IMETCO
INNOVATIVE METALS COMPANY, INC.

Environmental Product Declaration

In accordance with ISO 14025:2006 and ISO 21930:2017

Environmental Product Declaration for Metal Panel products produced by Innovative Metals Company, Inc. at their facility in Peachtree Corners, Georgia

ADMINISTRATIVE INFORMATION

International Certified Environmental Product Declaration

Declared Product and Declared Unit:	This Environmental Product Declaration (EPD) covers metal panel products produced by Innovative Metals Company, Inc., declared unit: 100 m2 of metal panel product
Declaration Owner:	Innovative Metals Company, Inc. 4648 South Old Peachtree Rd, GA https://imetco.com/
Program Operator:	Labeling Sustainability 200 S. Rosemary West Palm Beach, FL https://www.labelingsustainability.com/
Product Category Rule:	Product Category Rules for Building-Related Products and Services Published by UL Environment Part A: Life Cycle Assessment Calculation Rules and Report Requirements, UL 10010 v4.0, and Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels, UL 10010-5 PCR Program Operator: UL PCR review was conducted by: Thomas Gloria, PhD (chair); Lindita Bushi, PhD; Bob Zabcik, P.E., LEED AP BD+C
	ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services ISO 14040:2006 Environmental Management - Life Cycle Assessment - Principles and Framework ISO 14044:2006 Environmental Management - Life Cycle Assessment - Requirements and Guidelines
Market of Applicability	North America
EPD Scope	Cradle-to-gate (A1-A3)
EPD Type	Manufacturer-Specific EPD
LCIA Method and Version	TRACI 2.1, IPCC 2013 (AR5) CML-IA v4.8 (2016)
Independent LCA Reviewer and EPD Verifier:	This declaration was independently verified in accordance with ISO 14025:2006 Independent verification of the declaration, according to ISO 14025:2006 External :X Third Party Verifier Hammad Ur Rehman, Certified 3rd Party Verifier under Labeling Sustainability Program (www.labelingsustainability.com)
Date of Issue:	May 30, 2025
Period of Validity:	5 years
EPD Number:	IMPP2025053001

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COMPANY DESCRIPTION

Innovative Metals Company (IMETCO) is a leading manufacturer of premier metal products for the building envelope, delivering performance-inspired systems tailored to every project. IMETCO offers a full range of high-performance metal roofing, wall, deck, and edge systems that provide a virtually limitless realm of aesthetic possibilities.

STUDY GOAL

The intended application of the background life cycle assessment (LCA) study was to comply with the procedures for creating a Type III environmental product declaration (EPD) and publish the EPD for public review on the website, https://www.labelingsustainability.com/. This level of study is in accordance with the product category rule (PCR) for building-related products and services published by UL Environment, Part A: Life Cycle Assessment Calculation Rules and Report Requirements, v4.0, Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels, UL 10010-5, 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. This study does not intend to support comparative assertions and is intended to be disclosed to the public.

The project report was commissioned to differentiate IMETCO from their competition for the following reasons: generate an advantage for the organization; offer customers information to help them make informed product decisions; identify and quantify the environmental impacts associated with its metal panel products to support future strategies for impact reduction based on measurable data and to strengthen IMETCO's license to operate in the community. The intended audience for this EPD report is Innovative Metals Company, Inc.'s 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, and LCA professionals. This EPD report does not include product comparisons from other facilities.

PRODUCT DESCRIPTION

IMETCO's metal panel products are engineered to meet the aesthetic and functional demands of modern architecture in both wall and roofing applications. Designed for durability and visual impact, these products offer proven resistance to wind uplift and water infiltration, ensuring long-term protection of the building envelope system. This makes them ideal for achieving modern aesthetics, performance, and value in residential, commercial, and industrial building projects.

CSI/CSC Classifications:

- 07 41 00 Roof Panels
- 07 41 11 Metal Roof Panels
- 07 42 00 Wall Panels
- 07 42 93 Soffit Panels
- 07 42 13 Metal Wall Panels
- 07 46 00 Metal Siding
- 07 61 00 Sheet Metal Roofing
- 07 61 13 Standing Seam Sheet Metal Roofing
- 07 61 16 Batten Seam Sheet Metal Roofing
- 07 61 19 Flat Seam Sheet Metal Roofing
- 07 64 00 Sheet Metal Wall Cladding
- 07 64 13 Standing Seam Sheet Metal Wall Cladding
- 07 64 16 Batten Seam Sheet Metal Wall Cladding
- 07 64 19 Flat Seam Sheet Metal Wall Cladding

PRODUCT APPLICATIONS

IMETCO products are designed for a wide range of intended applications, including both structural and architectural roofing, as well as exterior wall and soffit systems.

DECLARED PRODUCT

The results reported for IMETCO products in this EPD are specific to the modeled weights for each product covered in the study.

As specified by the PCR, the declared unit for metal panels is the coverage of 100 square meters (1076.4 square feet) of building area. The coverage area represents the total flat area covered by the installed products and does not account for losses resulting from overlapping or scrap during installation.

