ICC EVALUATION SERVICE®

ENVIRONMENTAL PRODUCT DECLARATION

Standing Seam Panel (Painted Galvanized), Standing Seam Panel (Painted Zincalume), Standing Seam Panel (Painted Aluminum), Exposed Fastener Panel (Painted Galvanized), Exposed Fastener Panel (Painted Zincalume), Exposed Fastener Panel (Painted Aluminum), Concealed Fastener Siding (Painted Galvanized), Concealed Fastener Siding (Painted ZIncalume),

TAYLOR METAL PRODUCTS

According to ISO 14025

Taylor Metal Products is a leading and prominent sheet metal panel manufacturer and is committed to supplying contractors with the most modern, high-quality metal roofs in the industry. Residential metal roofing has been its specialty since 1985. Furthermore, Taylor Metal offers a wide range of metal roofing and metal siding supplies for residential, commercial, and agricultural applications. Taylor Metal products effectively mitigate solar heat absorption, resulting in reduced cooling energy consumption and promoting sustainability.

This EPD reports on various metal roofing panels and siding, including Standing Seam Metal Panels, Exposed Fastener Panels, and Concealed Fastener Siding manufactured at the Taylor Metal Products facility situated in Riverside, California.

This level of study is in accordance with EPD Product Category Rule (PCR) for Metal Panel published by UL Environment entitled, 'Guidance for Building-Related Products and Services, Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels; International Standards Organization (ISO) 14025:2006 Environmental labels and declarations, Type III environmental declarations-Principles and procedures; ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services; ISO 14044:2006 Environmental management, Life cycle assessment- Requirements and guidelines; and ISO 14040:2006 Environmental management, Life cycle assessment-Principles and framework. The performance of this study and its subsequent publishing is in alignment with the business-to-business (B2B) communication requirements for the environmental assessment of building products. The study does not intend to support comparative assertions and is intended to be disclosed to the public.

This study was commissioned to differentiate Taylor Metal Products from their competition for the following reasons: generate an advantage for the organization; offer customers information to help them make informed product decisions; improve the environmental performance of Taylor Metal Products by continuously measuring, controlling and reducing the environmental impacts of their products; help project facilitators working on Leadership in Energy and Environmental Design (LEED) projects achieve their credit goal; and to strengthen Taylor Metal Products' license to operate in the community. The intended audience for this study is Taylor Metal Products' employees, their suppliers, project specifiers of their products, architects, and engineers. The EPD report is also available for policymakers, government officials interested in sustainability, academic professors,

Table 1: LCA Results Summary

Standing Seam Panel (Painted Galvanized)

Amount Per Serving – **100 m2 of Average Metal Panel Product**

LCA IMPACT MEASURES	TOTAL
Primary Energy (MJ)	**2.30E+03**
Global Warming Potential ($kgCO_2$ equivalent)	**1.00E+03**
Ozone Depletion (kg CFC^- 11 equivalent)	**1.17e-05**
Eutrophication Potential (kg N equivalent)	**7.07E+00**
Acidification Potential (kg SO_2 equivalent)	**2.89E+01**
Photochemical Oxidant Creation Potential (smog) (kg O_3 equivalent)	**7.05E+01**
PERFORMANCE ATTRIBUTES	
Fire-Rated (ASTM E108): Class A	
Modulus of Elasticity: 200000 MPa	
Further performance attributes are detailed in Table 3	

Product Ingredients: The product is mainly composed of iron, zinc and aluminum with galvanized coating.

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Standing Seam Panel (Painted Zincalume)

Amount Per Serving – **100 m2 of Average Metal Panel Product**

LCA IMPACT MEASURES	TOTAL
Primary Energy (MJ)	**2.24E+03**
Global Warming Potential ($kgCO_2$ equivalent)	**9.81E+02**
Ozone Depletion (kg CFC^- 11 equivalent)	**1.14e-05**
Eutrophication Potential (kg N equivalent)	**6.90E+00**
Acidification Potential (kg SO_2 equivalent)	**2.81E+01**
Photochemical Oxidant Creation Potential (smog) (kg O_3 equivalent)	**6.90E+01**
PERFORMANCE ATTRIBUTES	
Fire-Rated (ASTM E108): Class A	
Modulus of Elasticity : 200000 MPa	
Further performance attributes are detailed in Table 3	

Product Ingredients: The product is mainly composed of iron, zinc and aluminum with zincalume coating.

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Standing Seam Panel (Painted Aluminum)

Amount Per Serving – **100 m2 of Average Metal Panel Product**

LCA IMPACT MEASURES	TOTAL
Primary Energy (MJ)	**2.96E+03**
Global Warming Potential ($kgCO_2$ equivalent)	**1.92E+03**
Ozone Depletion (kg CFC^- 11 equivalent)	**1.18e-05**
Eutrophication Potential (kg N equivalent)	**8.42E+00**
Acidification Potential (kg SO_2 equivalent)	**1.25E+01**
Photochemical Oxidant Creation Potential (smog) (kg O_3 equivalent)	**1.35E+02**
PERFORMANCE ATTRIBUTES	
Fire-Rated (ASTM E108): Class A	
Modulus of Elasticity : 70000 MPa	
Further performance attributes are detailed in Table 3	

Product Ingredients: The product is mainly composed of iron, zinc and aluminum.

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Exposed Fastener Panel (Painted Galvanized)

Amount Per Serving – **100 m2 of Average Metal Panel Product**

LCA IMPACT MEASURES	TOTAL
Primary Energy (MJ)	**1.65E+03**
Global Warming Potential ($kgCO_2$ equivalent)	**7.21E+02**
Ozone Depletion (kg CFC^- 11 equivalent)	**8.37e-06**
Eutrophication Potential (kg N equivalent)	**5.08E+00**
Acidification Potential (kg SO_2 equivalent)	**2.08E+01**
Photochemical Oxidant Creation Potential (smog) (kg O_3 equivalent)	**5.06E+01**
PERFORMANCE ATTRIBUTES	
Fire-Rated (ASTM E108): Class A	
Modulus of Elasticity : 200000 MPa	
Further performance attributes are detailed in Table 3	

Product Ingredients: The product is mainly composed of iron, zinc and aluminum with galvanized coating.

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Exposed Fastener Panel (Painted Zincalume)

Amount Per Serving – **100 m2 of Average Metal Panel Product**

LCA IMPACT MEASURES	TOTAL
Primary Energy (MJ)	**1.61E+03**
Global Warming Potential ($kgCO_2$ equivalent)	**7.05E+02**
Ozone Depletion (kg CFC^- 11 equivalent)	**8.15e-06**
Eutrophication Potential (kg N equivalent)	**4.96E+00**
Acidification Potential (kg SO_2 equivalent)	**2.02E+01**
Photochemical Oxidant Creation Potential (smog) (kg O_3 equivalent)	**4.94E+01**
PERFORMANCE ATTRIBUTES	
Fire-Rated (ASTM E108): Class A	
Modulus of Elasticity : 200000 MPa	
Further performance attributes are detailed in Table 3	

Product Ingredients: The product is mainly composed of iron, zinc and aluminum with zincalume coating.

