

# Oscura™ Blackened Steel

# Solanum™ Steel

# Spectura™ Steel

Zahner Materials: Architectural Metal Finishes

## Environmental Product Declaration

Date of Issue: 09/12/2025

Date of Expiration: 09/12/2030

### PRODUCT CATEGORY RULE

UL Part A: Life Cycle Assessment Calculation Rules and Report Requirements, UL 10010, V4.0

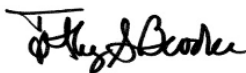

UL Part B: Insulated Metal Panels, Metal Composition Panels, and Metal Cladding: Rood and Wall Panels, UL 10010-5, V2.0

### DECLARED UNIT

Coverage of 100 m<sup>2</sup> (1,076.4 ft<sup>2</sup>) of building area



ASTM INTERNATIONAL

<b>Program Operator</b>	ASTM International 100 Barr Harbor Dr., West Conshohocken, PA 19428 <a href="mailto:cert@astm.org">cert@astm.org</a>		
<b>General Program Instructions and Version Number</b>	ASTM Program Operator Rules. Version: 8.0, Revised 04/29/20		
<b>Manufacturer Name and Address</b>	A. Zahner Company 1400 East 9th Street, Kansas City, MO 64106 <a href="mailto:info@azahner.com">info@azahner.com</a>		
<b>Declaration Number</b>	ASTM-EPD1065		
<b>Declared Product and Functional Unit</b>	Steel Wall Panels Declared Unit: Coverage of 100 m <sup>2</sup> (1,076.4 ft <sup>2</sup> ) of building area		
<b>Reference PCR and Version Number</b>	ISO 21930:2017 UL Part A: Part A: Life Cycle Assessment Calculation Rules and Report Requirements, UL 10010, V4.0 UL Part B: Insulated Metal Panels, Metal Composition Panels, and Metal Cladding: Roof and Wall Panels, UL 10010-5, V2.0		
<b>Product's intended Application and Use</b>	Commercial		
<b>Intended Audience</b>	Business-to-Business		
<b>Product RSL</b>	n/a		
<b>Markets of Applicability</b>	North America		
<b>Date of Issue</b>	09/12/2025		
<b>Period of Validity</b>	5 years from date of issue		
<b>EPD Type</b>	Manufacturer Specific		
<b>EPD Scope</b>	Cradle-to-Gate with Options (A1-A3, C1-C4, and D modules)		
<b>Year of reported manufacturer primary data</b>	August 2023 to July 2024		
<b>LCA Software and Version Number</b>	Sphera LCA for Experts 10.9		
<b>LCI Database and Version Number</b>	Sphera MLC 2025.1		
<b>LCIA Methodology and Version Number</b>	TRACI 2.1, CML v4.7 (Aug 2016) and IPCC AR5		
<b>LCIA Results Overview per 100 m<sup>2</sup> (A1 to A3 modules)</b>			
	<b>Oscura™ Blackened Steel</b>	<b>Solanum™ Steel</b>	<b>Spectura™ Steel</b>
<b>GWP excluding biogenic carbon [kg CO<sub>2</sub> eq]</b>	7.22E+03	7.53E+03	5.22E+03
<b>ODP [kg CFC 11 eq]</b>	6.36E-10	7.58E-10	2.02E-10
<b>AP [kg SO<sub>2</sub> eq]</b>	1.30E+01	1.24E+01	1.15E+01
<b>EP [kg N eq]</b>	7.07E-01	8.06E-01	6.68E-01
<b>SFP [kg O<sub>3</sub> eq]</b>	2.15E+02	2.35E+02	2.10E+02
<b>ADP<sub>r</sub> [MJ surplus]</b>	8.48E+04	8.88E+04	5.96E+04
<b>The sub-category PCR review was conducted by:</b>	Thomas Gloria, PhD (Chair) Lindita Bushi, PhD Bob Zabcik, P.E., LEED AP BD+C		
<b>Independent verification of the declaration and data, according to ISO 21930:2017, UL Part A, ISO 14025:2006, and UL Part B sub-category.</b>  <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External	 Tim Brooke, ASTM International		
<b>This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:</b>	WAP Sustainability Consulting		
<b>This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:</b>	 Thomas Gloria, Ph.D., Industrial Ecology Consultants		
<b>Limitations:</b> <ul style="list-style-type: none"> <li>Environmental declarations from different programs (ISO 14025) may not be comparable.</li> <li>Full conformance with this 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.</li> </ul>			

## General Information

### Company Description

Since 1897 and across four generations, the family-owned business of A. Zahner Company produces highly crafted architectural metalwork for artists and architects around the globe. Throughout the company's history, employees at Zahner have developed advanced metal surfaces and systems for both functional and ornamental architectural forms. We enhance the world around us by building on generations of innovation to turn imaginative ideas into incredible realities through the mindful use of crafted metals.

