

## ENVIRONMENTAL PRODUCT DECLARATION

# COLD-FORMED STEEL FRAMING SYSTEMS

STRUCTURAL, STUDRITE®, JOISTRITE®, CLIPSOURCE® CONNECTORS, QUICKFRAME, VIPERSTUD®, SHAFTWALL, AREA SEPARATION WALL, FAS TRACK, SLOTTED TRACK, LATH, SOUNDGUARD, ACCESSORIES



*Marino\WARE manufactures and distributes a wide range of cold-formed steel framing products and accessories. Above are examples of SoundGuard (bottom right), ClipSource products (bottom left) and our StudRite system (top).*



### Sustainability at Marino\WARE®

Marino\WARE believes sustainability and environmental management are not construction industry trends, but corporate responsibilities. Architects, designers and contractors demand tools and resources to improve the environmental performance of buildings, and Marino\WARE products help them achieve their sustainability objectives.

Steel is inherently a green building product. It can be recycled time and time again. It is our goal to show the construction industry through our company specific Environmental Product Declaration that steel should be the product of choice for green building professionals.

For additional information, visit [www.marinoware.com](http://www.marinoware.com).



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**MarinoWARE®**  
Cold-Formed Steel Framing Systems

According to ISO  
14025, EN 15804, and  
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EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Environment 333 Pfingsten Road Northbrook, IL 60611	<a href="https://www.ul.com/">https://www.ul.com/</a> <a href="https://spot.ul.com/">https://spot.ul.com/</a>
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	General Program Instructions v.2.5 March 2020	
MANUFACTURER NAME AND ADDRESS	MarinoWARE   777 Greenbelt Pkwy Griffin Georgia 30223-4518	
DECLARATION NUMBER	4789995390.101.2 (Extended)	
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Cold-Formed Steel Framing Products; 1 metric ton	
REFERENCE PCR AND VERSION NUMBER	Part B: Steel Construction Product EPD Requirements, v2.0 (August 26, 2020)	
DESCRIPTION OF PRODUCT APPLICATION/USE	Cold-Formed Steel Products are used in a wide range of steel framing products and accessories for both commercial and residential construction markets.	
PRODUCT RSL DESCRIPTION (IF APPL.)	N/A	
MARKETS OF APPLICABILITY	North America	
DATE OF ISSUE	July 1, 2021	
DATE OF EXPIRATION	June 30th, 2027	
EPD TYPE	Product-Specific Type III	
RANGE OF DATASET VARIABILITY	N/A	
EPD SCOPE	Cradle-to-gate	
YEAR(S) OF REPORTED PRIMARY DATA	2020	
LCA SOFTWARE & VERSION NUMBER	GaBi v10	
LCI DATABASE(S) & VERSION NUMBER	GaBi 2021.1	
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1	

This PCR Review was conducted by:	UL Environment
	PCR Review Panel
	epd@ulenvironment.com
This declaration was independently verified in accordance with ISO 14025: 2006. <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	<i>Grant R. Martin</i>
	Grant R. Martin, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	<i>Thomas P. Gloria</i>
	Thomas P. Gloria, Industrial Ecology Consultants

## LIMITATIONS

**Exclusions:** EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

**Accuracy of Results:** EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

**Comparability:** EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. 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.

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## 1. Product Definition and Information

### 1.1. Company Description



Marino\WARE® helps build America. A wholly U.S. owned and operated steel framing manufacturer, Marino\WARE produces a complete line of steel construction products and services used in commercial building across the country.

The company's three large, self-sufficient mega-plants in South Plainfield, NJ, Griffin, GA, and East Chicago, IN sell—ViperStud® drywall framing, structural, shaftwall, StudRite, JoistRite, SoundGuard, ClipSource Connectors, plastering and drywall finishing products—all under one roof.

