Declaration Owner

MBA Building Supplies
2200 Tempel Drive
Libertyville, IL 60048
www.mbastuds.com | 888.248.8076

Products
Light Gauge Steel Track and Stud Framing
manufactured at the following MBA Building Supplies locations:

- Libertyville, IL
- Frackville, PA
- Rainbow City, AL
- Dallas, TX

Declared Unit
The declared unit is one metric ton of steel track and stud product

EPD Number and Period of Validity
SCS-EPD-07566
EPD Valid January 7, 2022 through January 6, 2027

Product Category Rule
PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. UL 10010 Version 3.2. December 2018. UL Environment.

PCR Guidance for Building-Related Products and Services, Part B: Designated Steel Construction Product EPD Requirements. UL 10010-34. Version 2.0. August 2020. UL Environment

Program Operator
SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608
+1.510.452.8000 | www.SCSglobalServices.com

Declaration Owner:	MBA Building Supplies
Address:	2200 Tempel Drive. Libertyville, IL 60048
Declaration Number:	SCS-EPD--07566
Declaration Validity Period:	EPD Valid January 7, 2022 through January 6, 2027
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Gerard Mansell, Ph.D., SCS Global Services
LCA Software and LCI database:	OpenLCA 1.10 software and the Ecoinvent v3.7 database
Product RSL:	n/a
Markets of Applicability:	North America
EPD Type:	Product-Specific
EPD Scope:	Cradle-to-Gate
LCIA Method and Version:	TRACI 2.1
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal ☒ external
LCA Reviewer:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Part A Product Category Rule:	PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. UL 10010 Version 3.2. December 2018. UL Environment.
Part A PCR Review conducted by:	Lindita Bushi, PhD (Chair); Hugues Imbeault-Tétreault, ing., M.Sc.A.; Jack Geibig
Part B Product Category Rule:	PCR Guidance for Building-Related Products and Services, Part B: Designated Steel Construction Product EPD Requirements. UL 10010-34. Version 2.0. August 2020. UL Environment
Part B PCR Review conducted by:	Jack Geibig (chair), Ecoform; Thomas Gloria, Industrial Ecology Consultants; Thaddeus Owen
Independent verification of the declaration and data, according to ISO 14025 and the PCR	☐ internal ☒ external
EPD Verifier:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Declaration Contents:	

Disclaimers: *This EPD conforms to ISO 14025, 14040, 14044, and 21930.*

Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.*

In accordance with ISO 21930:2017, EPDs are comparable only if they comply with the core PCR, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.

1. MBA Building Supplies

More than 25 years since its founding, MBA Building Supplies continues to uphold the values the Company was built on, a sincere commitment to producing the highest quality products and providing the best service in the industry.

MBA manufactures light gauge steel framing and accessories. Our reputation has been built on a dedication to providing only the highest quality framing products manufactured at or above industry standards.

Our primary focus is on providing outstanding service to our customers. We take great pride in our ability to fill a wide variety of orders accurately, quickly and conveniently. Serving an industry in which schedule cannot be compromised, MBA maintains the quickest response times in the business.

2. Product

2.1 PRODUCT DESCRIPTION

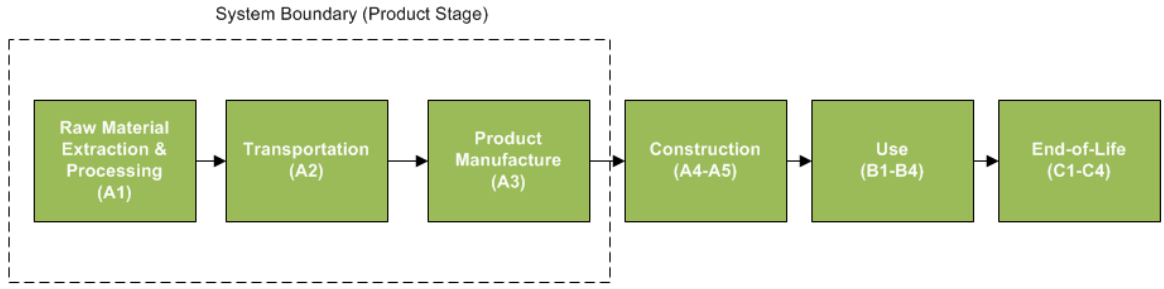
MBA manufactures cold-formed steel framing products from galvanized sheet steel. These steel framing products include steel studs and tracks. All MBA products are made from mill certified steel sheet. The steel framing products are used in a variety of construction applications for both load bearing and non-load bearing conditions including, but not limited to: interior walls and ceiling systems, exterior walls, floor and roof framing, soffit framing, and other architectural features.

As intermediate production products, the UNSPSC (or CSI/CSC) codes for the MBA steel stud and track are indeterminate.