Zahner is committed to protecting the environment and providing a safe and healthy environment for employees, family, and the community at large. The company maintains ecological practices at a local, regional, and national level, and works to protect the planet that we all inhabit.

All products are manufactured at Zahner's Grand Prairie factory in Texas.

### Product Descriptions



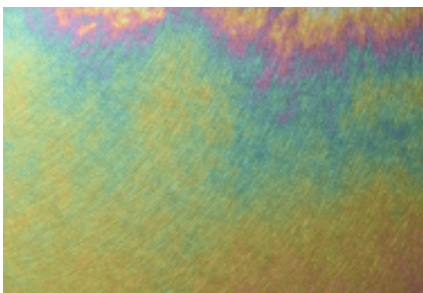
**Oscura™ Blackened Steel** is a rich, blackened patina on steel developed for interior use. Activated steel surfaces create a mottled and artistic ambiance that varies from sheet to sheet. Developed as a finish for interior feature walls, lobbies, perforated metal features, and other design accents, Oscura creates a tapestry of black and gray hues that can complement a wide range of materials and colors. Factory-sealed with a clear coat to protect against scratches, scrapes, and rusting caused by the ambient interior environment.

CSI: 05 70 00; UNSPSC: 30161500, 30161600



**Solanum™ Steel** is a next-generation pre-oxidized weathering steel that offers rich earth tones and enduring beauty. With hues of browns to deep reds, Solanum Steel brings the warm tones and rugged durability of a steel that has endured years of exposure to the elements, without the wait.

CSI: 05 70 00; UNSPSC: 30151800, 30151900, 30161500, 30161600



**Spectura™ Steel** is a pre-finished steel sheet with a thin, clear coating that acts as an interference layer on the base steel and creates a spectrum of color as the angle of view or the angle of illumination changes. Spectura's dynamic, vibrant, color-bending coating adds an element of variability that ensures that every sheet is unique. Architects and designers can use Spectura to bring colorful, artistic elements to interiors.

CSI: 05 70 00; UNSPSC: 30161500, 30161600

## Product Application

Oscura Blackened Steel can only be used in interior applications, should not be used near water or wet environments, and should be installed in areas subject to climate controlled conditions.

Solanum Steel can be used in most exterior applications in 14 gauge and thicker. Due to the potential for deterioration due to long-term oxidation, 16 gauge should be back-painted if used on exterior applications. 18 gauge should only be used in interior applications. Certain horizontal applications, such as exterior counters or seating, are discouraged for all thicknesses due to the potential for water to pool and create spotting or other staining effects.

Spectura Steel can only be used in interior applications, should not be used near water or wet environments, and should be installed in areas subject to climate controlled conditions.

## Product Composition

Table 1: Product compositions

Mass %	Oscura Blackened Steel	Solanum Steel	Spectura Steel
Steel	99.5%	100%	100%
Coating	0.05%	0%	0%
Recycled Content <sup>1</sup>	24.3%	35.6%	28.9%

## Technical Requirements

- **Oscura and Spectura:** ASTM A1008/A1008M: Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- **Solanum Steel:** ASTM A606: Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot Rolled and Cold-Rolled, With Improved Atmospheric Corrosion Resistance.

Table 2: Technical requirements

Name	Unit	Oscura Blackened Steel	Solanum Steel	Spectura Steel
Metal Alloy	-	1008A Cold-Rolled Steel	A606 Weathering Steel	A653 Galvanized Steel <sup>2</sup>
Length	in	≤ 144	≤ 144	≤ 144
Width	in	≤ 60	≤ 60	≤ 60
Thickness	in	0.075	0.075	0.075
Density	kg/m <sup>3</sup>	7,849	7,849	7,849
Tensile Strength	MPa	350	480	380
Modulus of Elasticity	GPa	190 – 210	200	190 – 210

## LCA Methodology

### Declared Unit

Table 3: Declared unit details

		Oscura Blackened Steel	Solanum Steel	Spectura Steel
Declared unit	m <sup>2</sup>	1.00E+02	1.00E+02	1.00E+02
Weight	kg	9.76E+02	9.76E+02	9.76E+02
Conversion to 1 kg	-	1.02E-03	1.02E-03	1.02E-03
Thickness	in	7.50E-02	7.50E-02	7.50E-02

<sup>1</sup> The recycled content amount is based on the average scrap content indicated in the Sphera MLC background datasets and does not represent the actual amount expected in the products.

<sup>2</sup> Note that A653 is the standard specification for the coating (zinc), while 1008A is the specification for the base steel.