Table 1: **Declared unit parameters.**

1) Latitude		
Parameter	**Value**	**Unit**
Declare unit	100	m2 of coverage
Product mass	478.64	kg / 100 m²
Product dimension	100	m²
Conversion factor to 1 kg, declare unit	0.00209	-
2) Legacy		
Declare unit	100	m2 of coverage
Product mass	295.77	kg / 100 m²
Product dimension	100	m²
Conversion factor to 1 kg, declare unit	0.00338	-
3) PermWall		
Declare unit	100	m2 of coverage
Product mass	419.36	kg / 100 m²
Product dimension	100	m²
Conversion factor to 1 kg, declare unit	0.00238	-
4) 7.2 Rib		
Declare unit	100	m2 of coverage
Product mass	656.68	kg / 100 m²
Product dimension	100	m²
Conversion factor to 1 kg, declare unit	0.00152	-
5) Cor-Pan		
Declare unit	100	m2 of coverage
Product mass	602.82	kg / 100 m²
Product dimension	100	m²
Conversion factor to 1 kg, declare unit	0.00166	-
6) R-Panel		
Declare unit	100	m2 of coverage
Product mass	570.1	kg / 100 m²
Product dimension	100	m²
Conversion factor to 1 kg, declare unit	0.00175	-
7) FW Series		
Declare unit	100	m2 of coverage
Product mass	395.06	kg / 100 m²
Product dimension	100	m²
Conversion factor to 1 kg, declare unit	0.00253	-
8) Element		
Declare unit	100	m2 of coverage
Product mass	528.67	kg / 100 m²
Product dimension	100	m²

Conversion factor to 1 kg, declare unit	0.00189	-
9) SP Series		
Declare unit	100	m2 of coverage
Product mass	245.16	kg / 100 m^2
Product dimension	100	m^2
Conversion factor to 1 kg, declare unit	0.00408	-
10) Trim/Accessories/Flat sheets/Coils		
Declare unit	100	m2 of coverage
Product mass	637.43	kg / 100 m^2
Product dimension	100	m^2
Conversion factor to 1 kg, declare unit	0.00157	-
11) Coping		
Declare unit	100	m2 of coverage
Product mass	543.2	kg / 100 m^2
Product dimension	100	m^2
Conversion factor to 1 kg, declare unit	0.00184	-
12) ZIP-RIB		
Declare unit	100	m2 of coverage
Product mass	545.56	kg / 100 m^2
Product dimension	100	m^2
Conversion factor to 1 kg, declare unit	0.00183	-
13) Series 300		
Declare unit	100	m2 of coverage
Product mass	522.19	kg / 100 m^2
Product dimension	100	m^2
Conversion factor to 1 kg, declare unit	0.00192	-
14) Batten-Tite		
Declare unit	100	m2 of coverage
Product mass	409.13	kg / 100 m^2
Product dimension	100	m^2
Conversion factor to 1 kg, declare unit	0.00244	-
15) PermLok		
Declare unit	100	m2 of coverage
Product mass	518	kg / 100 m^2
Product dimension	100	m^2
Conversion factor to 1 kg, declare unit	0.00193	-
16) SS Panel		
Declare unit	100	m2 of coverage
Product mass	615.68	kg / 100 m^2
Product dimension	100	m^2
Conversion factor to 1 kg, declare unit	0.00162	-

17) Twinlok/Flushlok		
Declare unit	100	m2 of coverage
Product mass	449.54142	kg / 100 m^2
Product dimension	100	m^2
Conversion factor to 1 kg, declare unit	0.00222	-

TECHNICAL DATA

Metal panels are available in a range of gauges and sizes, fabricated from zinc, aluminum and steel, featuring a variety of finishes and paint options. The technical properties of metal panel products discussed in this study are outlined in the table below.

Table 2: **Technical data.**

Parameter	Value	Unit
Length	various dimensions	m
Width	0.305 - 0.914	m
Thickness (Aluminum)	0.813 – 1.600	mm
Thickness (Steel)	0.701 - 1.311	mm
Density	n/a	kg/m3
Modulus of Elasticity	n/a	MPa
Tensile Strength	n/a	MPa
U-value	n/a	W/(m2-K)
R-value	n/a	m2-K/W
Water vapor permeance	n/a	Metric perms
Airborne sound reduction	n/a	dB
Sound absorption coefficient	n/a	%

DESIGN COMPOSITION

The following figure provides the mass breakdown (kg per declared unit) of the material composition of each product considered in this declaration.