### 1.2. Product Description

The Marino\WARE steel framing products covered by this EPD are:



#### Structural Stud & Track

- Used for load-bearing framing, curtain wall, headers, rafters and floor systems
- Conventional C-shape, wide variety of gauges and flange sizes



#### StudRite®

- Proprietary stud system used for load-bearing framing, rafters and curtain walls
- Lip reinforced repetitive triangular knockouts
- Lightweight, easy to use, less cutting by trades



#### JoistRite®

- Used as a floor joist system
- Large lip reinforced repetitive triangular knockouts for easy pass through of trades

*Material & Coatings:*

*Marino\WARE  
uses low alloy steel  
with metallic or  
conversion coatings.*

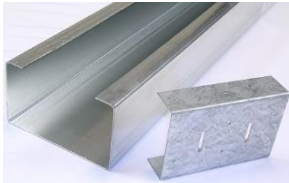


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### QuickFrame

Rough opening framing system that uses large C-shaped members to replace built up headers and jambs



### ViperStud®

Proprietary drywall framing system that uses thinner high-strength steel to achieve performance equivalent of conventional thickness lower-strength steel drywall framing members



### Shaftwall

CT stud framing system for non load-bearing framing that allows installation of gypsum wallboard from one side only; easy to use for stairwells and shaft



### Slotted Track & FAS Track

Fire-rated head-of-wall system that allows for deflection at the ceiling-to-floor intersection while providing a fire-rated joint



### ClipSource® Connectors

Steel framing connectors produced in a wide variety of shapes and sizes for connecting framing members



### Lath

Expanded metal lath is made by slitting and stretching galvanized steel to create small openings that allow plaster to bond with the lath



### SoundGuard

Acoustically decoupled stud for interior partitions with high STC ratings



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## 1.3. Application

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Marino\WARE uses cold-formed steel to manufacture a wide range of steel framing products and accessories for The commercial and residential construction markets. Common applications are:

1. Interior and Exterior framing, both for load-bearing and non-load bearing applications
2. Interior and exterior finishing
3. Floor framing
4. Accessories for interior and exterior framing

## 1.4. Declaration of Methodological Framework

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The EPD has been created strictly in accordance to the standards and norms below:

- ISO 14025:2011 Type III environmental declarations - Principles and procedures [EN ISO 14025].
- EN 15942: 2011, Sustainability of construction works – Environmental Product Declarations – Communication format business-to-business. European Committee for Standardization [EN 15942].
- ISO 21930: 2017, Sustainability in building and construction – Environmental declaration of building products, International Organization for Standardization, Geneva, Switzerland [ISO 21930].
- Product Category Rule (PCR) Guidance for building-related products and services- Part A: Life Cycle Assessment Calculation Rules and Report Requirements [UL 2018]
- Product Category Rule (PCR) Guidance for building-related products and services- Part B: Designated steel construction product EPD requirements [UL 2020].



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## 1.5. Technical Requirements

### MATERIAL SPECIFICATION (ASTM)

ViperStud® Drywall Nonstructural Framing Members & Accessories .....	A1003/A653
Structural Framing Members & Accessories .....	A1003/A653
JoistRite® Framing Members & Accessories .....	A1003/A653
StudRite® Framing Members & Accessories .....	A1003/A653
QuickFrame™ .....	A1003/A653
Shaftwall .....	A1003/A653
SoundGuard® .....	A1003/A653

### PRODUCT SPECIFICATION

	ASTM
ViperStud® Drywall Nonstructural Framing Members & Accessories .....	C645
Structural Framing Members & Accessories .....	C955
JoistRite® Framing Members & Accessories .....	C955
StudRite® Framing Members & Accessories .....	C645/C955
QuickFrame™ .....	C955
Shaftwall .....	C645
SoundGuard® .....	C645
Beads & Trims (Metal, Paper, Vinyl) .....	C1047
Veneer & Plaster Accessories .....	C841/C1063
Metal Lath .....	C847

### COATING SPECIFICATION

	ASTM
ViperStud® Drywall Nonstructural Framing Members & Accessories .....	C645/A1003
Structural Framing Members & Accessories .....	C955/A1003
JoistRite® Framing Members & Accessories .....	C955/A1003
StudRite® Framing Members & Accessories .....	C645/C955/A1003
QuickFrame™ .....	C955/A1003
Shaftwall .....	C645/A1003
SoundGuard® .....	C645/A1003
Metal Lath .....	C847/A1003