## System Boundary

Table 4. Description of the system boundary modules

Production			Construction		Use							End of Life				Benefits & Loads Beyond 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 to Site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction	Transport	Waste Processing	Disposal	Reuse, Recovery, Recycling Potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

\*MND = not declared

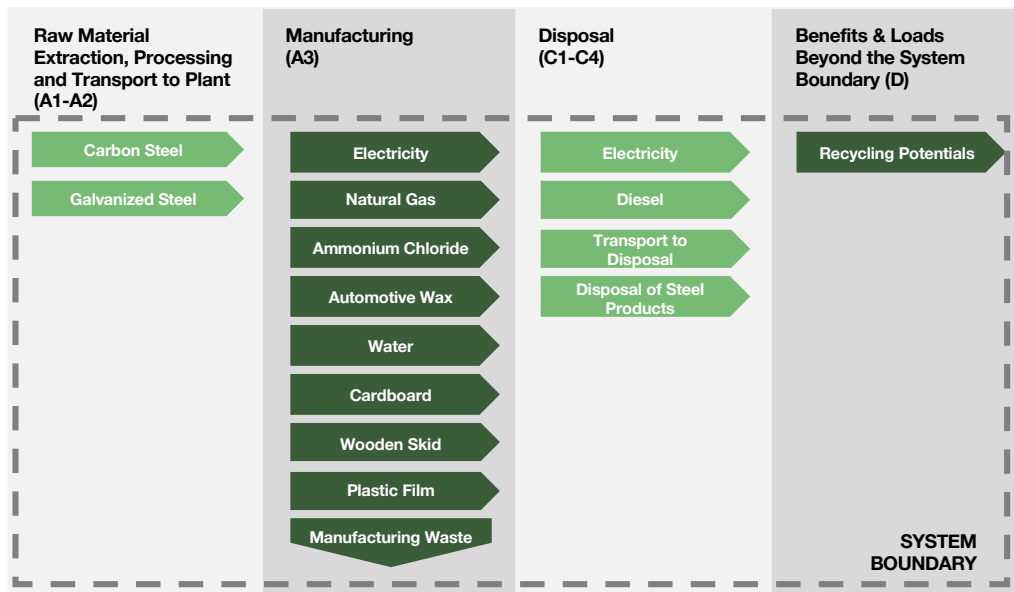


Figure 1: System boundary diagram

## Allocation

General principles of allocation were based on ISO 14040/44. To derive a per-unit value for manufacturing inputs such as electricity, thermal energy and water, allocation based on total production by area was adopted, as this is the basis on which products are processed and sold, regardless of product weight. As a default, secondary GaBi datasets use a physical basis for allocation.

## Cut-off Rules

Material inputs greater than 1% (based on total mass of the final product) were included within the scope of analysis. Material inputs less than 1% were included if sufficient data was available to warrant inclusion and/or the material input was thought to have significant environmental impact. Cumulative excluded material inputs and environmental impacts are less than 5% based on total weight of the functional unit. No known flows are deliberately excluded from this EPD.

## Period Under Review

Data were obtained from Zahner for the period between August 2023 and July 2024.

## Technical Information and Scenarios

### A3 – Manufacturing

Production of **Oscura™ Blackened Steel** starts with cold-rolled carbon steel sheets received from Zahner's suppliers. During the processing, a chemical reagent is applied to the material surface to create an oxide/patina. A wax coating is then applied before the products are packaged for shipping.

Production of **Solanum™ Steel** starts with the reception of weathering steel sheets from Zahner's suppliers. The sheets are subjected to a blasting process, where compressed-air driven blast media removes surface scale and leaves a non-directional satin finish to the surface. The sheets move to a separate line, where a chemical reagent is applied to the material surface to accelerate oxidation. The products then are packaged and then shipped to the customers.

Production of **Spectura™ Steel** starts with cold-rolled carbon steel sheets received from Zahner's supplier base. During processing, a chemical reagent is applied to the material surface to product an oxide/patina. The sheets are then ready to be packaged for shipping to customers.