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Exposed Fastener Panel (Painted Aluminum)

Amount Per Serving – **100 m2 of Average Metal Panel Product**

LCA IMPACT MEASURES	TOTAL
Primary Energy (MJ)	**2.12E+03**
Global Warming Potential ($kgCO_2$ equivalent)	**1.38E+03**
Ozone Depletion (kg CFC^- 11 equivalent)	**8.47e-06**
Eutrophication Potential (kg N equivalent)	**6.04E+00**
Acidification Potential (kg SO_2 equivalent)	**8.95E+00**
Photochemical Oxidant Creation Potential (smog) (kg O_3 equivalent)	**9.67E+01**
PERFORMANCE ATTRIBUTES	
Fire-Rated (ASTM E108): Class A	
Modulus of Elasticity : 70000 MPa	
Further performance attributes are detailed in Table 3	

Product Ingredients: The product is mainly composed of iron, zinc and aluminum.

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Concealed Fastener Siding (Painted Galvanized)

Amount Per Serving – **100 m2 of Average Metal Panel Product**

LCA IMPACT MEASURES	TOTAL
Primary Energy (MJ)	**1.47E+03**
Global Warming Potential ($kgCO_2$ equivalent)	**6.40E+02**
Ozone Depletion (kg CFC^- 11 equivalent)	**7.43e-06**
Eutrophication Potential (kg N equivalent)	**4.51E+00**
Acidification Potential (kg SO_2 equivalent)	**1.84E+01**
Photochemical Oxidant Creation Potential (smog) (kg O_3 equivalent)	**4.50E+01**
PERFORMANCE ATTRIBUTES	
Fire-Rated (ASTM E108): Class A	
Modulus of Elasticity : 200000 MPa	
Further performance attributes are detailed in Table 3	

Product Ingredients: The product is mainly composed of iron, zinc and aluminum with galvanized coating.

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Concealed Fastener Siding (Painted Zincalume)

Amount Per Serving – **100 m2 of Average Metal Panel Product**

LCA IMPACT MEASURES	TOTAL
Primary Energy (MJ)	**1.43E+03**
Global Warming Potential ($kgCO_2$ equivalent)	**6.25E+02**
Ozone Depletion (kg CFC^- 11 equivalent)	**7.24e-06**
Eutrophication Potential (kg N equivalent)	**4.40E+00**
Acidification Potential (kg SO_2 equivalent)	**1.79E+01**
Photochemical Oxidant Creation Potential (smog) (kg O_3 equivalent)	**4.39E+01**
PERFORMANCE ATTRIBUTES	
Fire-Rated (ASTM E108): Class A	
Modulus of Elasticity : 200000 MPa	
Further performance attributes are detailed in Table 3	

Product Ingredients: The product is mainly composed of iron, zinc and aluminum with zincalume coating.

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Concealed Fastener Siding (Painted Aluminum)

Amount Per Serving – **100 m2 of Average Metal Panel Product**

LCA IMPACT MEASURES	TOTAL
Primary Energy (MJ)	**1.88E+03**
Global Warming Potential ($kgCO_2$ equivalent)	**1.23E+03**
Ozone Depletion (kg CFC^- 11 equivalent)	**7.52E-06**
Eutrophication Potential (kg N equivalent)	**5.37E+00**
Acidification Potential (kg SO_2 equivalent)	**7.95E+00**
Photochemical Oxidant Creation Potential (smog) (kg O_3 equivalent)	**8.59E+01**
PERFORMANCE ATTRIBUTES	
Fire-Rated (ASTM E108): Class A	
Modulus of Elasticity: 70000 MPa	
Further performance attributes are detailed in Table 3	

Product Ingredients: The product is mainly composed of iron, zinc and aluminum.

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This document is a Type III declaration by Taylor Metal Products that is certified by ICC-ES as conforming to the requirements of ISO 14025. ICC-ES has assessed that the Life Cycle Assessment (LCA) information fulfills the requirements of ISO 14040 in accordance with the instructions listed in the product category rules cited below. The intent of this document is to further the development of environmentally compatible and sustainable construction methods by providing comprehensive environmental information related to potential impacts in accordance with international standards.

Declaration Number	7fdc28ba-4a91-4221-a906-0d4f6d7007a8
Program Operator	**ICC-ES Evaluation Services, LLC** **www.icc-es.org**
Declaration Holder	Taylor Metal Products

Declared Products	▪ Standing Seam Panel (Painted Galvanized) ▪ Standing Seam Panel (Painted Zincalume) ▪ Standing Seam Panel (Painted Aluminum) ▪ Exposed Fastener Panel (Painted Galvanized) ▪ Exposed Fastener Panel (Painted Zincalume) ▪ Exposed Fastener Panel (Painted Aluminum) ▪ Concealed Fastener Siding (Painted Galvanized) ▪ Concealed Fastener Siding (Painted Zincalume) ▪ Concealed Fastener Siding (Painted Aluminum)
Declaration Type	Cradle-to-Gate.
Market of Applicability	North America
EPD Type	Manufacturer-Specific EPD
LCIA Method and Version	TRACI 2.2, IPCC 2013 (AR5), CML IA (2016) v4.8
Product Application	The intended applications of Taylor Metal's products include metal roofing and siding systems for residential, commercial, and new construction projects.
Content of the Declaration	This declaration includes the following sections: ▪ Product Definition ▪ Product Application ▪ Performance Attributes ▪ Material Content ▪ Production of Metal Panels ▪ Installation ▪ Usage ▪ Extraordinary Effects ▪ End of Life Stage ▪ Life Cycle Assessment ▪ Additional Information, Evidence, Test Certificates ▪ References

PCR Development	☐ New or Revised ✓☒ Existing
PCR Reference	ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services Product Category Rules (PCR) Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements, v 4.0, and Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels, UL10010-5 v2.0

EPD Date of Issue: **12 June 2024** | **EPD Period of Validity:** **12 June 2029**

Verification and Authorization of the Declaration

This Declaration and the rules on which the EPD is based have been examined by an independent verifier in accordance with ISO 14025.

This EPD conforms to the requirements of ISO 21930:2017.

X		**X**	
Eric J Polzin, P.E., Manager of Environmental Programs, ICC-ES	Date:	Name of Independent Verifier: Vicki Rybl - WAP Sustainability	Date:

ICC-ES certification of an Environmental Product Declaration (EPD) is not the equivalent of an ICC-ES Evaluation Report (ESR), Verification of Attributes Report (VAR), or ICC-ES Listing (ESL) for code compliance. ICC-ES certification of an EPD is limited to the requirements for Type III environmental declarations in accordance with ISO 14025 and does not apply to product performance attributes which demonstrate compliance to codes. ICC-ES certification of this EPD is not to be construed as representing aesthetics or any other attributes not specifically addressed, nor should it be construed as an ICC-ES endorsement of the subject of the EPD or a recommendation for its use. There is no warranty by ICC-ES, express or implied, as to any finding or other matter in the EPD, or as to any product covered by the EPD. The EPD holder is liable for the information and evidence on which the EPD is based.

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

Comparison of the environmental performance of metal panel and cladding products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building use phase as instructed under this PCR.

Full conformance with the PCR for metal panels and cladding allows EPD comparability only when all stages of a life cycle have been considered when they comply with all referenced standards, use the same sub-category PCR, and use equivalent scenarios with respect to construction works. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

Summary LCA Results

Product Components Related to Life Cycle Assessment

The declared metal panel products consist of a metal sheet (aluminum or steel), a protective coating, and a paint finish. The metal sheet constitutes approximately 94%–96% of the total weight for steel panels and 99.9% for aluminum panels. The protective coating comprises 3%–5% by weight, while the paint finish represents less than 0.1% of the total weight.