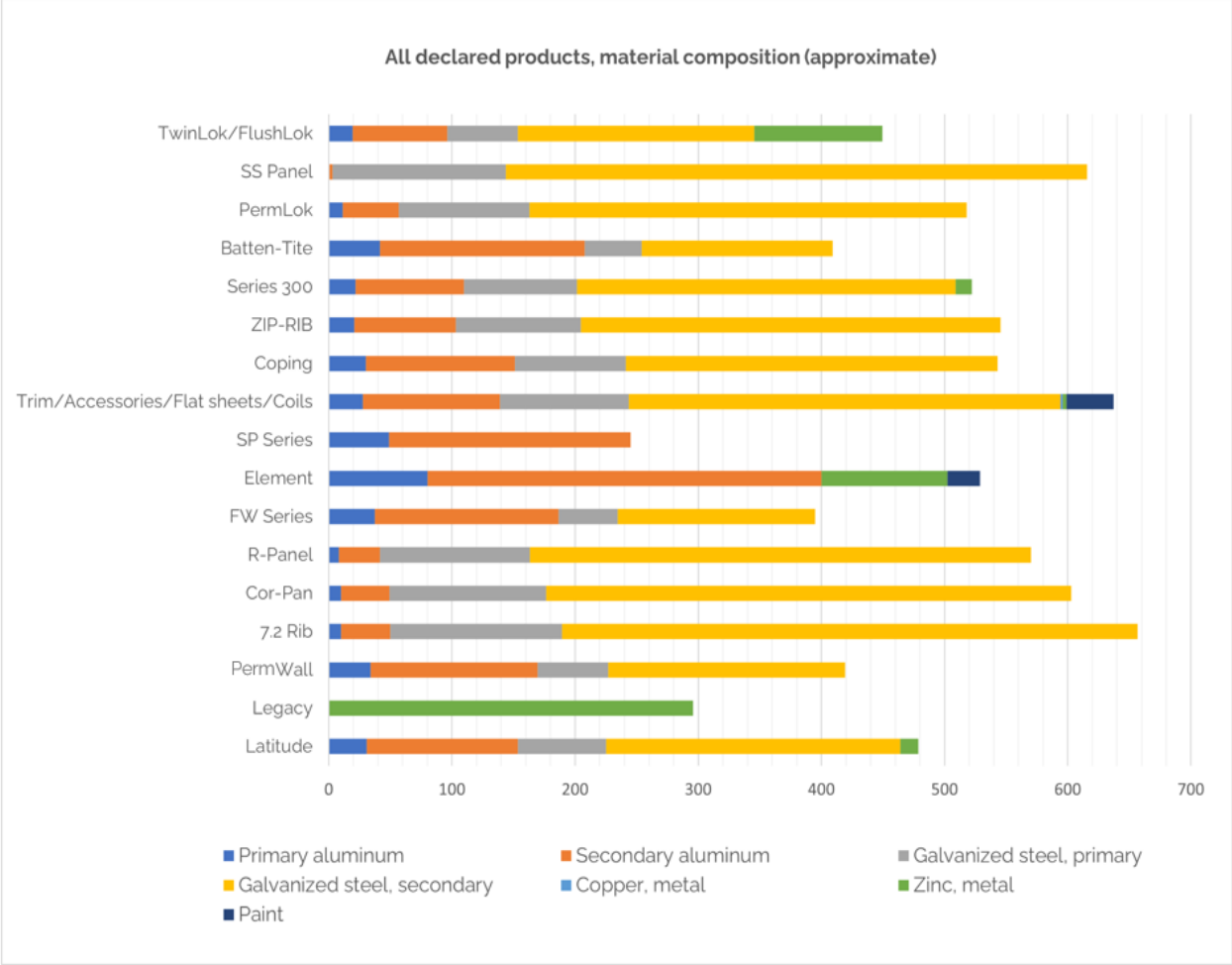

Figure 1: **Material composition - all declared products per 100 m2 of metal panel product.**

The following tables provide a list of metal panel products considered in this EPD, along with key performance parameters.

Table 3: **Declared products with all declared products considered in this environmental product declaration.**

Prod #	Unique name/ID	Short description	Declared Unit (DU)	Density, dry kg/DU	bio-carbon content, kg C/DU dry basis
1	Latitude	Metal wall panel systems	100 m2	478.64	0.00
2	Legacy	Metal wall panel systems	100 m2	295.77	0.00
3	PermWall	Metal wall panel systems	100 m2	419.36	0.00
4	7.2 Rib	Metal wall panel systems	100 m2	656.68	0.00
5	Cor-Pan	Metal wall panel systems	100 m2	602.82	0.00
6	R-Panel	Metal wall panel systems	100 m2	570.10	0.00
7	FW Series	Metal wall panel systems	100 m2	395.06	0.00
8	Element	Metal wall panel systems	100 m2	528.67	0.00

9	SP Series	Metal wall panel systems	100 m2	245.16	0.00
10	Trim/Accessories/Flat sheets/Coils	Accessories	100 m2	637.43	0.00
11	Coping	Accessories	100 m2	543.20	0.00
12	ZIP-RIB	Metal roof panel systems	100 m2	545.56	0.00
13	Series 300	Metal roof panel systems	100 m2	522.19	0.00
14	Batten-Tite	Metal roof panel systems	100 m2	409.13	0.00
15	PermLok	Metal roof panel systems	100 m2	518.00	0.00
16	SS Panel	Metal roof panel systems	100 m2	615.68	0.00
17	TwinLok/FlushLok	Metal roof panel systems	100 m2	449.54	0.00

A1 RAW MATERIAL RECYCLED CONTENT AND MATERIAL LOSSES

The following table provides a list of the raw material inputs (module A1) across all products considered, their recyclability content, and assumed material losses.

Table 4: **Module A1 raw material inputs, the recyclability content and assumed material losses (dry basis).**

Material Name	Mix Category	Primary Content	Avg. Post Industrial Content	Avg. Post Consumer Content	Material Losses
Primary aluminum	aluminum alloy, AlMg3	100%	0%	0%	2%
Primary steel	Steel, low-alloyed	100%	0%	0%	2%
Secondary aluminum	aluminum, wrought alloy	0%	25%	55%	2%
Secondary steel	Steel, low-alloyed	0%	5%	75%	2%
Recycled steel (Alabama)	Steel, low-alloyed	0%	12.2%	59.40%	2%
Zinc, metal	zinc	100%	0%	0%	2%
Copper, metal	Copper, cathode	100%	0%	0%	2%
Post-paint/finish	alkyd paint, white, without water, in 60% solution state	100%	0%	0%	2%
Galvanized coating	zinc coat, coils	100%	0%	0%	2%
Pre-paint	Polyvinyl fluoride, film	100%	0%	0%	2%

Note: The recycled content percentages referenced in this study reflect typical reported averages derived from the standardized recycled content data sheets and may vary based on material sources and manufacturing practices.

MANUFACTURING PROCESS

The following figure illustrates the manufacturing process of metal panel products, produced by IMETCO at their manufacturing facility in Peachtree Corners, GA.