The MBA steel framing studs and track products meet the requirements of ASTM C45, ASTM C995 and the SFIA Code Compliance Certification Program.

2.2 PRODUCT FLOW DIAGRAM

A flow diagram illustrating the life cycle phases included in the scope of the EPD is provided below.



2.3 APPLICATION

The products are intended for use in various commercial and residential building construction applications.

2.4 DECLARATION OF METHODOLOGICAL FRAMEWORK

The scope of the EPD is cradle-to-gate, including raw material extraction and processing, upstream transportation and product manufacture, including packaging. The life cycle phases included in the product system boundary are shown below.

Cut-off and allocation procedures are described below and conform to the PCR and ISO standards.

Table 1. *Life cycle phases included in the MBA Building Supplies' product system boundary.*

Product			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B1	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X = Module Included | MND = Module Not Declared

The EPD conforms to ISO 14040/44 and the PCR. The impact indicators considered for the assessment include:

- Potential for Global Warming,
- Acidification Potential,
- Eutrophication Potential,
- Photochemical Ozone (Smog) Formation Potential,
- Ozone Depletion Potential,
- Fossil Fuel Depletion Potential.

2.5 TECHNICAL DATA

Technical specifications for the MBA steel products are available at the manufacturer's website at www.mbastuds.com.

2.6 MATERIAL COMPOSITION

The primary materials include steel.

Table 2. *Average material content for the MBA products and packaging in metric tons per declared unit.*

Component	Material	Steel Framing Stud & Track
Product		
Steel framing stud/track	Metallic coated steel coil	1.00
Product Total		***1.00***
Packaging		
Packaging	Steel banding	$8.44x10^{-4}$
Packaging	Plastic strapping	$6.07x10^{-4}$
	Wood dunnage	$1.28x10^{-2}$
Packaging Total		***$1.43x10^{-2}$***

No substances required to be reported as hazardous are associated with the production of this product

2.7 MANUFACTURING

The assessed products include MBA's steel track and stud product manufactured at the company's production facilities in Illinois, Pennsylvania, Alabama and Texas. Electricity use at the manufacturer's facilities is modeled based on the regional electricity supply mix for appropriate NERC subregion using the USEPA eGRID emissions database. Electricity and resources (e.g., propane) used at the manufacturing facilities are allocated to the products based on annual production data for 2019.

2.8 PACKAGING

The products are packaged for shipment using plastic and metal banding and wood dunnage.

2.9 FURTHER INFORMATION

Further information on the products can be found on the manufacturers' website at www.mbastuds.com.

3. LCA: Calculation Rules

3.1 DECLARED UNIT

The declared unit, and reference flow, for the product system is one metric ton of steel product.

3.2 SYSTEM BOUNDARY

The scope of the EPD is cradle-to-gate, including raw material extraction and processing, transportation and product manufacture. The life cycle phases included in the EPD scope are described in Table 3 and illustrated in Figure 1.

Table 3. *The modules and unit processes included in the scope for the MBA product system.*

Module	Module description from the PCR	Unit Processes Included in Scope
A1	Extraction and processing of raw materials; any reuse of products or materials from previous product systems; processing of secondary materials; generation of electricity from primary energy resources; energy, or other, recovery processes from secondary fuels	Extraction and processing of raw materials for the steel product system components.
A2	Transport (to the manufacturer)	Transport of component materials to the manufacturing facilities
A3	Manufacturing, including ancillary material production	Manufacturing of products and packaging (incl. upstream unit processes)
A4	Transport (to the building site)	Module Not Declared
A5	Construction-installation process	Module Not Declared
B1	Product use	Module Not Declared
B2	Product maintenance	Module Not Declared
B3	Product repair	Module Not Declared
B4	Product replacement	Module Not Declared
B5	Product refurbishment	Module Not Declared
B6	Operational energy use by technical building systems	Module Not Declared
B7	Operational water uses by technical building systems	Module Not Declared
C1	Deconstruction, demolition	Module Not Declared
C2	Transport (to waste processing)	Module Not Declared
C3	Waste processing for reuse, recovery and/or recycling	Module Not Declared
C4	Disposal	Module Not Declared

Module	Module description from the PCR	Unit Processes Included in Scope
D	Reuse-recovery-recycling potential	Module Not Declared