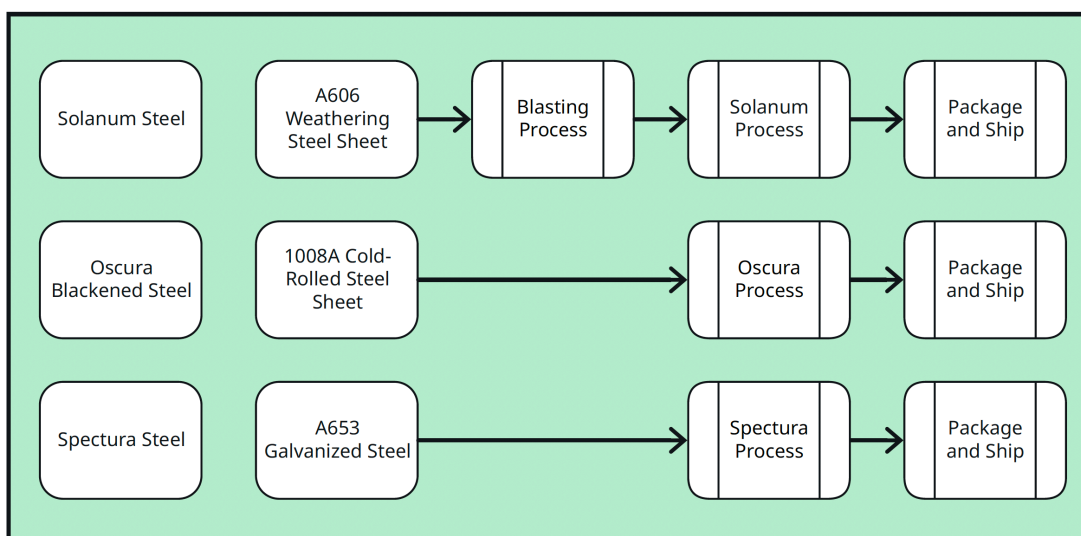


Figure 2: Zahner Steel Product Manufacturing Process

### A3 – Packaging

Packaging requirements are presented in Table 5, per declared unit.

Table 5: Packaging per 100 m<sup>2</sup>

	Oscura Blackened Steel	Solanum Steel	Spectura Steel	Unit
Cardboard	1.63E+01	1.63E+01	1.63E+01	kg
Wood Skid	1.43E+02	1.43E+02	1.43E+02	kg

### C1-C4 – End-of-Life

In this stage, the product is deconstructed from the building, which requires an input of 1 gallon of diesel and 2 kWh of electricity as per the PCR default (UL, 2018). The product is then transported to the end-of-life facility and disposed. The transportation to disposal was assumed to be 100 km by truck as per PCR (UL, 2018). The disposal channels for the products are in accordance with disposal routes for “other metals” as referenced in Part A, Section 2.8.5 and 2.8.6 of the PCR (UL, 2018). Specific information related to the disposal of the product at its end of life is reported in Table 6, per declared unit.

Table 6. End-of-life (C1-C4) per 100 m<sup>2</sup>

Name		Oscura Blackened Steel	Solanum Steel	Spectura Steel	Unit
Assumptions for scenario development	Disposal rates as per UL Part A PCR (UL, 2018)	74% recycling, 26% landfill			
Collection process (specified by type)	Collected separately	9.97E+02	9.97E+02	9.97E+02	kg
	Collected with mixed construction waste	0.00E+00	0.00E+00	0.00E+00	kg
Recovery (specified by type)	Reuse	0.00E+00	0.00E+00	0.00E+00	kg
	Recycling	7.38E+02	7.38E+02	7.38E+02	kg
	Landfill	2.59E+02	2.59E+02	2.59E+02	kg
	Incineration	0.00E+00	0.00E+00	0.00E+00	kg
Disposal	Product or material for final deposition	2.59E+02	2.59E+02	2.59E+02	kg
Removals of biogenic carbon (excluding packaging)		0.00E+00	0.00E+00	0.00E+00	kg CO <sub>2</sub>

Table 7. Reuse, recovery and/or recycling potentials (D) per 100 m<sup>2</sup>

Name	Oscura Blackened Steel	Solanum Steel	Spectura Steel	Unit
Net energy benefit from energy recovery from waste treatment declared as exported energy in C3 (R>0.6)	0.00E+00	0.00E+00	0.00E+00	MJ
Net energy benefit from thermal energy due to treatment of waste declared as exported energy in C4 (R<0.6)	0.00E+00	0.00E+00	0.00E+00	MJ
Net energy benefit from material flow declared in C3 for energy recovery	0.00E+00	0.00E+00	0.00E+00	MJ
Process and conversion efficiencies	n/a	n/a	n/a	-
Further assumptions for scenario development	Recycling credits based on a net scrap approach			

## Results

Environmental impacts were calculated using the Sphera LCA for Experts software platform. Impact results have been calculated using IPCC AR5, TRACI 2.1 and CML-baseline, v4.7 August 2016 characterization factors. Results presented in this report are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.