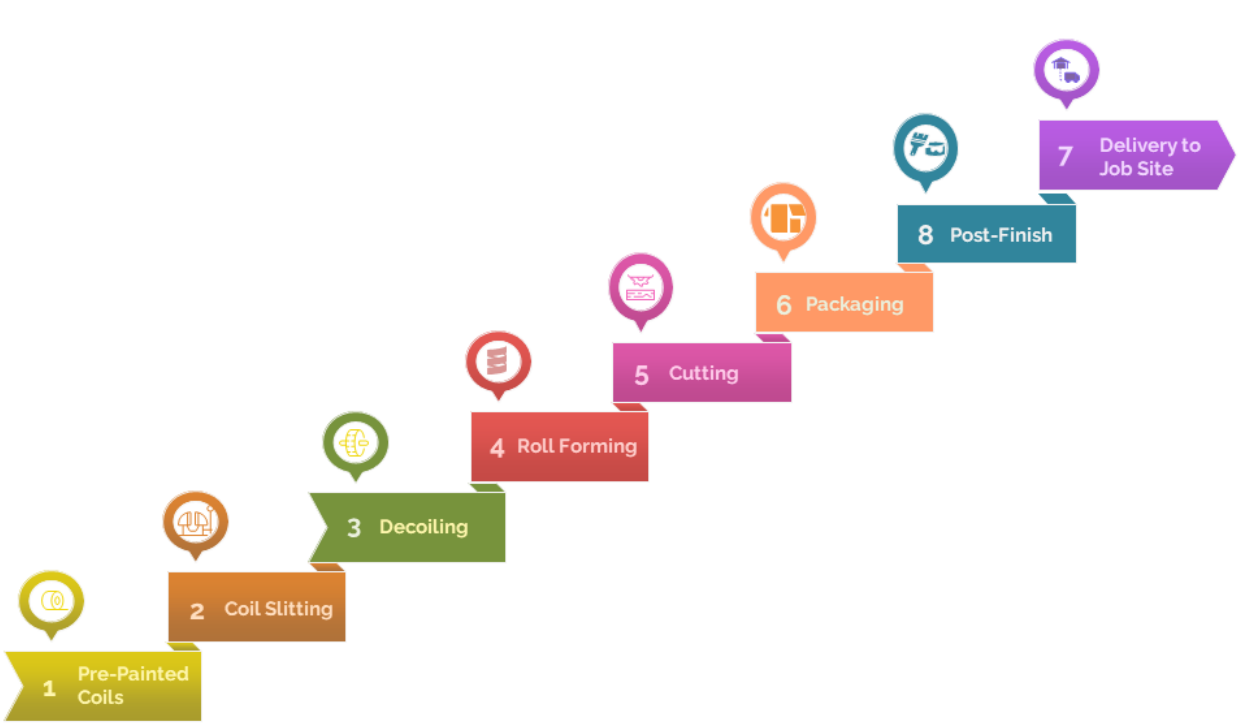

Figure 2: **Process flow diagram for the production of metal panel products.**

Roll forming is a manufacturing process in which a metal coil or sheet — often made of materials like coiled steel, aluminum, copper, or zinc — is progressively shaped as it moves through a series of rolling dies or stands. Each set of rolls makes a slight adjustment to the material until the final cross-sectional shape is achieved. This method is particularly well-suited for creating long, uniform parts in high volumes, with less manual handling compared to techniques such as press braking. While roll forming can produce a wide range of profiles, each design requires a precisely engineered set of roll tools. Panels can be manufactured in a factory, shaped directly at the job site using a mobile roll-forming machine, or created through a combination of these methods.

Health, Safety and Environmental Aspects During Production

IMETCO 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, IMETCO uses energy-efficient methods and pollution control systems to limit environmental impact during production.

SYSTEM BOUNDARIES

The following figure depicts the cradle-to-gate (A1-A3) system boundary considered in this study:

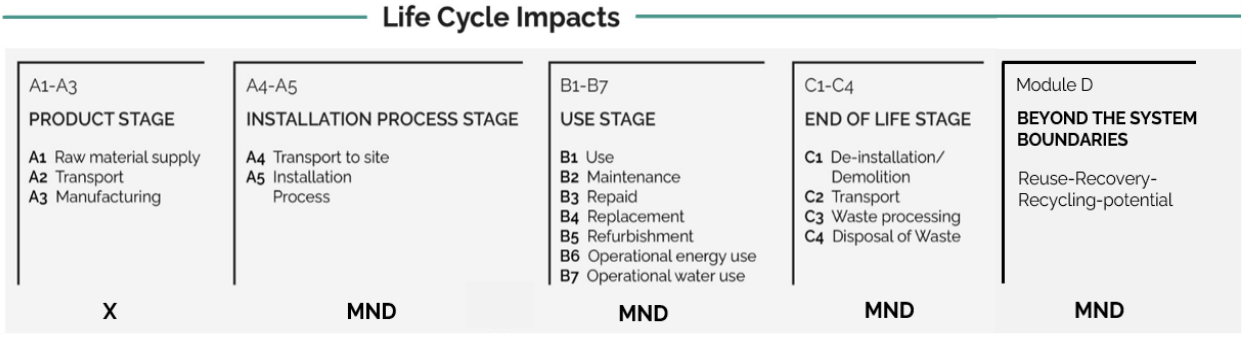

Figure 3: **General life cycle phases for consideration in a construction works system. (X = declared module, MND = module not declared).**

The following figure depicts the system boundary considered in this EPD and the general activities and input requirements for producing metal panel products, and it is not necessarily exhaustive.