### SUREBOARD

- IAPMO ES ER-0126
- IAPMO ES ER-0185

### JOISTRITE®

- ICC-ES ESR #1741



### CLIPSOURCE® CONNECTORS

- ICC-ES ESR #3578



### VIPERSTUD® DRYWALL FRAMING

- Intertek CCRR-0154



### STUDRITE®

- IAPMO ES ER-781



### METAL LATH

- ICC-ES ESL #1005



### STRUCTURAL STUD & TRACK

- ICC-ES ESR #4062



*MarinoWARE products are not expected to create exposure conditions that exceed safe thresholds for health impacts to humans or flora/fauna under normal operating conditions.*



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## 1.6. Properties of Declared Product as Delivered

PRODUCT	SIZES	THICKNESS (MILS)
STRUCTURAL	1-5/8"–16" Stud & Track	33, 43, 54, 68, 97, 118
STUDRITE	3-5/8", 4", 6", 8"	18, 30, 33, 43, 54, 68
JOISTRITE	8", 9-1/4", 10", 11-1/4", 12", 14"	43, 54, 68, 97
QUICKFRAME	3-5/8", 4", 6", 8"	54, 68, 97, 118
VIPERSTUD	1-5/8"–6"	25eq, 20eq, 30, 33
SHAFTWALL	2-1/2", 4", 6"	18, 30, 33, 43
SLOTTED / FAS TRACK	2-1/2"–10"	18, 30, 33, 43, 54, 68
FRAMERITE CONNECTORS	Various	Various
LATH	27" x 97"	1.75lb./yd <sup>2</sup> , 2.5 lb./yd <sup>2</sup> , 3.4 lb./yd <sup>2</sup>

## 1.7. Material Composition

Marino\WARE manufactures a variety of steel framing products using low alloy metallic coated (ex. HDG) or conversion coated steel. As the cold-forming process solely represents the mechanical shaping of the input material, i.e. HDG steel, the product is entirely composed of coated steel.

Material	Mass [kg]	Mass [%]	DQI*
Coated Steel	1000	100	Measured

## 1.8. Manufacturing

The EPD represents Marino\WARE's cold-forming process at three sites, South Plainfield, NJ, Griffin, GA, and East Chicago. The manufacturing operations include following steps and are summarized in Figure 1.

- Coil slitting
  - Decoiling
  - Slitting
  - Recoiling
- Roll forming
- Packaging
- Loading



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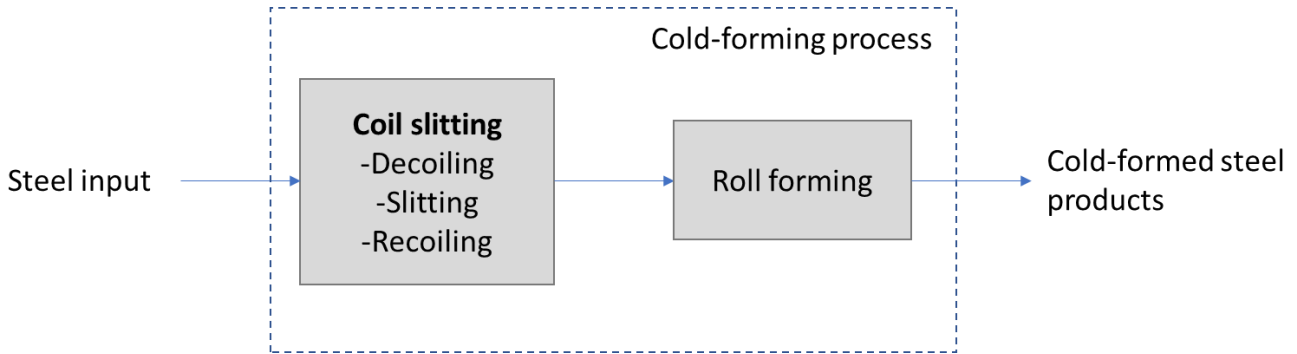


Figure 1: Flow diagram with cold-forming steel manufacturing steps

## 1.9. Packaging

All of the various steel framed products are packaged and shipped using one of the following material: steel banding, plastic wrapping, and wooden palets.