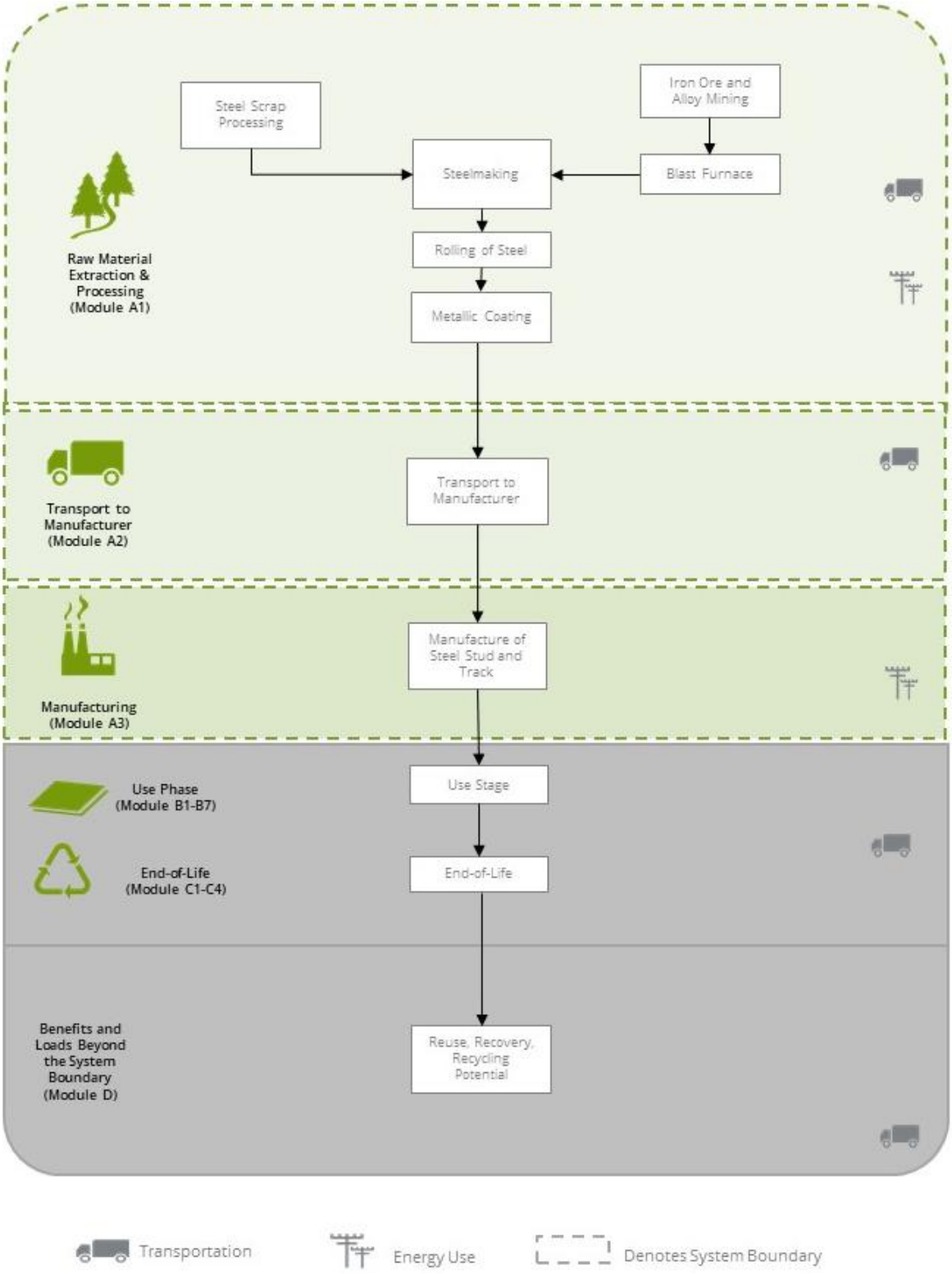


Figure 1. *Flow Diagram for the life cycle of the MBA Building Supplies' steel framing product system.*

3.3 UNITS

All data and results are presented using SI units.

3.4 ESTIMATES AND ASSUMPTIONS

- Energy resource use and emissions at the MBA manufacturing facilities were reported separately for electricity and fuel consumption. Resource use and emissions were allocated to the product based on the mass of the product as a fraction of the total facility production (i.e., mass-based allocation).
- Unit processes were developed within the OpenLCA model, drawing upon data from multiple sources. The principal sources of secondary LCI data are the Ecoinvent v3.7 LCI database. Detailed descriptions of unit processes can be found in the accompanying documentation.
- MBA's steel framing stud and track products are manufactured from galvanized sheet steel sourced from multiple suppliers in the U.S. including from steel brokers. Data were not available on the source of steel purchased through brokers. Between 71% and 83% of each facility's steel was purchased from U.S. EAF steel mills. The remainder is of unknown origin and the steelmaking method is not specifically known. To address this limitation, industry average data from the American Iron and Steel Institute are used and assumed to represent the steel of unknown origin.
- Primary data were not available for the metallic coating and this process was modeled using a zinc coating dataset from the Ecoinvent LCI database.