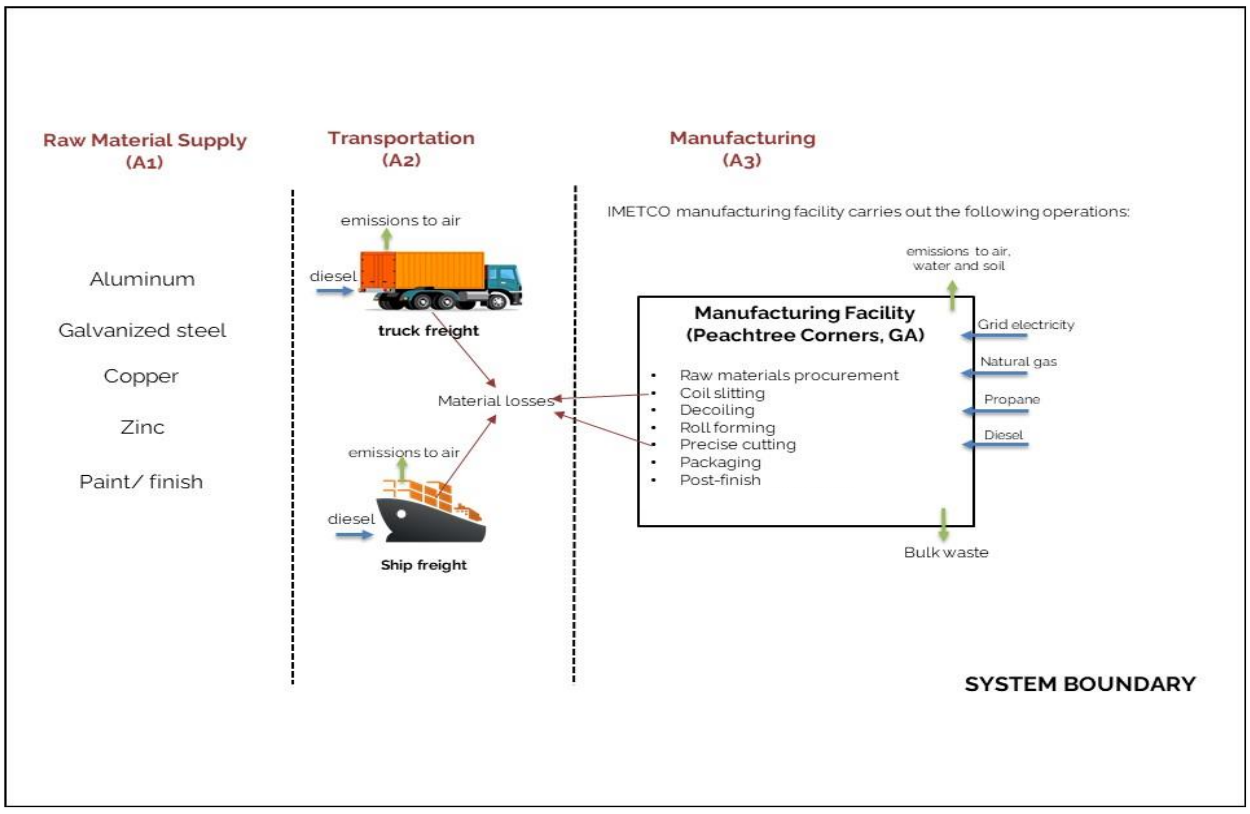

Figure 4: **General system inputs considered in the product system and categorized by modules in scope.**

The following life cycle stages are included in this EPD:

- A1: Raw material supply (upstream processes) - Extraction, handling, and processing of the materials used in the manufacturing of the declared products.
- A2: Transportation - Transportation of A1 materials from the supplier to 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.

The life cycle stages not covered by this EPD 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;
- Personnel-related activities (travel, furniture, office supplies);
- Energy use related to company management and sales activities.
- Packaging of incoming raw materials (e.g, packaging film, pallets, etc.) is excluded as it accounts for less than 1% of the product's mass.
- Research and development activities.
- Long-term emissions.

REPORTING PERIOD

This study represents the production data for 12 consecutive months from January 1, 2024, to December 31, 2024, for the IMETCO manufacturing facility in Peachtree Corners, GA.

CUT-OFF 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%.

ALLOCATION

This EPD follows the allocation guidelines of ISO 14044, ISO 21930, 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. As a default, secondary ecoinvent datasets use a physical mass basis for allocation. Secondary materials used adhere to the polluter pays principle. Thus, the environmental impacts allocated to these materials are limited to the treatment and transportation required to use them as a material input.

The processing and recycling of the net amount of scrap exiting the system, defined as the difference between scrap outputs and secondary material inputs, fall outside the scope of this study. The system boundary of this EPD is defined in accordance with the modularity principle as outlined in ISO 21930. All environmental impacts are assigned to the life cycle stages in which they occur, without allocation to other stages.

COMPARABILITY

Environmental declarations from different programs (ISO 14025) may not be comparable. EPDs are comparable only if prepared from cradle-to-grave life cycle results and based on the same function, quantified by the same functional unit, and taking account of replacement based on the product reference service life (RSL) relative to an assumed building service life, can be used to assist purchasers and users in making informed comparisons between products. This EPD is meant for B2B communication.

No known flows are deliberately excluded from this EPD.

DATA SOURCES AND DATA QUALITY ASSESSMENT

No recovered on-site energy occurs at this facility.

The following statements explain how the above facility requirements/generation were derived:

Raw material transport:

IMETCO provided all primary information for the reporting year 2024, including comprehensive details on raw material consumption and logistics data for its manufacturing facility. This includes all essential raw materials used in the manufacturing of the declared products. The transportation of these materials was determined based on the actual distance from the manufacturers or distributors. Logistics for A2 requirements relied on primary data to document transportation specifics, including the exact distance, mode of transport, and location details such as city, state, and country.

Electricity:

The reported electricity consumption is based on primary data from IMETCO's utility bills for the reporting period. The allocation of electricity was initially determined by normalizing the annual electricity consumption to the declared unit, i.e., 100 m2. Subsequently, this value was multiplied by the total production volume, measured in 100 m2, for each product covered in this study.