Scope and Boundaries of Life Cycle Assessment

This LCA assumes the impacts from products manufactured in accordance with the standards outlined in this report. This LCA is a cradle-to-gate study, and therefore, stages extending beyond the plant gate are not included in this LCA. Excluded stages include transportation of the manufactured material to the construction site; on-site construction processes and components; building (infrastructure) use and maintenance; and “end-of-life” effects.

This LCA encompasses raw material production, transport of raw materials to the production facility, and fabrication of metal panel products.

Life Cycle Assessment Summary

Declared Unit: 100 m2 of Average Metal Panel Product. Table 1 presents a summary of the LCA results.

Additional Information

Additional information regarding Taylor Metal products covered, which falls outside the scope of the LCA, is provided below. Taylor Metal Products undergoes rigorous testing to ensure compliance with industry standards and regulations. The products are certified under the following evaluations.

- ICC-ESR #5046 and 5045 with CBC-CRC Supplement, verifying compliance with applicable building codes.
- UL Evaluation Report UL ER #25913-01, ensuring adherence to safety and performance standards.

Detailed LCA Results

1.0 Product Definition

1.1 Product Definition and Performance

Taylor Metal's products are used in a variety of applications, including residential, commercial, and agricultural applications. These products are engineered to withstand extreme weather conditions, including high winds, intense sunlight, and heavy snowfall. These panels offer superior durability and weather resistance, making them ideal for achieving modern aesthetics, performance, and value in residential, commercial, and industrial building projects.

2.0 Product Application

The intended applications of Taylor Metal's products include metal roofing and siding systems for residential, commercial, and new construction projects.

2.1 Product Averaging

Metal panel products are categorized into different groups and reported as average products. These groupings were established based on the products' functional applications, material composition, and performance characteristics. Each group represents the arithmetic mean value of the metal panels it encompasses, with mass (kg)/100 m2 as the most influencing parameter.

The results reported for Taylor Metal's products in this EPD are specific to the modeled weights for each product covered in the study.

Table 2: Declared Unit

1) Standing Seam Panel (Painted Galvanized)

Parameter	Value	Unit
Declared unit	100	m2 of coverage
Product mass	460.01	kg per 100 m2
Product dimension	100	m2
Conversion factor to 1 kg, declared unit	0.002174	-

2) Standing Seam Panel (Painted Zincalume)

Declared unit	100	m2 of coverage
Product mass	439.49	kg per 100 m2
Product dimension	100	m2
Conversion factor to 1 kg, declared unit	0.002275	-

3) Standing Seam Panel (Painted Aluminum)

Declared unit	100	m2 of coverage
Product mass	189.16	kg per 100 m2
Product dimension	100	m2
Conversion factor to 1 kg, declared unit	0.005287	-

4) Exposed Fastener Panel (Painted Galvanized)

Declared unit	100	m2 of coverage
Product mass	330.22	kg per 100 m2
Product dimension	100	m2
Conversion factor to 1 kg, declared unit	0.003028	-

5) Exposed Fastener Panel (Painted Zincalume)

Declared unit	100	m2 of coverage
Product mass	315.49	kg per 100 m2
Product dimension	100	m2
Conversion factor to 1 kg, declared unit	0.003170	-

6) Exposed Fastener Panel (Painted Aluminum)

Declared unit	100	m2 of coverage
Product mass	135.79	kg per 100 m2
Product dimension	100	m2
Conversion factor to 1 kg, declared unit	0.007364	-

7) Concealed Fastener Siding (Painted Galvanized)

Declared unit	100	m2 of coverage
Product mass	293.19	kg per 100 m2
Product dimension	100	m2
Conversion factor to 1 kg, declared unit	0.003411	-

8) Concealed Fastener Siding (Painted Zincalume)

Declared unit	100	m2 of coverage
Product mass	280.11	kg per 100 m2
Product dimension	100	m2
Conversion factor to 1 kg, declared unit	0.003570	-

9) Concealed Fastener Siding (Painted Aluminum)

Declared unit	100	m2 of coverage
Product mass	120.57	kg per 100 m2
Product dimension	100	m2
Conversion factor to 1 kg, declared unit	0.008294	-

3.0 Performance Attributes

Taylor Metal's products offer various levels of performance, each tailored to specific applications. Taylor Metal Products covered in this study meet the performance requirements listed in Table 3.

3.1 Performance Selection

Table 3: Technical Specifications

Product	Category	Standard
• Standing Seam Panel (Painted Galvanized) • Standing Seam Panel (Painted Zincalume) • Standing Seam Panel (Painted Aluminum) • Exposed Fastener Panel (Painted Galvanized) • Exposed Fastener Panel (Painted Zincalume) • Exposed Fastener Panel (Painted Aluminum) • Concealed Fastener Siding (Painted Galvanized) • Concealed Fastener Siding (Painted Zincalume) • Concealed Fastener Siding (Painted Aluminum)	Structural Material Specifications	ASTM A653/A924 - G90 Galvanized
		ASTM A792 - Zincalume/Galvalume AZ-50/55
		ASTM B209 - Aluminum Substrate
	Metal Roof Performance	ASTM E1680 - Air infiltration (roof)
		ASTM E1646 - Water infiltration (roof)
	Metal Wall Performance	ASTM E283 - Air infiltration (wall)
		ASTM E331 - Water infiltration (wall)
	Fire and Impact Performance	UL 790 Class A (ASTM E108) - Fire rated
		UL 2218 Class 4 - Impact (hail) rated
	Wind Performance	UL 580 Class 90 - Wind Uplift
	Water Penetration Performance	ASTM E2140 - Standard Test Method for Water Penetration (full immersion)
	Structural Performance	ASTM E1592 - Negative structural uniform static air pressure
		ASTM E330 - Positive structural uniform static air pressure

Table 4: Technical Data

Parameter	Unit	Standing Seam Panel (Painted Galvanized)	Standing Seam Panel (Painted Zincalume)	Standing Seam Panel (Painted Aluminum)	Exposed Fastener Panel (Painted Galvanized)	Exposed Fastener Panel (Painted Zincalume)	Exposed Fastener Panel (Painted Aluminum)	Concealed Fastener Siding (Painted Galvanized)	Concealed Fastener Siding (Painted Zincalum)	Concealed Fastener Siding (Painted Aluminum)
Length	m	123.03 – 291.63	123.03 – 291.63	123.03 - 291.63	40.11 - 111.39	40.11 - 111.39	40.11 - 111.39	94.37 - 218.72	94.37 - 218.72	94.37 - 218.72
Width	m	0.457 – 0.610	0.457 – 0.610	0.457 – 0.610	0.7398 - 1.2287	0.7398 - 1.2287	0.7398 - 1.2287	0.30 - 0.61	0.30 - 0.61	0.30 - 0.61
Thickness	mm	0.8636	0.6	0.8128	0.8636	0.6	0.8128	0.8636	0.6	0.8128
Density	kg/m3	7850	7700	2700	7850	7700	2700	7850	7700	2700
Modulus of Elasticity	MPa	200000	200000	70000	200000	200000	70000	200000	200000	70000
Tensile Strength	MPa	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
U-value	W/(m2-K)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
R-value	m2-K/W	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Water vapor permeance	Metric perms	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Airborne sound reduction	dB	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Sound absorption coefficient	%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

3.2 Key Selection Attributes

- High Recycled Content
- Energy-Saving: Mitigate Solar Heat Absorption
- Finishes: 21 Standard Colors, 5 Metallic Colors and 4 Specialized Materials
- 40-Year Residential Paint Warranty
- 24 and 22 Tru-Gauge and .032” and .040 Aluminum
- Factory Injected Butyl Sealant

4.0 Material Content

4.1 Definitions

The three primary products—Standing Seam Panels, Exposed Fastener Panels, and Concealed Siding Fastener Panels—are available in different thickness options: 22 and 24 gauge, as well as 0.032" and 0.04". The breakdown of material composition is detailed in Table 5.