Acronym [Unit]	Environmental Indicators	Methodology
GWPe [kg CO <sub>2</sub> eq]	Global Warming Potential, excl biogenic carbon	IPCC AR5
GWPi [kg CO <sub>2</sub> eq]	Global Warming Potential, incl biogenic carbon	IPCC AR5
ODP [kg CFC-11 eq]	Ozone Depletion Potential	TRACI 2.1
AP [kg SO <sub>2</sub> eq]	Acidification Potential	TRACI 2.1
EP [kg N eq]	Eutrophication Potential	TRACI 2.1
SFP [kg O <sub>3</sub> eq]	Smog Formation Potential	TRACI 2.1
ADP <sub>f</sub> [MJ, Surplus]	Abiotic Depletion Potential, Fossil fuels	CML v4.7
<b>Resource Use Indicators</b>		
RPRE [MJ]	Use of renewable primary energy	
RPRM [MJ]	Renewable primary energy resources used as raw materials	
RPRT [MJ]	Total use of renewable primary energy resources	
NRPRE [MJ]	Use of non-renewable primary energy	
NRPRM [MJ]	Non-renewable primary energy resources used as raw materials	
NRPRT [MJ]	Total use of non-renewable primary energy resources	
SM [kg]	Input of secondary material	
RSF [MJ]	Use of renewable secondary fuels	
NRSF [MJ]	Use of non renewable secondary fuels	
RE [MJ]	Recovered energy	
FW [m <sup>3</sup> ]	Use of net fresh water	
<b>Output Flows and Waste Categories</b>		
HWD [kg]	Hazardous waste disposed	
NHWD [kg]	Non-hazardous waste disposed	
HLRW [kg]	High-level radioactive waste, conditioned, to final repository	
ILLRW [kg]	Intermediate- and low-level radioactive waste, conditioned, to final repository	
CRU [kg]	Components for re-use	
MR [kg]	Materials for Recycling	
MER [kg]	Material for Energy Recovery	
EEE [MJ]	Exported electrical energy	
EET [MJ]	Exported thermal energy	
<b>Carbon Emissions and Removals</b>		
BCRP [kg CO <sub>2</sub> ]	Biogenic Carbon Removal from Product	
BCEP [kg CO <sub>2</sub> ]	Biogenic Carbon Emissions from Product	
BCRK [kg CO <sub>2</sub> ]	Biogenic Carbon Removal from Packaging	
BCEK [kg CO <sub>2</sub> ]	Biogenic Carbon Emissions from Packaging	
BCEW [kg CO <sub>2</sub> ]	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Processes	
CCE [kg CO <sub>2</sub> ]	Calcination Carbon Emissions	
CCR [kg CO <sub>2</sub> ]	Carbonation Carbon Removals	
CWNR [kg CO <sub>2</sub> ]	Carbon Emissions from Combustion of Waste from Non-Renewable Sources Used in Production Processes	



## LCA Results

Table 8: LCA Results for Oscura Blackened Steel, per 100 m<sup>2</sup> of steel panel

Impact Categories	A1-A3	C1	C2	C3	C4	D
<i>GWPe [kg CO<sub>2</sub> eq]</i>	7.22E+03	1.53E+01	8.28E+00	0.00E+00	5.88E+00	-1.30E+03
<i>GWPI [kg CO<sub>2</sub> eq]</i>	6.79E+03	1.53E+01	8.32E+00	0.00E+00	5.87E+00	-1.29E+03
<i>ODP [kg CFC 11 eq]</i>	1.30E+01	1.24E-01	2.32E-02	0.00E+00	3.66E-02	-2.52E+00
<i>AP [kg SO<sub>2</sub> eq]</i>	7.07E-01	8.75E-03	1.98E-03	0.00E+00	4.24E-03	-1.51E-01
<i>EP [kg N eq]</i>	6.36E-10	7.82E-13	3.67E-13	0.00E+00	1.21E-12	3.46E-11
<i>SFP [kg O<sub>3</sub> eq]</i>	2.15E+02	4.28E+00	5.20E-01	0.00E+00	5.25E-01	-2.72E+01
<i>ADPf [MJ]</i>	8.48E+04	1.92E+02	1.04E+02	0.00E+00	8.40E+01	-1.32E+04
<b>Resource Use Indicators</b>						
<i>RPRE [MJ]</i>	2.50E+04	1.21E+01	4.38E+00	0.00E+00	1.23E+01	5.03E+02
<i>RPRM [MJ]</i>	3.67E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>RPRT [MJ]</i>	2.87E+04	1.21E+01	4.38E+00	0.00E+00	1.23E+01	5.03E+02
<i>NRPRE [MJ]</i>	9.36E+04	1.98E+02	1.05E+02	0.00E+00	8.67E+01	-1.27E+04
<i>NRPRM [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>NRPRT [MJ]</i>	9.36E+04	1.98E+02	1.05E+02	0.00E+00	8.67E+01	-1.27E+04
<i>SM [kg]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>RSF [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>NRSF [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>RE [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>FW [m<sup>3</sup>]</i>	3.68E+01	1.42E-02	4.72E-03	0.00E+00	9.44E-03	-1.30E+02
<b>Output Flows and Waste Categories</b>						
<i>HWD [kg]</i>	6.75E-04	3.95E-08	1.74E-08	0.00E+00	2.07E-08	-9.53E-05
<i>NHWD [kg]</i>	9.56E+01	2.40E-02	2.59E+02	0.00E+00	2.59E+02	1.54E+02
<i>HLRW [kg]</i>	3.63E-03	2.60E-06	4.29E-07	0.00E+00	1.08E-06	1.35E-06
<i>ILLRW [kg]</i>	3.04E+00	2.17E-03	3.61E-04	0.00E+00	9.53E-04	1.35E-03
<i>CRU [kg]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>MR [kg]</i>	3.97E+02	0.00E+00	7.38E+02	0.00E+00	0.00E+00	0.00E+00
<i>MER [kg]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>EEE [MJ]</i>	2.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>EET [MJ]</i>	9.75E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>Carbon Emissions and Removals</b>						
<i>BCRP [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCEP [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCRK [kg CO<sub>2</sub>]</i>	3.29E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCEK [kg CO<sub>2</sub>]</i>	3.29E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCEW [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>CCE [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>CCR [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>CWNR [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 9: LCA Results for Solanum Steel, per 100 m<sup>2</sup> of steel panel