The PCR requires the reporting of several inventory flows related to construction products including energy and resource use and waste and outflows. These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted considering this limitation.

3.5 CUT-OFF RULES

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact are included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No known flows are deliberately excluded from this EPD.

3.6 PERIOD UNDER REVIEW

The period of review is calendar year 2019.

3.7 ALLOCATION

Manufacturing resource use was allocated to the products based on mass. Impacts from transportation were allocated based on the mass of material and distance transported.

3.8 COMPARABILITY

The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.

3.9 DATA SOURCES

Primary data were provided by MBA for their manufacturing facilities. The sources of secondary LCI data are the Ecoinvent LCI database and published literature.

Table 4. *Data sources for the MBA steel track and stud product system.*

Component	Material Dataset	Processing Dataset	Publication Date
PRODUCT			
EAF galvanized steel coil	steel production, electric, low-alloyed | steel, low-alloyed | Cutoff, S/RoW	zinc coating, coils, per kg | zinc coat, coils | Cutoff, S/RoW	2020; 2020
BOF galvanized steel coil	steel production, converter, low-alloyed | steel, low-alloyed | Cutoff, S/RoW	zinc coating, coils, per kg | zinc coat, coils | Cutoff, S/RoW	2020; 2020
HDG steel sheet (brokered steel)	Sphera HDG steel[1]	Included in dataset	2020
ANCILLARY MATERIALS			
Lubricating oil	lubricating oil production | lubricating oil | Cutoff, S/RoW	Included in dataset	2020
Ink/Paint	paint production, for electrostatic painting for aluminium | electrostatic paint | Cutoff, S/GLO; printing ink production, offset, product in 47.5% solution state | printing ink, offset, without solvent, in 47.5% solution state | Cutoff, S/RoW	Included in dataset	2020
Solvents	market for solvent for paint | solvent for paint | Cutoff, S/GLO; chemical production, organic | chemical, organic | Cutoff, S/GLO	Included in dataset	2020
Labels	kraft paper production | kraft paper | Cutoff, S/RoW	Included in dataset	2020
PACKAGING			
Wood dunnage	EUR-flat pallet production | EUR-flat pallet | Cutoff, S/RoW	Included in dataset	2020
Steel banding	steel production, converter, low-alloyed | steel, low-alloyed | Cutoff, S/RoW	Included in dataset	2020
Plastic strapping	polyethylene terephthalate production, granulate, amorphous | polyethylene terephthalate, granulate, amorphous | Cutoff, S/RoW; polypropylene production, granulate | polypropylene, granulate | Cutoff, S/RoW	Included in dataset	2020
RESOURCE USE			
Grid electricity – Libertyville, IL	Electricity, medium voltage, per kWh - RFCW/RFCW[2]	NA	2018
Grid electricity – Frackville, PA	Electricity, medium voltage, per kWh - RFCE/RFCE[2]	NA	2018
Grid electricity – Rainbow City, AL	Electricity, medium voltage, per kWh - SRSO/SRSO[2]	NA	2018
Grid electricity – Dallas, TX	Electricity, medium voltage, per kWh - ERCT/ERCT[2]	NA	2018
Propane	heat production, propane, at industrial furnace >100kW | heat, district or industrial, other than natural gas | Cutoff, S/RoW	NA	2020
TRANSPORTATION			
Road	transport, freight, lorry 16-32 metric ton, EURO4 | transport, freight, lorry 16-32 metric ton, EURO4 | Cutoff, S/RoW	NA	2020

1) AISI HDG steel (Sphera)
2) eGRID 2018
NA is not applicable

3.10 DATA QUALITY

The data quality assessment addressed the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty.

Table 5. *Data quality assessment for the MBA steel product system.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage Age of data and the minimum length of time over which data should be collected	The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 5 years old (typically 2018 or more recent). All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annual production for 2019.
Geographical Coverage Geographical area from which data for unit processes should be collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Actual processes for upstream operations are primarily North American. Surrogate data used in the assessment are representative of North American operations. Data representative of European operations are considered sufficiently similar to actual processes.
Technology Coverage Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, are used to represent the actual processes, as appropriate.
Precision Measure of the variability of the data values for each data expressed (e.g. variance)	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the steel framing products. In some instances, surrogate data used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded.
Representativeness Qualitative assessment of the degree to which the data set reflects the true population of interest (i.e. geographical coverage, time period, and technology coverage)	Data used in the assessment represent typical or average processes as currently reported from multiple data sources and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high for modules A2 and A3. Data sources of similar quality and age are used with a bias towards Ecoinvent v3.7 data where available. Different portions of the product life cycle are equally considered. Consistency of the A1 module is limited by the background report on HDG production.
Reproducibility Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the Data Description of all primary and secondary data sources	Energy use data at the MBA facilities represent an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. LCI data for upstream producers of galvanized steel sheet were based on published literature and secondary data from the Ecoinvent v3.7 LCI database. Secondary data for HDG steel production in North America was obtained from the Sphera LCA report produced for AISI.
Uncertainty of the Information Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the steel framing products and packaging is low. Actual supplier data for upstream operations was not available for all suppliers and the study relied upon the use of existing representative datasets the life cycle inventory for steel making developed by Sphera. These datasets contained relatively recent data (<10 years) but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