Table 5: Metal Panel Design Composition

% Composition for 24 & 22 Gauge Galvanized Products		**% Composition for 24 & 22 Gauge Zincalume Products**		**% Composition for 0.032" & 0.040" Alum Products**	
Base steel	94.135%	Base steel	96.687%	Base aluminum	99.995%
Galvanized coating	5.860%	Zincalume coating	3.308%	Paint	0.005%
Paint	0.005%	paint	0.005%		
Base Steel		**Base Steel**		**Base Aluminum**	
Iron	98.15%	Iron	98.15%	Aluminum	95.00%
Carbon	0.30%	Carbon	0.30%	Manganese	1.60%
Manganese	1.20%	Manganese	1.20%	Iron	1.00%
Phosphorus	0.15%	Phosphorus	0.15%	Silicon	0.30%
Sulfur	0.05%	Sulfur	0.05%	TIN metal oxide	0.80%
Silicon	0.05%	Silicon	0.05%	Magnesium	0.30%
Aluminum	0.10%	Aluminum	0.10%	Nickle metal	0.10%
				Silver	0.10%
Galvanized Coating		**Zincalume Coating**		Zinc	0.20%
Aluminum	0.50%	Aluminum	53.48%	Copper dust	0.10%
Zinc	99.43%	Zinc	45.00%	Lead	0.10%
Antimony	0.05%	Silicon	1.50%	Titanium	0.10%
Iron	0.02%	Iron	0.02%	Antimony	0.10%
				Chromium	0.20%
Paint		**Paint**			
PVDF paint	100%	PVDF paint	100%	**Paint**	
				PVDF paint	100%

5.0 Production of Metal Panels

The manufacturing process of metal panel sheeting begins with the selection of materials. The metal coils are then placed into a decoiler, which unwinds the metal coil and is fed through a series of rolling systems. These systems shape the metal into the desired profile, which is then cut into specific sizes. The end product can range from simple flat panels to more complex, three-dimensional panels. The panels undergo quality control to ensure the final product meets specifications. Once the products pass quality control, the panels are carefully packaged for delivery to the job site.

The following figure depicts the manufacturing process of metal panels:

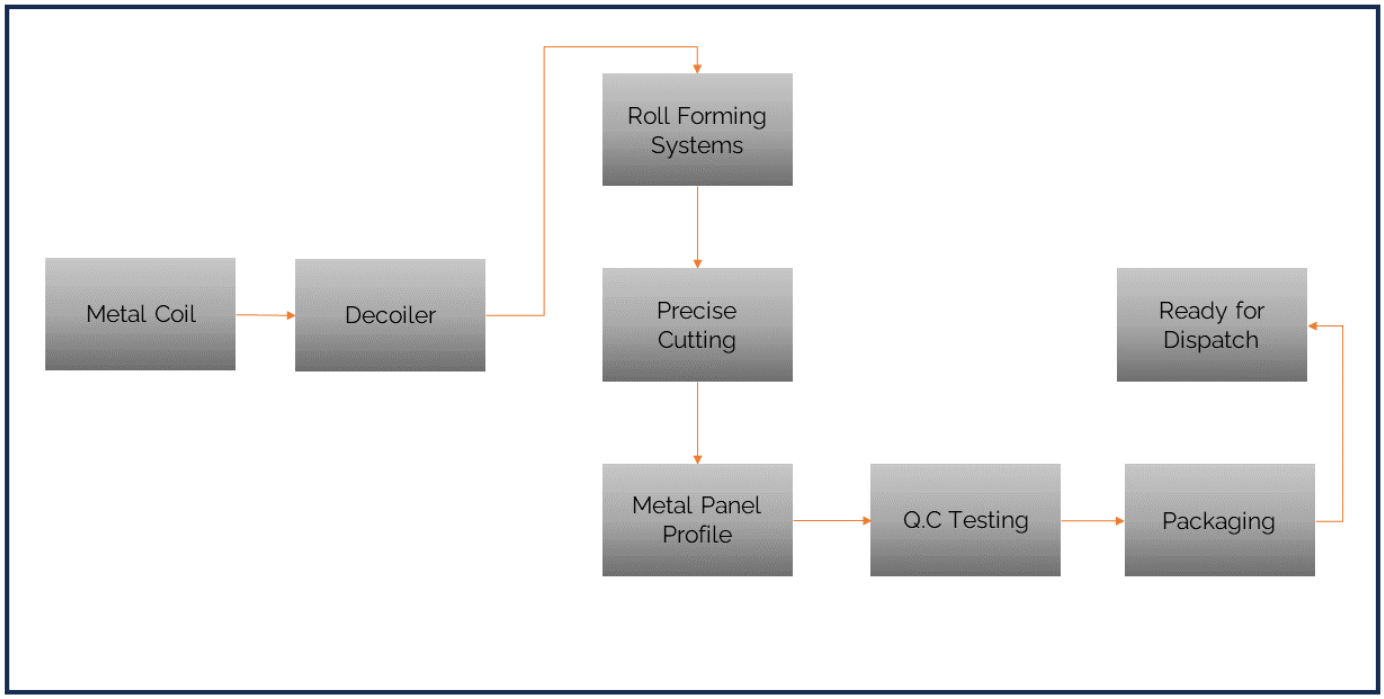

Figure 1: A standard process flow diagram of metal panel manufacturing process

5.1 Health, Safety and Environmental Aspects During Production

Taylor Metal Products is committed to maintaining high health, safety, and environmental standards throughout its production processes. The company ensures workplace safety by following stringent OSHA guidelines and providing necessary protective equipment to employees. They also prioritize environmental responsibility by implementing waste reduction strategies and recycling metal scraps, minimizing their carbon footprint. Additionally, Taylor Metal uses energy-efficient methods and pollution control systems to limit environmental impact during production.

6.0 Installation

This part is excluded as the scope of this EPD is cradle-to-gate.

7.0 Use Stage

This part is excluded as the scope of this EPD is cradle-to-gate.

8.0 Extraordinary Effects

The extraordinary performance of the products are detailed in Table 3.

9.0 End-of-Life Stage

9.1 Recycling or Reuse

End-of-life scenarios for metal panel products include manual deconstruction from the installation site, and it is assumed that the recycling rate of the panel is 95%[1] since metal panels are composed of materials like steel or aluminum, which are highly recyclable. The remaining end-of-life waste, which includes paint and other non-recyclable materials, is assumed to be disposed of in landfills. Any transportation required for end-of-life processing is accounted for based on assumed average distances to disposal or recycling facilities.