National production mix from import, medium voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Source	Amount	Unit
market for electricity, medium voltage/electricity, medium voltage/US-SERC/kWh	Ecoinvent 3.10.1	506.66	g CO2-eq/kWh

Process/space heating:

The facility incorporates natural gas within its production processes. The reported natural gas consumption is based on IMETCO's primary information derived from utility bills for the reporting period. The allocation methodology for natural gas consumption follows the same approach as that of electricity.

The conversion factor used for mmBTU to MJ to represent the natural gas heating values in Mega joules (MJ) was 1 mmBTU equating to 1055.06 MJ.

Machinery Fuel Requirement:

The machinery at the facility uses either propane or diesel to move materials in the facility. Primary data was gathered and calculated based on direct purchase records for the 2024 reference year. For propane, the conversion factor was determined as 1 m3 of propane = 93.2 MJ of energy. Similarly, 1 U.S gallon of diesel is equivalent to approximately 146.5 MJ of energy.

Waste generation:

Waste calculations were calculated using primary information from IMETCO's records or vendor bills, which includes bulk waste only. Transportation defaults were used because the driver's route and ultimate final destination are unknown. Therefore, the exact mileage could not be confirmed by the waste hauler.

Packaging:

Packaging accounts for approximately 9% to 24% of the total mass of the main products per the declared unit. The packaging materials used for metal panel products include packaging film and wooden pallets.

Recovered energy:

No on-site energy is recovered on site.

Recycled/reused material/components:

All the scrap/waste generated during the manufacturing process is reused, as every single material is consumable and can be reprocessed as a constituent in another manufacturing process.

Module A1 material losses:

Default material losses, 2%, were used.

Direct A3 emissions accounting:

Direct emissions were modeled with the best available ecoinvent processes.

A4 Transport to the building site:

Outside the scope of this EPD.

Product packaging waste:

The table below outlines the packaging waste generation and its biogenic carbon content per the declared unit.

Table 5: **A5 installation packaging waste and biogenic carbon content.**

Name	Unit	Value
Wooden pallet	kg	38.95
Packaging film (plastic)	kg	20.55
Biogenic carbon content of packaging (wooden pallet)	kg C	19.47
Biogenic carbon content of packaging (packaging film)	kg C	n/a

Note: Pallet waste generated at the construction stage can be reused, while the plastic film waste is disposed of in a landfill.

Use stage:

Outside the scope of this EPD.

Reference service life:

Outside the scope of this EPD.

End-of-life scenarios:

Outside the scope of this EPD.

Preferred waste management:

At the end of the product service life, metal panel products should follow a sustainable cycle through responsible recycling wherever feasible. Both aluminum and steel are highly efficient, durable and 100% recyclable building materials that can be recycled repeatedly. 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.

DATA SOURCES

Specific data for the product composition is provided by the manufacturer. The data represents the production of the declared product and was collected for EPD development in the year of study. Background data is based on EPDs according to ISO 21930, EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below. There are no data gaps in the study; should any data gaps be identified, they are handled on an individual case basis.

Table 6: **LCI inputs assumed for module A1 (i.e. raw material inputs).**

Materials	Source	Data Quality	Year
Metal - Aluminum alloy (AlMg3)	ecoinvent v3.10.1	database	2023
Metal - Steel low alloy (BOF)	ecoinvent v3.10.1	database	2023
Metal - Aluminum scrap, post-consumer	ecoinvent v3.10.1	database	2023
Metal - Steel low alloy (EAF)	ecoinvent v3.10.1	database	2023
Metal - Zinc	ecoinvent v3.10.1	database	2023
Metal – Copper	ecoinvent v3.10.1	database	2023
Paint, water-based	ecoinvent v3.10.1	database	2023
Zinc coat - coils	ecoinvent v3.10.1	database	2023
Polyvinylfluoride film	ecoinvent v3.10.1	database	2023

DATA QUALITY ASSESSMENT

Data quality/variability requirements, as specified in the PCR, are applied. 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 LCI datasets where relatively recent region-specific electricity inputs were utilized. The most relevant EPDs 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, recovered materials, emissions to air, water and soil, and waste recycling and treatment. The same background LCI datasets from the ecoinvent 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. 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.

Representativeness:

The representativeness of the data is summarized as follows**:**

- Time related coverage of the manufacturing processes' primary collected data from 2024-01-01 to 2024-12-31.
- Upstream (background) LCI data was either the PCR specified default (if applicable) or more appropriate LCI datasets as found in the country-adjusted ecoinvent 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. In instances where primary data was unavailable, representative datasets were employed that closely reflect the regional and temporal scope of the project.

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 IMETCO products. Collaboration among LCA practitioners, IMETCO 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 v3.10.1.
- The allocation of inputs and outputs is based on physical characteristics, i.e., area basis.
- The recycled content percentages considered in this study for the declared products are typical averages based on standardized data sheets and may vary depending on material sources and manufacturing practices.

ENVIRONMENTAL INDICATORS AND INVENTORY METRICS

Per the PCR, this EPD supports the life cycle impact assessment indicators and inventory metrics as listed in the tables below. As specified in the PCR, the most recent US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), impact categories were utilized as they provide a North American context for the mandatory category indicators to be included in the EPD. Additionally, the PCR requires a set of inventory metrics to be reported with the LCIA indicators (see tables below).

The following LCIA methods were used to report the LCI results in this EPD:

- IPCC 2013 developed the Intergovernmental Panel on Climate Change based on Fifth Assessment Report (AR5).
- TRACI (Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts), developed by the U.S. EPA.
- CML-IA, developed at Leiden University.