4. LCA: Results

Results of the Life Cycle Assessment are presented below as a production-weighted average across the MBA manufacturing facilities. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The following environmental impact category indicators are reported using characterization factors based on the U.S. EPA's Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts – TRACI 2.1.

TRACI 2.1 Impact Category	Unit
Global Warming Potential **(GWP)**	kg CO_2 eq
Ozone Depletion Potential **(ODP)**	kg CFC 11 eq
Acidification Potential **(AP)**	kg SO_2 eq
Eutrophication Potential **(EP)**	kg N eq
Smog Formation Potential **(SFP)**	kg O_3 eq
Fossil Fuel Depletion Potential **(FFD)**	MJ Surplus, LHV

These 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.

Table 6. *LCIA results for one ton of MBA Steel Track and Stud products- weighted average across facilities. All values are rounded to three significant digits. Results reported in MJ are calculated using lower heating values.*

Impact Category	Unit	PRODUCT STAGE		
		Module A1 - Raw Materials	Module A2 - Transport to fabricator	Module A3 - Manufacturing
TRACI v2.1				
Global warming Potential	Metric ton CO_2 eq	1.36	0.155	$3.49x10^{-2}$
Acidification Potential	Metric ton SO_2 eq	$7.03x10^{-2}$	$1.70x10^{-2}$	$2.23x10^{-3}$
Eutrophication Potential	Metric ton N eq	$1.42x10^{-2}$	$7.02x10^{-4}$	$1.80x10^{-4}$
Smog Creation Potential	Metric ton O_3 eq	$4.61x10^{-3}$	$1.72x10^{-4}$	$1.06x10^{-4}$
Ozone depletion Potential	Metric ton CFC-11 eq	$6.28x10^{-8}$	$3.60x10^{-8}$	$8.20x10^{-9}$
Fossil fuel depletion Potential	MJ surplus	1.16	0.328	$4.99x10^{-2}$

Table 7. *Resource use and waste results for one ton of MBA Steel Track and Stud products- weighted average across facilities. All values are rounded to three significant digits. Results reported in MJ are calculated using lower heating values.*

Impact category	Unit	PRODUCT STAGE		
		Module A1 - Raw Materials	Module A2 - Transport to fabricator	Module A3 - Manufacturing
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	0.913	$2.59x10^{-2}$	0.309
Use of renewable primary energy resources used as raw materials	MJ	None	None	None
Use of nonrenewable primary energy excluding nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA
Use of nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA
Use of secondary materials	Metric ton	Not available	0.00	0.00
Use of renewable secondary fuels	Metric ton	Negligible	Negligible	Negligible
Use of nonrenewable secondary fuels	Metric ton	Negligible	Negligible	Negligible
Net use of fresh water	m^3	2.45	$1.63x10^{-3}$	$2.61x10^{-3}$
Nonhazardous waste disposed	Metric ton	$2.83x10^{-4}$	$6.10x10^{-6}$	$6.21x10^{-7}$
Hazardous waste disposed	Metric ton	0.596	0.110	$2.83x10^{-3}$
High-level Radioactive Waste disposed	Metric ton	$6.75x10^{-6}$	$1.22x10^{-7}$	$4.51x10^{-7}$
Intermediate- and Low-level Radioactive Waste disposed	Metric ton	$3.30x10^{-5}$	$1.52x10^{-5}$	$3.02x10^{-6}$
Components for re-use	Metric ton	Negligible	Negligible	Negligible
Materials for recycling	Metric ton	Not available	None	$1.92x10^{-2}$
Materials for energy recovery	Metric ton	Negligible	Negligible	Negligible
Exported energy	MJ	Negligible	Negligible	Negligible

Table 8. *LCIA results for one ton of MBA Steel Track and Stud products manufactured at Dallas, TX. All values are rounded to three significant digits. Results reported in MJ are calculated using lower heating values.*