[1]Taken from International Aluminum Institute (IAI) Report: Aluminium Recyclability and Recycling – Towards Sustainable Cities, April 2015, p. 37 Table 2.4. Includes commercial and residential buildings.

9.2 Disposal

At the end of the product service life, metal panels should follow a sustainable cycle through responsible recycling wherever feasible. Components that can no longer be recycled must be handled through appropriate waste management practices. The disposal should follow industry-standard practices and regional waste management regulations. Waste materials may be directed to municipal landfills or commercial incineration facilities, ensuring full compliance with local, state, and federal requirements.

10.0 Life Cycle Assessment

The methods for conducting the life cycle assessments used for this project were consistent with ISO 14040 and 14044. This report is intended to fulfill the reporting requirements in Section 5 of ISO 14044 and Part B of the Product Category Rules for Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels.

10.1 Information on the Product System Definition and Modeling of the Life Cycle

The declared unit for this EPD is 100 m2 of Average Metal Panel Product.

For this LCA the manufacturing plant, owned and operated by Taylor Metal Products, is located at their facility in Riverside, California, USA. All operating data is formulated using the actual data from Taylor Metal Products' plant at the above location, including water, energy consumption and waste generation. All inputs for this system boundary are calculated for the plant.

This life cycle inventory was organized in a spreadsheet and was then input into an RStudio environment where pre-calculated LCIA results for relevant products/activities stemming from the ecoinvent v3.10 database and a local EPD database in combination with primary data from Taylor Metal Products were utilized. Explanations of the contribution of each data source to this study are outlined in the section 'Data Sources and Quality'. Further LCI details for each declared product are provided in the sections 'Detailed LCI tables' and 'Transport tables' of the detailed LCA report.

10.1.1 System Boundaries

The following figure depicts the cradle-to-gate system boundary considered in this study and the general activities and input requirements for producing metal panel products and it is not necessarily exhaustive.

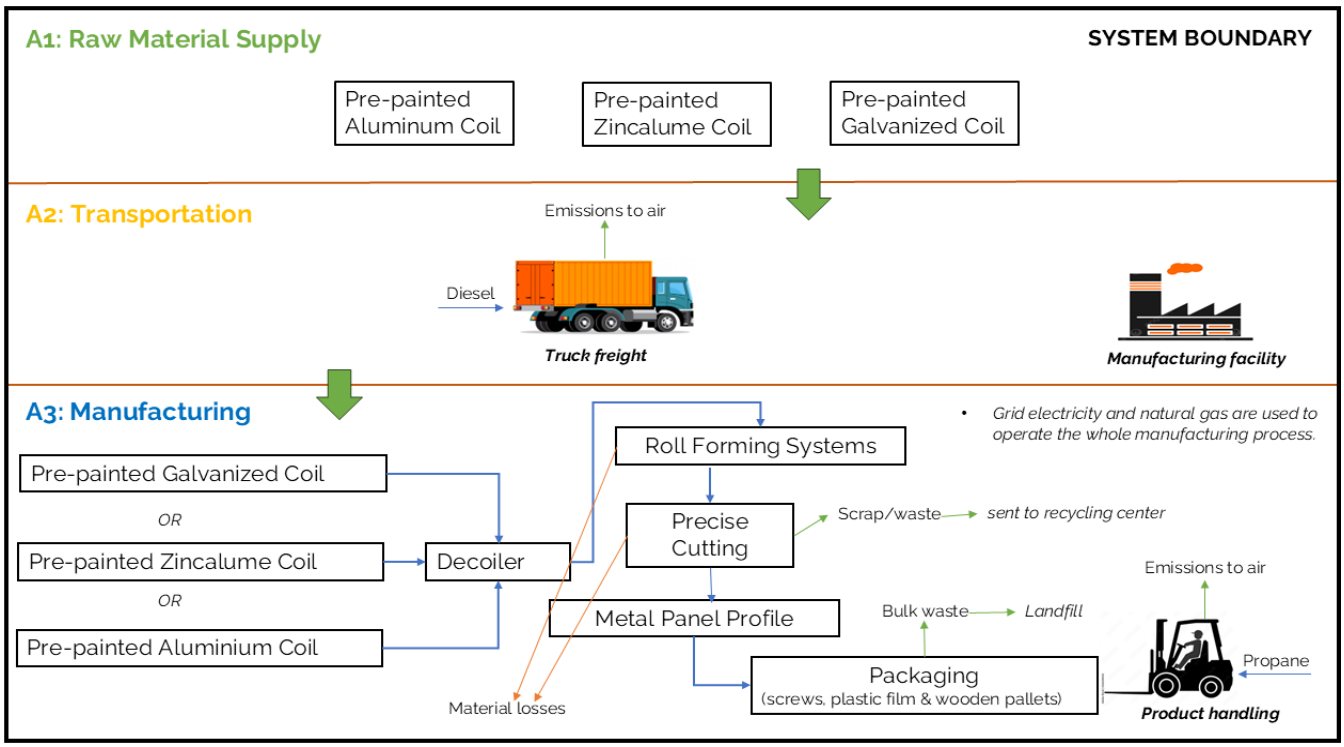

Figure 2: General system inputs considered in the product system and categorized by modules in scope

This is a Cradle-to-gate life cycle assessment and the following life cycle stages are included in the study:

- A1: Raw material supply (upstream processes) – Extraction, handling, and processing of the materials used in

manufacturing the declared products in this LCA.

- A2: Transportation – Transportation of A1 materials from the supplier to the "gate" of the manufacturing facility (i.e. A3).
- A3: Manufacturing (core processes)- The energy and other utility inputs used to store, move, and manufacture the declared products and to operate the facility.

The life cycle stages/modules not covered in this study include the construction stage (A4-A5), usage stage (B1-B7), end-of-life stage (C1-C4) and module D.

In addition, according to the relevant PCR, the following requirements are excluded from this study:

- Production, manufacture and construction of A3 building/capital goods and infrastructure;
- Production and manufacture of steel production equipment, steel delivery vehicles, earth-moving equipment, and laboratory equipment;
- Personnel-related activities (travel, furniture, office supplies);
- Energy use related to company management and sales activities.
- Packaging of incoming materials (e.g. metal coils, pallets) is excluded as it accounts for less than 1% of the product's mass.

10.1.2 Assumptions and Estimates

All estimates and assumptions are within the requirements of ISO 14040/44. Certain assumptions made in this study may have influenced the results are:

- The selection of secondary datasets from the ecoinvent database plays a critical role in representing supply chain aspects for Taylor Metal Products. Collaboration among LCA practitioners, Taylor Metal Products associates, and ecoinvent data experts was instrumental in identifying the most suitable datasets.
- The weights of each packaging material used were estimated based on industry averages.
- Region-specific electricity was used to model the electricity mix using the ecoinvent database v3.10.
- The allocation of inputs and outputs are based on physical characteristics i.e. area basis.

10.1.3 Reporting Period

This study is intended to represent the production for the year 2023.

10.1.4 Cutoff Criteria

ISO 14044:2006 and the focus PCR requires the LCA model to contain a minimum of 95% of the total inflows (mass and energy) to the upstream and core modules be included in this study. The cut-off criteria were applied to all other processes unless otherwise noted above as follows. A 1% cut-off is considered for all renewable and non-renewable primary energy

consumption and the total mass of inputs within a unit process where the total of the neglected inputs does not exceed 5%.

