5] International Organization for Standardization (ISO), "ISO 21930:2017(E) Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services," 2017.
- [6] National Renewable Energy Laboratory, "U.S. Life Cycle Inventory Database," 2012. [Online]. Available: <https://www.lcacommons.gov/nrel/search>. [Accessed: 03-Feb-2020].
- [7] F. R. *et al.*, "Overview and Methodology. ecoinvent report No. 1," Dübendorf, 2007.
- [8] Vertima, "Life Cycle Assessment of Sky Acoustics' Acoustical Ceiling and Wall Panels," 2022.
- [9] ASTM International, "ASTM Program Operator Rules. Version: 8.0, Revised 04/29/20," 2020[Online]. Available: www.astm.org.



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www.sky-acoustics.com

EPD

This LCA and EPD were prepared by Vertima Inc.

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G2L 2K8 CANADA

 **vertima**
Environmental certification experts

vertima.ca

PRODUCT CERTIFICATE

Valid from: 12/2022 to 12/2025

Vertima does hereby certify that an independent assessment has been conducted on behalf of:

SKY ACOUSTICS

55 Bradwick Drive, Concord ON L4K 1K5

www.sky-acoustics.com

These products meet all the necessary qualifications to be certified for the following claims:

Recycled Content

Final product	Pre-consumer	Post-consumer
Aura Panels	15.8% - 32.0%	15.3% - 34.5%
Baffle - Coated Finish Panels	10.9% - 26.6%	14.2% - 29.7%
Baffle - Fabric Finish Panels	9.2% - 28.4%	12.0% - 32.1%
Baffle - Wood Veneer Finish Panels	10.6% - 26.3%	13.8% - 29.4%
Legno Panels	16.7% - 32.1%	16.2% - 29.3%
Loha Panels	9.5% - 20.8%	10.5% - 20.1%
Nexus Acoustical Panels	0.0% - 30.5%	18.6% - 48.6%
Nexus High Impact Panels	4.6% - 30.0%	17.5% - 44.3%
Nexus Nova Panels	0.0% - 26.0%	14.5% - 41.4%
Nexus High Impact Ultimate Panels	0.0% - 29.6%	17.7% - 47.1%
Stratus - Coated Finish Panels	0.0% - 28.7%	21.2% - 47.3%
Stratus - Fabric Finish Panels	0.0% - 31.3%	19.4% - 49.7%
Supercluster Panels	8.2% - 27.6%	17.5% - 38.8%

Conforms to the Vertima's procedure: VERT-032008-02, Second Edition



Environmental certification experts

Certificate # VERT-RC22-1099-01



Josée Lupien,
LEED Fellow & WELL AP
President of Vertima Inc.
www.vertima.ca



PRIOR APPROVAL REQUEST:

January 13, 2025

VIA Email: Jennisse.waters@montana.edu

Pages: 1 including cover

Jackola Engineering
705 Osterman Dr Unit B
Bozeman, MT 59715

Reviewed
Jennisse Waters, AIA, MSU

RE: **MSU Classroom Improvements**
Bozeman, MT

01/14/2025 4:13:50 PM

ATTN: **Jennisse Waters**

This letter is in regards for prior approval to bid equipment on the above referenced project. Please see specifics below.

Specification 233100 – Metal Ducts: Omniduct

Specification 233100 – Underground Duct: Simtech

Specification 233700 – Grilles Registers and Diffusers: Nailor Industries

Specification 233300 – Unit Ventilators: Magic Aire

If any information is required on the above-listed equipment, please advise and it will be forwarded immediately.

Respectfully,

S. CONLEY SALES, INC.

Gary Wambeke