Impact Categories	A1-A3	C1	C2	C3	C4	D
<i>GWP<sub>e</sub> [kg CO<sub>2</sub> eq]</i>	7.53E+03	1.53E+01	8.28E+00	0.00E+00	5.88E+00	-1.30E+03
<i>GWP<sub>i</sub> [kg CO<sub>2</sub> eq]</i>	7.12E+03	1.53E+01	8.32E+00	0.00E+00	5.87E+00	-1.29E+03
<i>ODP [kg CFC 11 eq]</i>	1.24E+01	1.24E-01	2.32E-02	0.00E+00	3.66E-02	-2.52E+00
<i>AP [kg SO<sub>2</sub> eq]</i>	8.06E-01	8.75E-03	1.98E-03	0.00E+00	4.24E-03	-1.51E-01
<i>EP [kg N eq]</i>	7.58E-10	7.82E-13	3.67E-13	0.00E+00	1.21E-12	3.46E-11
<i>SFP [kg O<sub>3</sub> eq]</i>	2.35E+02	4.28E+00	5.20E-01	0.00E+00	5.25E-01	-2.72E+01
<i>ADP<sub>f</sub> [MJ]</i>	8.88E+04	1.92E+02	1.04E+02	0.00E+00	8.40E+01	-1.32E+04
<b>Resource Use Indicators</b>						
<i>RPRE [MJ]</i>	2.87E+04	1.21E+01	4.38E+00	0.00E+00	1.23E+01	5.03E+02
<i>RPRM [MJ]</i>	3.67E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>RPRT [MJ]</i>	3.23E+04	1.21E+01	4.38E+00	0.00E+00	1.23E+01	5.03E+02
<i>NRPRE [MJ]</i>	1.00E+05	1.98E+02	1.05E+02	0.00E+00	8.67E+01	-1.27E+04
<i>NRPRM [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>NRPRT [MJ]</i>	1.00E+05	1.98E+02	1.05E+02	0.00E+00	8.67E+01	-1.27E+04
<i>SM [kg]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>RSF [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>NRSF [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>RE [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>FW [m<sup>3</sup>]</i>	2.57E+01	1.42E-02	4.72E-03	0.00E+00	9.44E-03	-1.30E+02
<b>Output Flows and Waste Categories</b>						
<i>HWD [kg]</i>	1.53E-03	3.95E-08	1.74E-08	0.00E+00	2.07E-08	-9.53E-05
<i>NHWD [kg]</i>	1.47E+02	2.40E-02	2.59E+02	0.00E+00	2.59E+02	1.54E+02
<i>HLRW [kg]</i>	4.93E-03	2.60E-06	4.29E-07	0.00E+00	1.08E-06	1.35E-06
<i>ILLRW [kg]</i>	4.12E+00	2.17E-03	3.61E-04	0.00E+00	9.53E-04	1.35E-03
<i>CRU [kg]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>MR [kg]</i>	3.56E+02	0.00E+00	7.38E+02	0.00E+00	0.00E+00	0.00E+00
<i>MER [kg]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>EEE [MJ]</i>	2.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>EET [MJ]</i>	9.75E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>Carbon Emissions and Removals</b>						
<i>BCRP [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCEP [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCRK [kg CO<sub>2</sub>]</i>	3.29E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCEK [kg CO<sub>2</sub>]</i>	3.29E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCEW [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>CCE [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>CCR [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>CWNR [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 10: LCA Results for Spectura Steel, per 100 m<sup>2</sup> of steel panel