Product Image	Product Category	Product Description
	Exterior Framing: Skid (StudRite in photo-conventional framing packaged similiarly)	Framing members are nested together, and strapped with banding over lumber.
	Interior Framing: Skid (SoundGuard in photo-conventional framing packaged similiarly)	Framing members are nested together, and strapped with banding over lumber.
	Exterior Finishing: Metal Lath - Skids	Bundles are plastic strapped together, then bundles are stacked and strapped with banding over lumber.




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Product Image	Product Category	Product Description
	Interior & Exterior Finishing accessories: Boxed goods	Cardboard boxes are stacked and strapped with banding over lumber.

## 1.10. Transportation

Transportation to customer after production not declared in this EPD.

## 1.11. Product Installation

Product Installation is not declared in this EPD.

## 1.12. Use

Use of product is not declared in this EPD.

## 1.13. Reference Service Life and Estimated Building Service Life

As the declared system boundary is A1-A3, a reference service life is not declared.

## 1.14. Reuse, Recycling, and Energy Recovery

Reuse, Recycling and Energy Recovery of product is not declared in this EPD.

## 1.15. Disposal

Disposal of product is not declared in this EPD.



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## 2. Life Cycle Assessment – Product System and Modeling

A “cradle-to-gate” analysis using life cycle assessment (LCA) techniques was conducted for this EPD. The analysis was done according to the product category rule (PCR) for Designated Steel Construction Products and followed LCA principles, requirements and guidelines laid out in the ISO 14040/14044 standards. As such, EPDs of construction products may not be comparable if they do not comply with the same PCR. While the intent of the PCR is to increase comparability, there may still be differences among EPDs that comply with the same PCR (e.g., due to differences in system boundaries, background data, etc.).

### 2.1. Functional or Declared Unit

The declared unit for an EPD is one metric ton of steel construction product.

The declared unit of calculation is one metric ton of Cold-Formed Steel Product (1000 kg).

Name	Required Unit	Value
Declared Unit	Metric Ton	1

### 2.2. System Boundaries

The declared system boundary is cradle-to-gate. Cradle-to-gate includes the PCR life cycle modules A1, A2, and A3. The declared system boundaries are shown below:

Production			Installation		Use Stage							End-Of-Life				Next Product System
Raw material supply (extraction, processing, recycled material)	Transport to manufacturer	Manufacturing	Transport to building site	Installation into building	Use / application	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport to EoL	Waste processing for reuse, recovery or recycling	Disposal	Reuse, recovery or recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X= declared module; MND= module not declared

The system boundary and life cycle stages assessed in this EPD are shown in Figure