10.1.5 Data Quality

This section describes the achieved data quality relative to the ISO 14044:2006 requirements. Data quality is judged based on its precision (measured, calculated or estimated), completeness (e.g., unreported emissions), consistency (degree of uniformity of the methodology applied within a study serving as a data source) and representativeness (geographical, temporal, and technological).

Precision: Through measurement and calculation, the manufacturers collected and provided primary data on their annual production. The product-specific data derived from specific production processes was used for modeling the life cycle of the declared products. For accuracy, the LCA practitioner and 3rd Party Verifier validated the plant gate-to-gate data.

Completeness: All relevant specific processes, including inputs (raw materials, energy and ancillary materials) and outputs (emissions and production volume) were considered and modeled to represent the specified and declared products. The majority of relevant background materials and processes were taken from ecoinvent v3.10 LCI datasets where relatively recent region-specific electricity inputs were utilized. The most relevant LCA studies requiring key A1 inputs were also utilized where readily available.

Consistency: To ensure consistency, the same modeling structure across the respective product systems was utilized for all inputs, which consisted of raw material inputs and ancillary material, energy flows, water resource inputs, product and co-products outputs, returned and recovered Metal Panel materials, emissions to air, water and soil, and waste recycling and treatment. The same background LCI datasets from the ecoinvent v3.10 database were used across all product systems. Crosschecks concerning the plausibility of mass and energy flows were continuously conducted. The LCA team conducted mass and energy balances at the plant and selected process level to maintain a high level of consistency.

Reproducibility: Internal reproducibility is possible since the data and the models are stored and available in a machine-readable project file for all foreground and background processes, and in Labeling Sustainability's proprietary Metal Panel LCA calculator* for all production facility and product-specific calculations. A considerable level of transparency is provided throughout the detailed LCA report as the specifications and material quantity make-up for the declared products are presented and key primary and secondary LCI data sources are summarized. The provision of more detailed publicly accessible data to allow full external reproducibility was not possible due to reasons of confidentiality.

*Labeling Sustainability has developed a proprietary tool that allows the calculation of PCR-compliant LCA results for Metal Panel product designs. The tool auto-calculates results by scaling base-unit technosphere inputs (i.e. 1 kg sand, 1 kWh electricity, etc.) to replicate the reference flow conversions that take place in any typical LCA software like openLCA or SimaPro. The tool was tested against several LCAs performed in openLCA and the tool generated identical results to those realized in openLCA across every impact category and inventory metric (where comparisons could be readily made).

Representativeness: The representativeness of the data is summarized as follows.

- Time related coverage of the manufacturing processes' primary collected data from 2023-01-01 to 2023-12-31.
- Upstream (background) LCI data was either the PCR specified default (if applicable) or more appropriate LCI datasets as found in the country-adjusted ecoinvent v3.10 database.
- Geographical coverage for inputs required by the A3 facility(ies) is representative of its region of focus; other upstream and background processes are based on US, North American, or global average data and adjusted to regional electricity mixes when relevant.
- Technological coverage is typical or average and specific to the participating facilities for all primary data.

Treatment of Missing Data: In this study, missing data were not averaged as zeros; data gaps were addressed using default assumptions provided by the Product Category Rules (PCR), or through verified sources such as the ecoinvent database. Secondary sources such as LCA databases (e.g., ecoinvent) and industry-specific literature were consulted when primary data was unavailable. In cases where neither primary nor secondary data was accessible, analogous processes or materials were selected as proxies, ensuring that their selection was well-reasoned and appropriately justified. Missing data were minimized to the extent possible. Any remaining data gaps were filled with conservative estimates that do not significantly influence the overall LCA results.

Sources of Data: All manufacturing processes were based on primary data. For raw materials, facility-specific supplier-provided data was utilized whenever it was accessible. In the absence of primary data, relevant secondary data from the ecoinvent database was used to represent raw material production.

Uncertainty: Primary data was collected for over 95% of the processes involved. As such, uncertainty is considered low and does not significantly influence the overall LCA results. The pedigree matrix method was used to assess data uncertainty. Each dataset was scored across five dimensions: reliability, completeness, temporal correlation, geographical correlation, and technological correlation. These scores helped identify data with higher uncertainty and guide the selection of more reliable sources where available.

Third-party verified ISO 14040/44 secondary LCI data sets contribute more than 80% of the total impact (either at the unit process level or in aggregate) to any of the required impact categories identified by the applicable PCR.

No known flows are deliberately excluded from this EPD.

10.1.6 Allocation

This study follows the allocation principles specified by the ISO 14044, ISO 21930:2017, and the reference PCR. Where possible, allocation was avoided. When allocation was necessary, inputs and outputs were allocated on the basis of physical relationships, i.e., area basis.

The allocation ratio is determined by dividing the surface area of each panel produced by the total surface area produced within the facility for the reporting period.

This methodology provided a representative approach for allocating manufacturing inputs/outputs, given that all products at the facility were produced through a similar production process. Furthermore, the lack of sub-metering systems precluded the extraction of product-specific data. As a default, secondary ecoinvent datasets use a physical mass basis for allocation. Scrap inputs to manufacturing adhere to the polluter pays principle. The processing and recycling of the net amount of scrap existing the system, defined as the difference between scrap outputs and secondary material inputs, fall outside the scope of this study.

10.1.7 Comparability

The reference PCR establishes the guidelines for the comparability of Environmental Product Declarations (EPDs).

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

Comparison of the environmental performance of metal panel and cladding products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building use phase as instructed under this PCR.

Full conformance with the PCR for metal panels and cladding allows EPD comparability only when all stages of a life cycle have been considered when they comply with all referenced standards, use the same sub-category PCR, and use equivalent scenarios with respect to construction works. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

10.2 Results of the Life Cycle Assessment

The following table reports detailed LCA results for each product produced at the given Taylor Metal Products facility per 100 m2 of Average Metal Panel Product basis. The LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

These six 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, the EPD users shall not use additional measures for comparative purposes. Toxicity impacts shall be reported under "Additional Environmental Information".

Table 6: Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 100 m2 of Average Metal Panel Product basis

a) Midpoint Impact Categories:

Indicator/LCI Metric (A1-A3)	*GWP100	ODP	AP	EP	SFP	ADPfossil**
Unit	kg CO2-eq	kg CFC-11-eq	kg SO2-eq	kg N-eq	kg O3-eq	MJ