Impact Categories	A1-A3	C1	C2	C3	C4	D
<i>GWP<sub>e</sub> [kg CO<sub>2</sub> eq]</i>	5.22E+03	1.53E+01	8.28E+00	0.00E+00	5.88E+00	-1.30E+03
<i>GWP<sub>i</sub> [kg CO<sub>2</sub> eq]</i>	4.79E+03	1.53E+01	8.32E+00	0.00E+00	5.87E+00	-1.29E+03
<i>ODP [kg CFC 11 eq]</i>	1.15E+01	1.24E-01	2.32E-02	0.00E+00	3.66E-02	-2.52E+00
<i>AP [kg SO<sub>2</sub> eq]</i>	6.68E-01	8.75E-03	1.98E-03	0.00E+00	4.24E-03	-1.51E-01
<i>EP [kg N eq]</i>	2.02E-10	7.82E-13	3.67E-13	0.00E+00	1.21E-12	3.46E-11
<i>SFP [kg O<sub>3</sub> eq]</i>	2.10E+02	4.28E+00	5.20E-01	0.00E+00	5.25E-01	-2.72E+01
<i>ADP<sub>f</sub> [MJ]</i>	5.96E+04	1.92E+02	1.04E+02	0.00E+00	8.40E+01	-1.32E+04
<b>Resource Use Indicators</b>						
<i>RPRE [MJ]</i>	9.75E+03	1.21E+01	4.38E+00	0.00E+00	1.23E+01	5.03E+02
<i>RPRM [MJ]</i>	3.67E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>RPRT [MJ]</i>	1.34E+04	1.21E+01	4.38E+00	0.00E+00	1.23E+01	5.03E+02
<i>NRPRE [MJ]</i>	6.39E+04	1.98E+02	1.05E+02	0.00E+00	8.67E+01	-1.27E+04
<i>NRPRM [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>NRPRT [MJ]</i>	6.39E+04	1.98E+02	1.05E+02	0.00E+00	8.67E+01	-1.27E+04
<i>SM [kg]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>RSF [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>NRSF [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>RE [MJ]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>FW [m<sup>3</sup>]</i>	2.62E+01	1.42E-02	4.72E-03	0.00E+00	9.44E-03	-1.30E+02
<b>Output Flows and Waste Categories</b>						
<i>HWD [kg]</i>	1.16E-03	3.95E-08	1.74E-08	0.00E+00	2.07E-08	-9.53E-05
<i>NHWD [kg]</i>	1.20E+02	2.40E-02	2.59E+02	0.00E+00	2.59E+02	1.54E+02
<i>HLRW [kg]</i>	1.84E-03	2.60E-06	4.29E-07	0.00E+00	1.08E-06	1.35E-06
<i>ILLRW [kg]</i>	1.54E+00	2.17E-03	3.61E-04	0.00E+00	9.53E-04	1.35E-03
<i>CRU [kg]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>MR [kg]</i>	3.80E+02	0.00E+00	7.38E+02	0.00E+00	0.00E+00	0.00E+00
<i>MER [kg]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>EEE [MJ]</i>	2.07E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>EET [MJ]</i>	9.75E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<b>Carbon Emissions and Removals</b>						
<i>BCRP [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCEP [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCRK [kg CO<sub>2</sub>]</i>	3.29E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCEK [kg CO<sub>2</sub>]</i>	3.29E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>BCEW [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>CCE [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>CCR [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
<i>CWNR [kg CO<sub>2</sub>]</i>	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Interpretation

Oscura Blackened Steel

The production stage (A1-A3) is the dominant contributor to environmental impacts across all Oscura Blackened Steel products, accounting for more than 94% across all categories as shown in Figure 3. Steel is the primary driver across all categories, contributing 56% to the A1-A3 GWP, due to the resource and energy-intensive nature of its production. It is closely followed by the electricity used during production, with potential impacts between 21% for AP and 43% for ADPf. Other stages such as end-of-life disposal contribute less than 6% collectively, while the recycling credits in module D represent up to -18% for EP.