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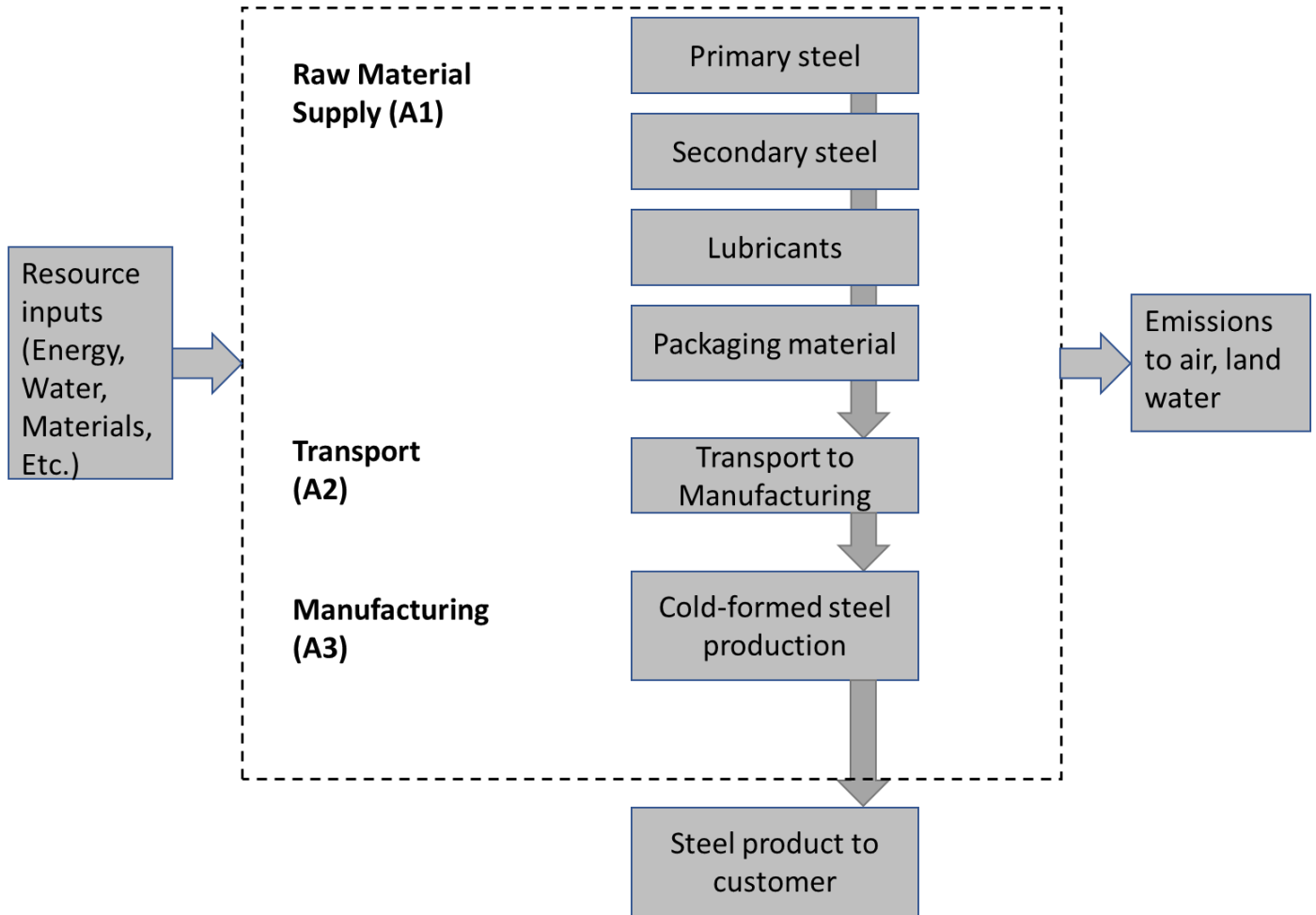


Figure 2: Flow diagram depicting the scope and system boundary



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## 2.3. Estimates and Assumptions

### Product Average (Production data assumptions)

This product specific EPD uses weighted averages based on production output from identical manufacturing processes at three production locations reported. Data from one site is considered as proxy for the other two sites. The electricity consumption is split between the three eGRID subregions, for the manufacturing sites based on the fractions of production output from each each site.

### Transport assumptions

The three MarinoWARE plants receive their materials from different sources, i.e., across different transport distances. For HDG steel inputs, a weighted average transport distance was applied based on each plant's fraction of total production and based on each plant's primary steel supplier's location. As a result, the weighted average distance is 793 kms. by heavy-duty truck. Lubricant, propane and packaging inputs were each assigned an estimated transport distance of 161 kms.

Transport distance of all waste materials, other than steel scrap, to disposal is assumed to be 32 kms and is carried out by truck. Only one-way transport distances have been modeled.

### Final product packaging assumptions

MarinoWARE does not currently track packaging waste. It is assumed that 2% of the packaging material is processed as waste.

### Steel assumptions

As is in line with the PCR, all steel manufacturing processes use scrap, regardless of production route. However, input of scrap is considered to enter the system without burden, and reprocessing into valuable secondary steel is assumed to be done outside of the system boundary. This approach is considered to be consistent with a cradle-to-gate analysis, as the load of using scrap as well as the credit of creating scrap at the end-of-life are similarly excluded from the system boundary.

### Data approximations

Most of the material inputs declared by MarinoWARE for the production of cold-formed steel products could be matched with corresponding datasets from the GaBi 10 database. However, in some few instances a direct match was not possible and proxy data were used instead. It is worth noting that most of these proxies were used for auxiliary materials and packaging materials that do not significantly contribute to the overall mass balances of the unit processes considered in this study.