Impact Category	Unit	PRODUCT STAGE		
		Module A1 - Raw Materials	Module A2 - Transport to fabricator	Module A3 - Manufacturing
TRACI v2.1				
Global warming Potential	Metric ton CO_2 eq	1.19	0.216	$3.12x10^{-2}$
Acidification Potential	Metric ton SO_2 eq	$6.48x10^{-2}$	$2.37x10^{-2}$	$1.74x10^{-3}$
Eutrophication Potential	Metric ton N eq	$1.50x10^{-2}$	$9.79x10^{-4}$	$1.29x10^{-4}$
Smog Creation Potential	Metric ton O_3 eq	$4.65x10^{-3}$	$2.40x10^{-4}$	$7.60x10^{-5}$
Ozone depletion Potential	Metric ton CFC-11 eq	$6.51x10^{-8}$	$5.03x10^{-8}$	$5.83x10^{-9}$
Fossil fuel depletion Potential	MJ surplus	1.09	0.457	$5.41x10^{-2}$

Table 9. *Resource use and waste results for one ton of MBA Steel Track and Stud products manufactured at Dallas, TX. All values are rounded to three significant digits. Results reported in MJ are calculated using lower heating values.*

Impact category	Unit	PRODUCT STAGE		
		Module A1 - Raw Materials	Module A2 - Transport to fabricator	Module A3 - Manufacturing
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	0.906	$3.61x10^{-2}$	0.277
Use of renewable primary energy resources used as raw materials	MJ	None	None	None
Use of nonrenewable primary energy excluding nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA
Use of nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA
Use of secondary materials	Metric ton	Not available	0.00	0.00
Use of renewable secondary fuels	Metric ton	Negligible	Negligible	Negligible
Use of nonrenewable secondary fuels	Metric ton	Negligible	Negligible	Negligible
Net use of fresh water	m^3	1.72	$2.28x10^{-3}$	$2.15x10^{-3}$
Nonhazardous waste disposed	Metric ton	$2.93x10^{-4}$	$8.51x10^{-6}$	$6.72x10^{-7}$
Hazardous waste disposed	Metric ton	0.554	0.154	$2.81x10^{-3}$
High-level Radioactive Waste disposed	Metric ton	$7.20x10^{-6}$	$1.70x10^{-7}$	$1.71x10^{-7}$
Intermediate- and Low-level Radioactive Waste disposed	Metric ton	$3.35x10^{-5}$	$2.12x10^{-5}$	$1.45x10^{-6}$
Components for re-use	Metric ton	Negligible	Negligible	Negligible
Materials for recycling	Metric ton	Not available	None	$1.92x10^{-2}$
Materials for energy recovery	Metric ton	Negligible	Negligible	Negligible
Exported energy	MJ	Negligible	Negligible	Negligible

Table 10. *LCIA results for one ton of MBA Steel Track and Stud products manufactured at Frackville, PA. All values are rounded to three significant digits. Results reported in MJ are calculated using lower heating values.*

Impact Category	Unit	PRODUCT STAGE		
		Module A1 - Raw Materials	Module A2 - Transport to fabricator	Module A3 - Manufacturing
TRACI v2.1				
Global warming Potential	Metric ton CO_2 eq	1.24	0.133	$2.53x10^{-2}$
Acidification Potential	Metric ton SO_2 eq	$7.12x10^{-2}$	$1.46x10^{-2}$	$1.28x10^{-3}$
Eutrophication Potential	Metric ton N eq	$1.65x10^{-2}$	$6.05x10^{-4}$	$9.45x10^{-5}$
Smog Creation Potential	Metric ton O_3 eq	$5.56x10^{-3}$	$1.49x10^{-4}$	$5.45x10^{-5}$
Ozone depletion Potential	Metric ton CFC-11 eq	$7.63x10^{-8}$	$3.11x10^{-8}$	$7.32x10^{-9}$
Fossil fuel depletion Potential	MJ surplus	1.06	0.283	$4.66x10^{-2}$

Table 11. *Resource use and waste results for one ton of MBA Steel Track and Stud products manufactured at Frackville, PA. All values are rounded to three significant digits. Results reported in MJ are calculated using lower heating values.*

Impact category	Unit	PRODUCT STAGE		
		Module A1 - Raw Materials	Module A2 - Transport to fabricator	Module A3 - Manufacturing
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	1.11	$2.23x10^{-2}$	$6.87x10^{-2}$
Use of renewable primary energy resources used as raw materials	MJ	None	None	None
Use of nonrenewable primary energy excluding nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA
Use of nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA
Use of secondary materials	Metric ton	Not available	0.00	0.00
Use of renewable secondary fuels	Metric ton	Negligible	Negligible	Negligible
Use of nonrenewable secondary fuels	Metric ton	Negligible	Negligible	Negligible
Net use of fresh water	m^3	1.02	$1.41x10^{-3}$	$2.43x10^{-3}$
Nonhazardous waste disposed	Metric ton	$3.27x10^{-4}$	$5.26x10^{-6}$	$5.73x10^{-7}$
Hazardous waste disposed	Metric ton	0.577	$9.49x10^{-2}$	$2.02x10^{-3}$
High-level Radioactive Waste disposed	Metric ton	$7.23x10^{-6}$	$1.05x10^{-7}$	$6.00x10^{-7}$
Intermediate- and Low-level Radioactive Waste disposed	Metric ton	$3.40x10^{-5}$	$1.31x10^{-5}$	$3.66x10^{-6}$
Components for re-use	Metric ton	Negligible	Negligible	Negligible
Materials for recycling	Metric ton	Not available	None	$1.92x10^{-2}$
Materials for energy recovery	Metric ton	Negligible	Negligible	Negligible
Exported energy	MJ	Negligible	Negligible	Negligible