Minimum	6.25E+02	7.24E-06	7.95E+00	4.40E+00	4.39E+01	6.90E+03
Maximum	1.92E+03	1.18E-05	2.89E+01	8.42E+00	1.35E+02	1.85E+04
Mean	1.02E+03	9.12E-06	1.82E+01	5.86E+00	7.18E+01	1.06E+04
Median	9.81E+02	8.37E-06	1.84E+01	5.37E+00	6.89E+01	1.08E+04
Standing Seam Panel (Painted Galvanized)	1.00E+03	1.17E-05	2.89E+01	7.07E+00	7.05E+01	1.11E+04
Standing Seam Panel (Painted Zincalume)	9.81E+02	1.14E-05	2.81E+01	6.90E+00	6.89E+01	1.08E+04
Standing Seam Panel (Painted Aluminum)	1.92E+03	1.18E-05	1.25E+01	8.42E+00	1.35E+02	1.85E+04
Exposed Fastener Panel (Painted Galvanized)	7.21E+02	8.37E-06	2.08E+01	5.08E+00	5.06E+01	7.96E+03
Exposed Fastener Panel (Painted Zincalume)	7.05E+02	8.15E-06	2.02E+01	4.96E+00	4.94E+01	7.78E+03
Exposed Fastener Panel (Painted Aluminum)	1.38E+03	8.47E-06	8.95E+00	6.04E+00	9.67E+01	1.33E+04
Concealed Fastener Siding (Painted Galvanized)	6.40E+02	7.43E-06	1.84E+01	4.51E+00	4.50E+01	7.07E+03
Concealed Fastener Siding (Painted Zincalume)	6.25E+02	7.24E-06	1.79E+01	4.40E+00	4.39E+01	6.90E+03
Concealed Fastener Siding (Painted Aluminum)	1.23E+03	7.52E-06	7.95E+00	5.37E+00	8.59E+01	1.18E+04

**GWP 100 was reported using IPCC 2013 (AR5) LCIA method.*

**The LCI indicator (GWP 100) did not include biogenic carbon removal(s) & emissions and emissions from land use change [GWP 100 (land-use change)].*

***ADPfossil was reported using the most recent version of the CML method (CML v4.8 2016) along with updated characterization factors.*

b) Resource Inventory Metrics:

Indicator/LCI Metric	**RPRE**	**RPRM**	**NRPRE**	**NRPRM**	**SM**	**RSF**	**NRSF**	**RE**	**FW**
Unit	**MJ**	**MJ**	**MJ**	**MJ**	**kg**	**MJ**	**MJ**	**MJ**	**m3**
Minimum	7.16E+02	4.54E-03	7.14E+02	1.40E-01	2.78E+01	3.66E-02	0.00E+00	3.26E+00	1.71E+00
Maximum	1.47E+03	1.93E-02	1.49E+03	5.34E-01	2.99E+02	8.89E-02	0.00E+00	9.81E+00	1.02E+01
Mean	9.79E+02	1.22E-02	9.84E+02	3.31E-01	1.66E+02	6.10E-02	0.00E+00	6.41E+00	4.11E+00
Median	9.36E+02	1.29E-02	9.47E+02	3.40E-01	1.90E+02	5.74E-02	0.00E+00	6.25E+00	2.69E+00
Standing Seam Panel (Painted Galvanized)	1.15E+03	1.93E-02	1.15E+03	5.34E-01	2.99E+02	8.89E-02	0.00E+00	9.81E+00	2.82E+00
Standing Seam Panel (Painted Zincalume)	1.12E+03	1.89E-02	1.12E+03	5.10E-01	2.93E+02	8.70E-02	0.00E+00	9.57E+00	2.69E+00

Standing Seam Panel (Painted Aluminum)	1.47E+03	8.02E-03	1.49E+03	2.20E-01	4.37E+01	5.74E-02	0.00E+00	5.11E+00	1.02E+01
Exposed Fastener Panel (Painted Galvanized)	8.27E+02	1.42E-02	8.25E+02	3.83E-01	2.15E+02	6.38E-02	0.00E+00	7.04E+00	2.03E+00
Exposed Fastener Panel (Painted Zincalume)	8.06E+02	1.37E-02	8.04E+02	3.66E-01	2.10E+02	6.24E-02	0.00E+00	6.87E+00	1.93E+00
Exposed Fastener Panel (Painted Aluminum)	1.05E+03	5.85E-03	1.07E+03	1.58E-01	3.13E+01	4.12E-02	0.00E+00	3.67E+00	7.33E+00
Concealed Fastener Siding (Painted Galvanized)	7.34E+02	1.29E-02	7.32E+02	3.40E-01	1.90E+02	5.67E-02	0.00E+00	6.25E+00	1.80E+00
Concealed Fastener Siding (Painted Zincalume)	7.16E+02	1.21E-02	7.14E+02	3.25E-01	1.87E+02	5.54E-02	0.00E+00	6.10E+00	1.71E+00
Concealed Fastener Siding (Painted Aluminum)	9.36E+02	4.54E-03	9.47E+02	1.40E-01	2.78E+01	3.66E-02	0.00E+00	3.26E+00	6.50E+00

c) Waste / Output Inventory Metrics:

Indicator/LCI Metric	**HWD**	**NHWD**	**HLRW**	**ILLRW**	**MR**	**MER**	**CRU**	**EEel**	**EEheat**
Unit	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**MJ**	**MJ**
Minimum	1.64E+02	2.35E+03	3.97E-03	7.54E-03	3.14E-01	6.00E-04	0.00E+00	2.21E+00	9.96E-01
Maximum	3.71E+02	7.71E+03	6.72E-03	1.49E-02	5.28E+00	2.93E-03	0.00E+00	6.47E+00	3.38E+00
Mean	2.33E+02	4.96E+03	5.10E-03	1.02E-02	1.64E+00	1.76E-03	0.00E+00	4.25E+00	2.16E+00
Median	2.36E+02	4.92E+03	4.70E-03	9.50E-03	4.92E-01	1.87E-03	0.00E+00	4.13E+00	2.16E+00
Standing Seam Panel (Painted Galvanized)	2.62E+02	7.71E+03	6.72E-03	1.21E-02	5.04E-01	2.93E-03	0.00E+00	6.47E+00	3.38E+00
Standing Seam Panel (Painted Zincalume)	2.57E+02	7.56E+03	6.55E-03	1.18E-02	4.92E-01	2.86E-03	0.00E+00	6.30E+00	3.31E+00
Standing Seam Panel (Painted Aluminum)	3.71E+02	3.68E+03	6.23E-03	1.49E-02	5.28E+00	9.42E-04	0.00E+00	3.47E+00	1.56E+00
Exposed	1.88E+02	5.54E+03	4.82E-03	8.71E-03	3.62E-01	2.10E-03	0.00E+00	4.65E+00	2.43E+00

Fastener Panel (Painted Galvanized)									
Exposed Fastener Panel (Painted Zincalume)	1.84E+02	5.43E+03	4.70E-03	8.49E-03	3.53E-01	2.05E-03	0.00E+00	4.52E+00	2.38E+00
Exposed Fastener Panel (Painted Aluminum)	2.66E+02	2.64E+03	4.47E-03	1.07E-02	3.79E+00	6.76E-04	0.00E+00	2.49E+00	1.12E+00
Concealed Fastener Siding (Painted Galvanized)	1.67E+02	4.92E+03	4.28E-03	7.74E-03	3.21E-01	1.87E-03	0.00E+00	4.13E+00	2.16E+00
Concealed Fastener Siding (Painted Zincalume)	1.64E+02	4.82E+03	4.17E-03	7.54E-03	3.14E-01	1.82E-03	0.00E+00	4.02E+00	2.11E+00
Concealed Fastener Siding (Painted Aluminum)	2.36E+02	2.35E+03	3.97E-03	9.50E-03	3.37E+00	6.00E-04	0.00E+00	2.21E+00	9.96E-01

10.3 Life Cycle Impact Reduction

In this study the impact is reduced by selecting materials that have lower GWP values compared to virgin resources, sourcing materials close to the manufacturing site. The suppliers are chosen on the basis of their own LCA results, focusing on those with lower carbon footprint. Manufacturing processes that are energy efficient (less energy) are implemented to reduce emissions. Waste and scrap materials are minimized by improving manufacturing processes.