Characterization factors were applied using established LCIA methods, including TRACI 2.1 (Bare et al., 2012), CML-IA (v4.8, 2016) (Guinée et al., 2016), and IPCC 2013 (AR5) to convert inventory data into potential environmental impacts.

Table 7: **Life cycle impact categories and life cycle inventory metrics.**

ID	LCIA indicators	Abbreviations	Units
1	Climate change: global warming potential	GWP100	kg CO2-eq
2	Ozone depletion: ozone depletion potential (ODP)	ODP	kg CFC-11-eq
3	Acidification: acidification potential (AP)	AP	kg SO2-eq
4	Eutrophication: eutrophication potential	EP	kg N-eq
5	Smog formation potential	SFP	kg O3-eq
6	Energy resources: non-renewable: abiotic depletion potential (ADP): fossil fuels	ADPfossil	MJ
Inventory metrics			
7	Inventory indicators ISO21930: Cumulative Energy Demand - renewable energy resources	RPRE	MJ
8	Inventory indicators ISO21930: Renewable primary resources with energy content used as material (i.e., PERM)	RPRM	MJ
9	Inventory indicators ISO21930: Cumulative Energy Demand - non-renewable energy resources	NRPRE	MJ
10	Inventory indicators ISO21930: Non-renewable primary resources with energy content used as material (i.e., PENRM)	NRPRM	MJ
11	Inventory indicators ISO21930: use of secondary material	SM	kg
12	Inventory indicators ISO21930: use of renewable secondary fuels	RSF	MJ
13	Inventory indicators ISO21930: use of non-renewable secondary fuels	NRSF	MJ
14	Inventory indicators ISO21930: recovered energy	RE	MJ
15	Inventory indicators ISO21930: use of net fresh water	FW	m3
16	Inventory indicators ISO21930: hazardous waste disposed	HWD	kg
17	Inventory indicators ISO21930: non-hazardous waste disposed	NHWD	kg
18	Inventory indicators ISO21930: radioactive waste disposed	RWD	kg
19	Inventory indicators ISO21930: materials for recycling	MR	kg
20	Inventory indicators ISO21930: materials for energy recovery	MER	kg
21	Inventory indicators ISO21930: exported energy - electricity	EEel	MJ
22	Inventory indicators ISO21930: exported energy - heat	EEheat	MJ

It should be noted that emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in any of the following categories.

- Renewable primary energy resources as energy (fuel);
- Renewable primary resources as material;
- Non-renewable primary resources as energy (fuel);
- Non-renewable primary resources as material;
- Secondary Materials;
- Renewable secondary fuels;
- Non-renewable secondary fuels;
- Recovered energy;
- Abiotic depletion potential for non-fossil mineral resources.
- Land use related impacts, for example on biodiversity and/or soil fertility;
- Toxicological aspects;
- Emissions from land use change [GWP 100 (land-use change)];
- Hazardous waste disposed;
- Non-hazardous waste disposed;
- High-level radioactive waste;
- Intermediate and low-level radioactive waste;
- Components for reuse;
- Materials for recycling;
- Materials for energy recovery;
- Recovered energy exported from the product system.

TOTAL IMPACT SUMMARY

The following table reports the total LCA results for each metal panel product produced at a given facility per declared unit 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 8: **Total life cycle (across modules in scope) impact results for all declared products, on a per 100 m2 basis.**

a) Midpoint Impact Categories:

Indicator/LCI Metric	*GWP	ODP	AP	EP	SFP	**ADPfossil
Unit	**kg CO2-eq**	**kg CFC-11-eq**	**kg SO2-eq**	**kg N-eq**	**kg O3-eq**	**MJ**
Latitude	1.03E+03	7.90E-06	5.15E+00	1.07E+03	6.77E+01	1.23E+04
Legacy	9.30E+02	1.29E-05	7.30E+00	1.07E+03	1.29E+02	1.47E+04
PermWall	9.19E+02	6.96E-06	4.68E+00	1.07E+03	5.87E+01	1.09E+04
7.2 Rib	1.26E+03	8.61E-06	5.12E+00	1.07E+03	7.35E+01	1.46E+04
Cor-Pan	1.17E+03	8.05E-06	4.79E+00	1.07E+03	6.86E+01	1.36E+04
R-Panel	1.12E+03	7.67E-06	4.54E+00	1.07E+03	6.54E+01	1.30E+04
FW Series	8.84E+02	6.81E-06	4.67E+00	1.07E+03	5.73E+01	1.06E+04
Element	1.44E+03	1.50E-05	9.74E+00	1.07E+03	1.20E+02	1.80E+04
SP Series	6.58E+02	5.65E-06	4.16E+00	1.07E+03	4.72E+01	8.19E+03
Trim/Accessories/Flat sheets/Coils	1.76E+03	1.48E-05	7.99E+00	1.07E+03	1.03E+02	1.96E+04
Coping	1.11E+03	8.10E-06	5.30E+00	1.07E+03	6.86E+01	1.30E+04
ZIP-RIB	1.09E+03	7.78E-06	4.88E+00	1.07E+03	6.60E+01	1.28E+04
Series 300	1.08E+03	7.99E-06	5.02E+00	1.07E+03	6.86E+01	1.28E+04
Batten-Tite	9.13E+02	7.09E-06	4.93E+00	1.07E+03	5.95E+01	1.09E+04
PermLok	1.03E+03	7.17E-06	4.31E+00	1.07E+03	6.11E+01	1.21E+04
SS Panel	1.18E+03	7.85E-06	4.45E+00	1.07E+03	6.72E+01	1.36E+04
TwinLok/FlushLok	1.03E+03	9.68E-06	5.99E+00	1.07E+03	8.87E+01	1.34E+04

*The LCI indicator (GWP 100) did not include biogenic carbon removal(s) & emissions and emissions from land use change [GWP100 (land-use-change)].