Table 12. *LCIA results for one ton of MBA Steel Track and Stud products manufactured at Libertyville, IL. All values are rounded to three significant digits. Results reported in MJ are calculated using lower heating values.*

Impact Category	Unit	PRODUCT STAGE		
		Module A1 - Raw Materials	Module A2 - Transport to fabricator	Module A3 - Manufacturing
TRACI v2.1				
Global warming Potential	Metric ton CO_2 eq	1.53	0.137	$4.21x10^{-2}$
Acidification Potential	Metric ton SO_2 eq	$7.29x10^{-2}$	$1.50x10^{-2}$	$2.94x10^{-3}$
Eutrophication Potential	Metric ton N eq	$1.24x10^{-2}$	$6.22x10^{-4}$	$2.49x10^{-4}$
Smog Creation Potential	Metric ton O_3 eq	$4.02x10^{-3}$	$1.53x10^{-4}$	$1.47x10^{-4}$
Ozone depletion Potential	Metric ton CFC-11 eq	$5.34x10^{-8}$	$3.19x10^{-8}$	$9.14x10^{-9}$
Fossil fuel depletion Potential	MJ surplus	1.27	0.290	$5.02x10^{-2}$

Table 13. *Resource use and waste results for one ton of MBA Steel Track and Stud products manufactured at Libertyville, IL. All values are rounded to three significant digits. Results reported in MJ are calculated using lower heating values.*

Impact category	Unit	PRODUCT STAGE		
		Module A1 - Raw Materials	Module A2 - Transport to fabricator	Module A3 - Manufacturing
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	0.799	$2.29x10^{-2}$	0.418
Use of renewable primary energy resources used as raw materials	MJ	None	None	None
Use of nonrenewable primary energy excluding nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA
Use of nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA
Use of secondary materials	Metric ton	Not available	0.00	0.00
Use of renewable secondary fuels	Metric ton	Negligible	Negligible	Negligible
Use of nonrenewable secondary fuels	Metric ton	Negligible	Negligible	Negligible
Net use of fresh water	m^3	3.72	$1.45x10^{-3}$	$3.01x10^{-3}$
Nonhazardous waste disposed	Metric ton	$2.49x10^{-4}$	$5.40x10^{-6}$	$6.48x10^{-7}$
Hazardous waste disposed	Metric ton	0.633	$9.75x10^{-2}$	$3.33x10^{-3}$
High-level Radioactive Waste disposed	Metric ton	$6.22x10^{-6}$	$1.08x10^{-7}$	$5.48x10^{-7}$
Intermediate- and Low-level Radioactive Waste disposed	Metric ton	$3.22x10^{-5}$	$1.34x10^{-5}$	$3.67x10^{-6}$
Components for re-use	Metric ton	Negligible	Negligible	Negligible
Materials for recycling	Metric ton	Not available	None	$1.92x10^{-2}$
Materials for energy recovery	Metric ton	Negligible	Negligible	Negligible
Exported energy	MJ	Negligible	Negligible	Negligible

Table 14. *LCIA results for one ton of MBA Steel Track and Stud products manufactured at Rainbow City, AL. All values are rounded to three significant digits. Results reported in MJ are calculated using lower heating values.*

Impact Category	Unit	PRODUCT STAGE		
		Module A1 - Raw Materials	Module A2 - Transport to fabricator	Module A3 - Manufacturing
TRACI v2.1				
Global warming Potential	Metric ton CO_2 eq	1.14	0.169	$2.73x10^{-2}$
Acidification Potential	Metric ton SO_2 eq	$6.69x10^{-2}$	$1.85x10^{-2}$	$1.66x10^{-3}$
Eutrophication Potential	Metric ton N eq	$1.66x10^{-2}$	$7.66x10^{-4}$	$1.22x10^{-4}$
Smog Creation Potential	Metric ton O_3 eq	$5.38x10^{-3}$	$1.88x10^{-4}$	$6.78x10^{-5}$
Ozone depletion Potential	Metric ton CFC-11 eq	$7.50x10^{-8}$	$3.93x10^{-8}$	$9.37x10^{-9}$
Fossil fuel depletion Potential	MJ surplus	1.02	0.358	$4.76x10^{-2}$