## 2.4. Cut-off Criteria

All input/output process data for the production of cold-formed steel products have been modelled. No cut-offs have been applied.

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## 2.5. Data Sources

All upstream data have been taken from the GaBi 2021 database (content version 2021.1), using GaBi software. All manufacturing data were collected from MarinoWARE for the calendar year 2019.

To ensure the highest data quality, primary data were collected by MarinoWARE. Where primary data could not be collected, background LCI data comes from the GaBi database.

## 2.6. Data Quality

### Representativeness

**Temporal:** All primary data were collected for the year 2019. All secondary data come from the GaBi 2021 databases and are representative of the years 2011-2020. Most of the burdens come from the AISI datasets and not from primary data. As the study intended to compare the product systems for the reference year 2019, temporal representativeness is considered to be high.

**Geographical:** All primary and secondary data were collected specific to the countries or regions under study. Where country-specific or region-specific data were unavailable, proxy data were used. Geographical representativeness is considered to be high.

**Technological:** All primary and secondary data were modeled to be specific to the technologies or technology mixes under study. Where technology-specific data were unavailable, proxy data were used. Technological representativeness is considered to be high.

### Completeness

All relevant process steps for each product system were considered and modeled to represent each specific situation. The process chain is considered sufficiently complete and detailed with regard to the goal and scope of this study.

### Reliability

Primary data for the production of cold-formed steel products were collected by ClarkDietrich using a specifically developed spreadsheet provided by thinkstep. Cross-checks concerning the plausibility of mass and energy flows were carried out by Sphera on the data received via email, telephone consultation and teleconferencing.

The foreground data is considered to be very good as it meticulously recorded all relevant energy and material flows. The background data quality is considered to be good.

### Consistency

All assumptions, methods and data are consistent with each other and with the study's goal and scope. Differences in background data quality were minimized by mainly using LCI data from the GaBi 2021 databases (with the exception of the steel input which was informed by AISI data). System boundaries, allocation rules, and impact assessment methods have been applied consistently throughout the study.

## 2.7. Period under Review

Primary data collected represent production during the 2020 calendar year. This analysis is intended to represent production in 2020.

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## 2.8. Allocation

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### Allocation of background data

Allocation of background data (energy and materials) taken from the GaBi 2021 databases is documented online at <https://sphaera.com/wp-content/uploads/2020/04/Modeling-Principles-GaBi-Databases-2021.pdf>.

### Allocation in the foreground data

The production process does not give rise to any co-products.

## 2.9. Comparability (Optional)

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Any comparison of EPDs shall be subject to the requirements of ISO 21930. For comparison of EPDs which report different module scopes, such that one EPD includes Module D and the other does not, the comparison shall only be made on the basis of Modules A1, A2, and A3. Additionally, when Module D is included in the EPDs being compared, all EPDs must use the same methodology for calculation of Module D values.



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## 3. Life Cycle Assessment – Results and Analysis

Table 1. Description of the system boundary modules

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
<b>EPD Type</b>	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

### 3.1. Life Cycle Impact Assessment Results

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Table 2. Impact Assessment Results: 1 metric ton of Cold-Formed Steel Product

TRACI v2.1	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
GWP 100 [kg CO <sub>2</sub> eq]	2.48E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ODP [kg CFC-11 eq]	1.73E-11	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP [kg SO <sub>2</sub> eq]	5.09E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP [kg N eq]	2.75E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SFP [kg O <sub>3</sub> eq]	8.92E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADP <sub>fossil</sub> [MJ, LHV]	2.02E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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.

Global warming potential (GWP) excludes biogenic carbon.