*GWP100 was reported using the IPCC 2013 (AR5) LCIA methodology.

**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**
Latitude	1.73E+03	6.41E+02	1.23E+04	4.23E+01	3.23E+02	1.76E+01	0.00E+00	0.00E+00	6.94E+00
Legacy	2.73E+03	6.41E+02	1.46E+04	4.23E+01	1.41E+01	1.76E+01	0.00E+00	0.00E+00	2.69E+01
PermWall	1.60E+03	6.41E+02	1.09E+04	4.23E+01	2.94E+02	1.76E+01	0.00E+00	0.00E+00	5.91E+00
7.2 Rib	1.75E+03	6.41E+02	1.45E+04	4.23E+01	4.37E+02	1.77E+01	0.00E+00	0.00E+00	4.24E+00
Cor-Pan	1.68E+03	6.41E+02	1.36E+04	4.23E+01	4.01E+02	1.77E+01	0.00E+00	0.00E+00	4.08E+00
R-Panel	1.63E+03	6.41E+02	1.30E+04	4.23E+01	3.77E+02	1.76E+01	0.00E+00	0.00E+00	3.86E+00
FW Series	1.59E+03	6.41E+02	1.05E+04	4.23E+01	2.81E+02	1.76E+01	0.00E+00	0.00E+00	6.18E+00
Element	2.88E+03	7.71E+02	1.77E+04	3.75E+02	3.34E+02	1.77E+01	0.00E+00	0.00E+00	2.14E+01
SP Series	1.48E+03	6.41E+02	8.16E+03	4.23E+01	2.02E+02	1.76E+01	0.00E+00	0.00E+00	7.13E+00
Trim/Accessories/Flat sheets/Coils	2.44E+03	6.76E+02	1.88E+04	9.06E+02	4.08E+02	1.77E+01	0.00E+00	0.00E+00	1.14E+01
Coping	1.74E+03	6.41E+02	1.30E+04	4.23E+01	3.75E+02	1.76E+01	0.00E+00	0.00E+00	6.07E+00
ZIP-RIB	1.67E+03	6.41E+02	1.27E+04	4.23E+01	3.71E+02	1.76E+01	0.00E+00	0.00E+00	5.01E+00
Series 300	1.72E+03	6.41E+02	1.27E+04	4.23E+01	3.47E+02	1.76E+01	0.00E+00	0.00E+00	6.12E+00
Batten-Tite	1.63E+03	6.41E+02	1.09E+04	4.23E+01	2.94E+02	1.76E+01	0.00E+00	0.00E+00	6.67E+00
PermLok	1.57E+03	6.41E+02	1.20E+04	4.23E+01	3.45E+02	1.76E+01	0.00E+00	0.00E+00	3.95E+00
SS Panel	1.63E+03	6.41E+02	1.36E+04	4.23E+01	4.02E+02	1.77E+01	0.00E+00	0.00E+00	3.11E+00
TwinLok/FlushLok	2.07E+03	6.41E+02	1.34E+04	4.23E+01	2.41E+02	1.76E+01	0.00E+00	0.00E+00	1.33E+01

c) Waste/output Inventory Metrics:

Indicator/LCI Metric	HWD	NHWD	RWD	***CRU	MR	MER	EEel	EEheat
Unit	kg	Kg	kg	kg	kg	kg	MJ	MJ
Latitude	2.30E+02	6.11E+03	4.29E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Legacy	1.11E+02	3.03E+03	7.41E-03	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PermWall	1.98E+02	5.06E+03	4.70E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.2 Rib	3.43E+02	1.01E+04	1.38E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cor-Pan	3.14E+02	9.18E+03	1.38E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
R-Panel	2.99E+02	8.72E+03	1.24E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW Series	1.82E+02	4.48E+03	5.11E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Element	2.10E+02	3.92E+03	1.12E+03	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SP Series	9.18E+01	1.43E+03	6.77E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trim/Accessories/Flat sheets/Coils	3.33E+02	8.97E+03	3.87E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Coping	2.63E+02	7.06E+03	4.15E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ZIP-RIB	2.73E+02	7.67E+03	2.76E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Series 300	2.59E+02	7.21E+03	3.04E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Batten-Tite	1.84E+02	4.46E+03	5.67E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PermLok	2.68E+02	7.74E+03	1.52E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SS Panel	3.30E+02	9.91E+03	6.92E+00	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TwinLok/FlushLok	2.05E+02	5.52E+03	2.63E+02	3.90E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00

*** This total includes only pallets for reuse.

Interpretation:

This study represents the environmental impacts of 100 m^2 of metal panel products. Primary data for IMETCO include galvanized steel, aluminum alloy, metals, paint, electricity, fuel consumption, and bulk waste. The study revealed specific key contributors or environmental hotspots that significantly contribute to the products' carbon footprint. The findings are as follows:

The most significant contributor to the metal panel products' carbon footprint, measured in kg CO_2 eq, stems from Module A1 (Raw Materials), including primary aluminum alloy (AlMg3), secondary steel, primary steel, and zinc-metal. Since these ingredients are the main constituents of the metal panels. Their contribution is directly related to the overall GWP, depending on the quantity used per declared unit.

Subsequently, the A3 manufacturing stage, primarily driven by electricity consumption, contributes significantly to the overall Global Warming Potential (GWP), accounting for approximately 10% to 15%. While other components and life cycle stages contribute to the global warming potential (GWP), their impact is comparatively smaller.

ADDITIONAL ENVIRONMENTAL INFO

- 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 regarding the performance attributes and test standards of the products can be found at https://imetco.com.

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