10.4 Interpretation

This study represents sheet metal produced for manufacturing residential and industrial roof panels. Primary Taylor metals data include galvanized primary and recycled steel, paint, electricity fuel consumption, and bulk waste. Stage A2 also includes inbound truck transportation for steel scrap.

The most significant contribution to Taylor Metals Riverside's carbon footprint, measured in kg CO2 eq, was from the raw material, A1. Taylor Metals primarily uses recycled steel and aluminum sheets as the main source for paneling.

The most significant A1 contributions include recycled steel and aluminum sheets, coatings, and paint. Since recycled steel and aluminum make up the largest portion of the raw material, the A2 transportation stage of this recycled material contributes more.

The A3 manufacturing stage contributes to the product's overall GWP and global warming potential through electricity's highest single-process contribution to the product's carbon footprint. Other contributions to A3 include hardware and

natural gas.

11.0 Additional Information, Evidence, Test Certificates

- The products contain no hazardous substances.
- No substances required to be reported as hazardous are associated with the production of these products.
- The products are free from indoor air emissions, gamma or ionizing radiation, and the release of chemicals into the air, water, or soil.
- Detailed information on the environmental certifications of Taylor Metal's products can be accessed on the official Taylor Metal Products website: https://taylormetal.com/.

12.0 References

12.1 PCR

UL Environment (2018). Guidance for Building-Related Products and Services, Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels. UL 10010-5 v2.0.

12.2 Standards

ISO 14025:2006 Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures.

ISO 21930:2017 Sustainability in Building Construction - Environmental Declaration of Building Products.

ISO 14040:2006 Environmental Management - Life Cycle Assessment - Principles and Framework.

ISO 14044:2006 Environmental Management - Life Cycle Assessment - Requirements and Guidelines.

UL Environment (2022). Product Category Rules for Building-Related Products and Services. Part A: Life Cycle Assessment Calculation Rules and Report Requirements, UL 10010 v4.0.

UL Environment (2018). Guidance for Building-Related Products and Services, Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels. UL 10010-5 v2.0.

EN 15804 Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products

ICC Evaluation Service (ICC-ES). General Program Instructions for the ICC-ES Environmental Product Declarations (EPD) Program. ICC-ES, 2024. https://cdn-v2.icc-es.org/wp-content/uploads/ICC-ES-EPD-Program-Instructions.pdf

ASTM A653/A924 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated by the Hot-Dip Process (G90 Galvanized)

ASTM A792 – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process (Zincalume/Galvalume AZ-50/55)

ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Aluminum Substrate)ASTM E1680 - Air infiltration (roof)

ASTM E1680 – Standard Test Method for Air Leakage Through Exterior Metal Roof Panel Systems

ASTM E1646 – Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems

ASTM E283 – Standard Test Method for Determining the Rate of Air Leakage through Exterior Walls

ASTM E331 – Standard Test Method for Water Penetration of Exterior Walls by Uniform Static Air Pressure Difference

ASTM E2140 – Standard Test Method for Water Penetration of Roof Assemblies under Full Immersion Conditions

ASTM E1592 – Standard Test Method for Structural Performance of Metal Roof and Siding Systems under Negative Wind Loads

ASTM E330 – Standard Test Method for Structural Performance of Metal Wall and Roof Systems under Uniform Static Air Pressure Loads.

13.0 Accreditations

Fire-Rating (ASTM E108) – Class A
ICC-ES Evaluation Reports (ESR-5045 and ESR-5046)
UL Evaluation Reports ER25913-01

14.0 Quality Assurance

Taylor Metal has a robust internal Quality Assurance process that is based on industry-accepted best practices and is led by a team of quality professionals who have been certified. The process involves several hundred different measures made throughout the manufacturing processes. Taylor Metal Products are ICC-ESR certified, including compliance with CBC-CRC requirements. Furthermore, the products have been tested and certified under UL ER #25913-01 in compliance with industry standards.

Definitions

Table 7: Definition of life cycle impact categories and life cycle inventory metrics

LCI Category	Description	Unit
Global Warming Potential (GWP)	Global warming potential is a relative measure of how much heat a greenhouse gas traps in the atmosphere. The global warming potential is calculated in carbon dioxide equivalents meaning that the greenhouse potential of emission is given in relation to CO2. Since the residence time of gases in the atmosphere is incorporated into the calculation, a time range for the assessment is defined to be 100 years.	kg CO2-eq

Ozone Depletion Potential (ODP)	Ozone depletion potential represents a relative value that indicates the potential of a substance to destroy ozone gas as compared with the potential of chlorofluorocarbon-11 which is assigned a reference value of 1, resulting in an equilibrium state of total ozone reduction.	kg CFC11-eq
Acidification Potential (AP)	The acidification of soils and waters occurs predominantly through the transformation of air pollutants into acids, which leads to a decrease in the pH value of rainwater and fog from 5.6 and below. Acidification potential is described as the ability of certain substances to build and release H+ions and is given in sulfur dioxide equivalents.	kg SO2-eq
Eutrophication Potential (EP)	Eutrophication is the enrichment of nutrients in a certain place. It can be aquatic or terrestrial. All emissions of N and P to air, water, and soil and of organic matter to water are aggregated into a single measure.	kg N-eq
Photochemical Ozone Creation/Smog Potential (POCP)	Ozone is protective in the stratosphere, but at ground level, it is toxic to humans in high concentrations. Photochemical ozone, also called ground-level ozone, is formed by the reaction of volatile organic compounds and nitrogen oxides in the presence of heat and sunlight. The impact category depends largely on the amounts of carbon monoxide (CO), Sulphur dioxide (SO2), nitrogen oxide (NO), ammonium, and NMVOC (non-methane volatile organic compounds).	kg O3-eq
Non-renewable: abiotic depletion potential (ADP-fossil fuels)	Abiotic depletion describes the reduction of the global amount of non-renewable fossil fuels, which include fossil energy carriers (crude oil, natural gas, coal resources), based on the remaining reserves and the rate of extraction.	MJ
Inventory Metrics		
PDE	Primary energy demand is a measure of the total amount of primary energy extracted from the earth. PED is expressed in energy demand from non-renewable resources (e.g., petroleum, natural gas, etc.) and energy demand from renewable resources (e.g., hydropower, wind energy, solar, etc.).	MJ
RPRE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ
RPRM	Use of renewable primary energy resources used as raw materials (i.e., PERM)	MJ

NRPRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ
NRPRM	Use of non-renewable primary energy resources used as raw materials (i.e., PENRM)	MJ
RE	Recovered energy	
SM	Use of secondary material	kg
RSF	Use of renewable secondary fuels	MJ
NRSF	Use of non-renewable secondary fuels	MJ
FW	Net use of freshwater	m3
HW	Hazardous waste disposed of	kg
NHW	Non-hazardous waste disposed of	kg
HLRW	High-level radioactive waste	kg
ILLRW	Intermediate and low-level radioactive waste	kg
CRU	Components for re-use	kg
MR	Materials for recycling	kg
MER	Materials for energy recovery	kg
EEel	Exported energy, electrical	MJ
EEheat	Exported energy, heat	MJ