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## 3.2 Life Cycle Inventory Results

Table 3. Resource Use: 1 metric ton of Cold-Formed Steel Product

PARAMETER	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
RPR <sub>E</sub> [MJ, LHV]	1.59E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RPR <sub>M</sub> [MJ, LHV]	3.42E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RPR <sub>T</sub> [MJ, LHV]	-	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRPR <sub>E</sub> [MJ, LHV]	3.05E+04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRPR <sub>M</sub> [MJ, LHV]	2.21E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRPR <sub>T</sub> [MJ, LHV]	-	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM [kg]	3.92E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF [MJ, LHV]	-	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF [MJ, LHV]	-	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RE [MJ, LHV]	-	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW [m <sup>3</sup> ]	1.17E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Table 4. Output Flows and Waste Categories: 1 metric ton of Cold-Formed Steel Product

PARAMETER	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
HWD [kg]	1.16E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD [kg]	9.80E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
HLRW [kg]	1.10E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ILLRW [kg]	9.25E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU [kg]	-	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR [kg]	8.70E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER [kg]	-	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EE [MJ, LHV]	-	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND





MarinoWARE®  
Cold-Formed Steel Framing Systems



According to ISO  
14025, EN 15804, and  
ISO 21930:2017

#### 4. Life Cycle Assessment Interpretation

Module A1 contributes to over 89% of the impacts across all impact categories except for ozone depletion (ODP), renewable primary resources with energy content used as material (RPRM), and non-renewable primary resources with energy content used as material (NRPRM). The fabrication operations at MarinoWARE (A3) contribute to almost 100% of the impacts in these categories.

Module A2 contributes very little across the categories with a maximum of about 10% in the case of eutrophication potential (EP), and 7% for smog formation potential (SFP).

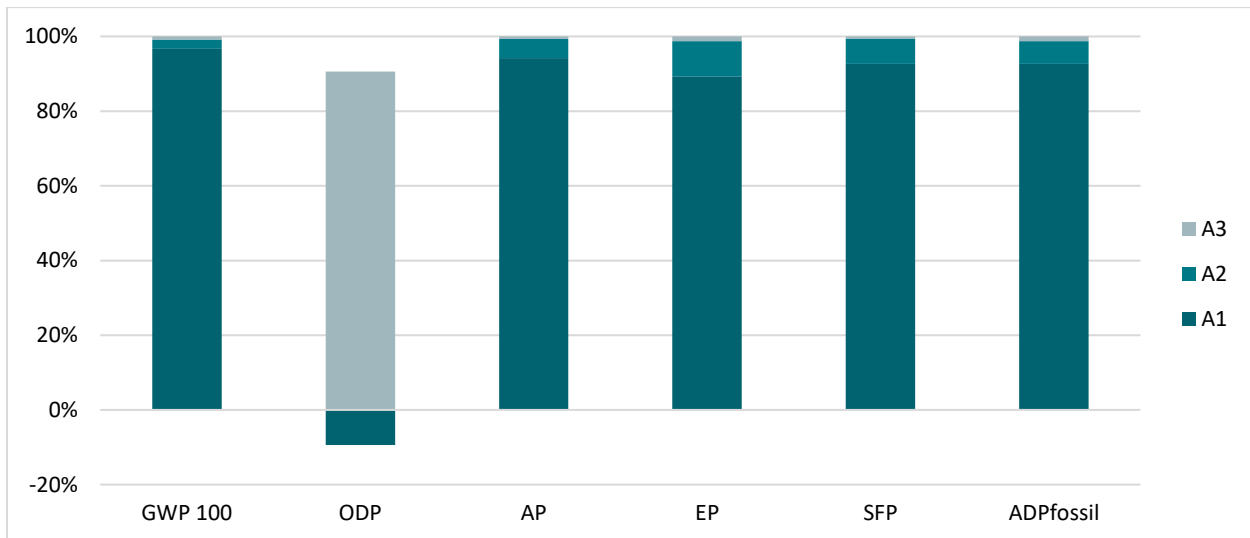


Figure 3: Cradle-to-gate life cycle impact assessment results

Other than the raw materials, inbound transport (i.e., transport of material inputs to the production site) has the highest contribution to manufacturing stage impacts across the categories and indicators with 3% contribution to GWP100 and 10% to eutrophication potential (EP).

Waste management (which includes transport of waste material to recovery or disposal, and relevant waste processing) makes negligible contributions to overall production phase impacts.



# ENVIRONMENTAL PRODUCT DECLARATION



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## 5. Supporting Documentation

Additional information Safety Data Sheets (SDS) and Health Product Declarations (HPD) may be found at

<https://www.marinoware.com/resource-center/sds/>

## 6. References

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