Table 15. *Resource use and waste results for one ton of MBA Steel Track and Stud products manufactured at Rainbow City, AL. All values are rounded to three significant digits. Results reported in MJ are calculated using lower heating values.*

Impact category	Unit	PRODUCT STAGE		
		Module A1 - Raw Materials	Module A2 - Transport to fabricator	Module A3 - Manufacturing
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	1.06	$2.82x10^{-2}$	0.316
Use of renewable primary energy resources used as raw materials	MJ	None	None	None
Use of nonrenewable primary energy excluding nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA
Use of nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA
Use of secondary materials	Metric ton	Not available	0.00	0.00
Use of renewable secondary fuels	Metric ton	Negligible	Negligible	Negligible
Use of nonrenewable secondary fuels	Metric ton	Negligible	Negligible	Negligible
Net use of fresh water	m^3	0.791	$1.78x10^{-3}$	$1.98x10^{-3}$
Nonhazardous waste disposed	Metric ton	$3.26x10^{-4}$	$6.65x10^{-6}$	$5.22x10^{-7}$
Hazardous waste disposed	Metric ton	0.548	0.120	$2.21x10^{-3}$
High-level Radioactive Waste disposed	Metric ton	$7.43x10^{-6}$	$1.33x10^{-7}$	$2.36x10^{-7}$
Intermediate- and Low-level Radioactive Waste disposed	Metric ton	$3.41x10^{-5}$	$1.65x10^{-5}$	$1.77x10^{-6}$
Components for re-use	Metric ton	Negligible	Negligible	Negligible
Materials for recycling	Metric ton	Not available	None	$1.92x10^{-2}$
Materials for energy recovery	Metric ton	Negligible	Negligible	Negligible
Exported energy	MJ	Negligible	Negligible	Negligible

5. LCA: Interpretation

The major contributor to the impact indicator results is the production of the galvanized steel sheet supplied for MBA's fabrication processes and depends on the specific mix of BOF and/or EAF steel. Impact reductions could be achieved through a shift to a larger EAF steel supply.

6. References

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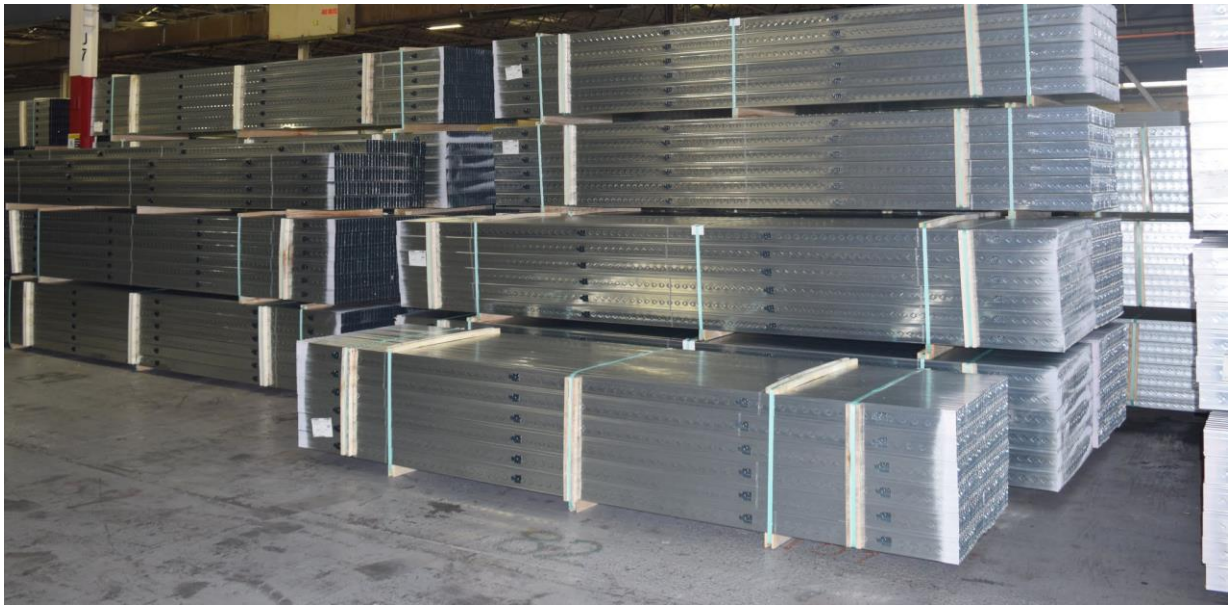

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