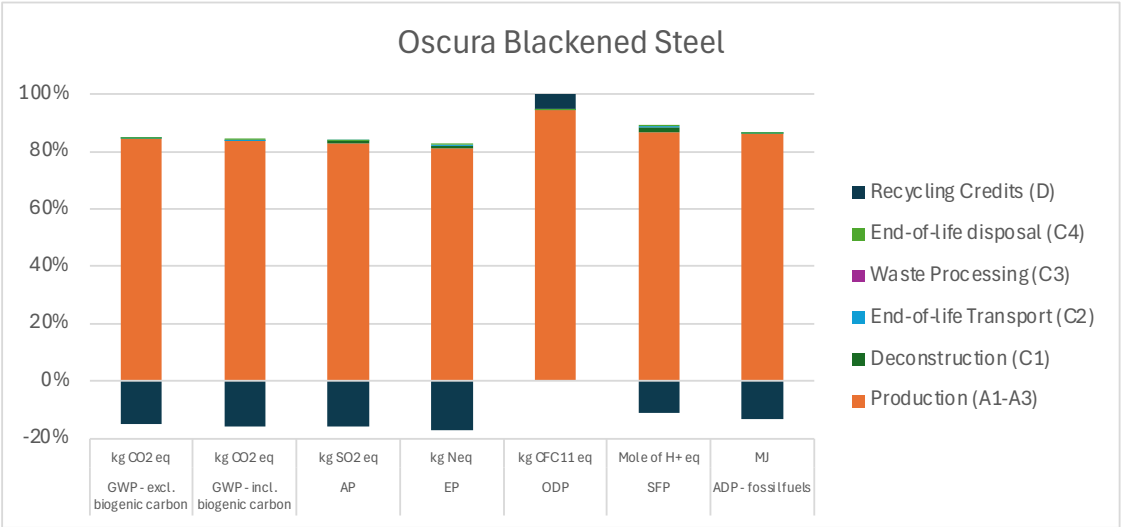


Figure 3: LCIA results for Oscura Blackened Steel

Solanum Steel

The production stage (A1-A3) is the dominant contributor to environmental impacts across all Solanum Steel products, accounting for more than 92% across all categories as shown in Figure 4. Steel is the primary driver across all categories, contributing 62% to the A1-A3 GWP, due to the resource and energy-intensive nature of its production. It is closely followed by the electricity used during production, with potential impacts between 12% for SFP and 31% for ADPf. Other stages such as end-of-life disposal contribute less than 2% collectively, while the recycling credits in module D represent up to -17% for GWP and a burden of 6% for ODP.

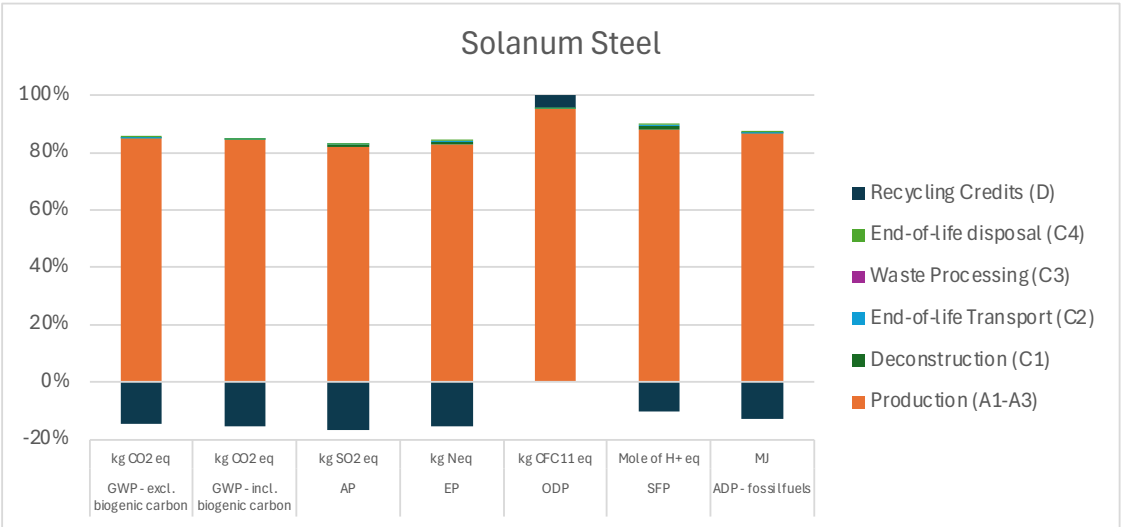


Figure 4: LCIA Results for Solanum Steel

Spectura Steel

The production stage (A1-A3) is the dominant contributor to environmental impacts across all Spectura Steel products, accounting for more than 88% across all categories as shown in Figure 5. Steel is the primary driver across all categories, contributing 80% to the A1-A3 GWP, due to the resource and energy-intensive nature of its production. It is closely followed by the electricity used during production, with potential impacts between 6% for SFP and 17% for ADPf. Other stages such as end-of-life disposal contribute less than 2% collectively, while the recycling credits in module D represent up to -22% for EP and a burden of 16% for ODP.



Figure 5: LCIA Results for Spectura Steel

### Additional Environmental Information

#### Environment and Health During Manufacturing

Zahner prioritizes environmental sustainability, health, and safety throughout its manufacturing processes. From product design to waste reduction initiatives, Zahner integrates responsible practices to minimize environmental impact. The company is committed to ensuring a safe working environment for its employees and strives to optimize energy and water usage while promoting recycling and responsible disposal practices.

#### Environment and Health During Installation

All recommendations shall be utilized as indicated by SDS and installation guidelines. Specific product SDS and installation instructions can be requested directly from Zahner. During installation and use, the product does not adversely impact human health or release emissions to indoor air. In addition, no environmental impacts to water, air or soil are expected during product lifetime. The product does not contain any hazardous substances according to the Resource Conservation and Recovery Act (RCRA), Subtitle 3.

#### Environmental Activities and Certifications

Solanum Steel is certified Red List Free by the International Living Future Institute. Environmental certifications for Zahner's products such as Declare Labels, HPD, SDS or acoustical performance can be requested directly from Zahner.

#### Further Information

For more information on these products, go to: <https://www.azahner.com/materials/>.

### References

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