Environmental Product Declaration

Vietnam

EPD of multiple products, based on a representative product
In accordance with EN 15804+A2 & ISO 14025

BlueScope

ZINCALUME® Ultra steel EPD

Substrate AM150 coating at 0.48mm BMT

Programme: The international EPD® System | environdec.com
Programme Operator: EPD International AB
Regional Programme Operator: EPD Southeast Asia | epd-southeastasia.com
EPD Registration number: EPD-IES-0022235:002
Publication date: 2025-06-01
Revision date: 2025-07-03
Valid until: 2030-05-31
Geographical scope: Vietnam

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at environdec.com

One Click LCA Environmental Product Declaration created with One Click LCA

Programme-Related Information and Verification

Manufacturer Information

EPD Owner (Manufacturer)	NS BlueScope Vietnam Co., Ltd.
Address	Factory: Phu My 1 Industrial Zone, Phu My Ward, Phu My City, Ba Ria Vung Tau Province, Vietnam. Head Office: 3rd Floor, Pearl 5 Building, 05 Le Quy Don Street, Vo Thi Sau Ward, District 3, Ho Chi Minh City, Vietnam.
Contact details	+(84-254) 392 2666 enquiries.vietnam@bluescope.com
Website	nsbluescope.com/vn/

Product Identification

Product name	Metal Roof Sheet - ZINCALUME® Ultra steel
Place(s) of production	Phu My factory (excluding rollforming): Phu My 1 Industrial Zone, Phu My Ward, Phu My City, Ba Ria Vung Tau Province, Vietnam.
CPC code	41231

About the Manufacturer

The NS BlueScope Vietnam factory in Ba Ria Vung Tau Province produces aluminium-zinc-magnesium alloy-coated steel and pre-painted aluminium-zinc-magnesium alloy-coated steel. Covering an area of 11.85 hectares, the facility consists of three main production lines: the Metal Coating Line (MCL), the Coil Painting Line (CPL), and the Combined Slitting Line (CSL). Additionally, the plant is equipped with auxiliary systems such as wastewater treatment, cooling water, compressed air supply, generators, and a product quality inspection room. The primary products are aluminium-zinc-magnesium alloy-coated steel coils and pre-painted aluminium-zinc-magnesium alloy-coated steel coils, with raw materials including Cold Rolled Steel, aluminium, zinc, magnesium, paint, and treatment chemicals.

EPD Information

EPD program operator	The International EPD System EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden. E-mail: info@environdec.com
EPD Regional Programme Operator	EPD Southeast Asia Business Park Kebon Jeruk, Jl. Raya Meruya Ilir No. 89, Jakarta Barat 11620, Indonesia.
EPD standards	This EPD is in accordance with EN 15804:2012 +A2:2019/AC:2021 and ISO 14025:2010 standards.
Product category rules (PCR)	The CEN standard EN 15804 serves as the core PCR. In addition, The International EPD System PCR 2019:14 Construction products, version 1.3.4 (2024-04-30).
PCR review conducted by	The Technical Committee of the International EPD® System Chair: Claudia A. Peña Contact: info@environdec.com
EPD Produced by	Nguyen Thi Huong Thu – GreenViet Green Building Consultancy
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
Verification date	2025-06-01
Third-party verifier	Rui Wang – IVL Swedish Environmental Research Institute
Verifier approved by	The International EPD System
Procedure for follow-up during EPD validity involves third-party verifier	☐ Yes ☑ No
EPD number	EPD-IES-0022235:002
Publishing date	2025-06-01
EPD valid until	2030-05-31
EPD Version History	v1.0 Initial release. v2.0 Updated product description and process diagram in IES platform.

General Information

- The Manufacturer has the sole ownership, liability, and responsibility for the EPD.
- EPDs within the same product category but registered in different EPD programmes may not be comparable.
- For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison.

Environmental Product Declaration
Vietnam
ZINCALUME® Ultra steel - substrate AM150 coating at 0.48mm BMT

Declared Unit

This EPD provides data for one flat square meter (1 m^2) of ZINCALUME® Ultra steel[1] for roofing, walling and lightweight structure, with a substrate metal coating class of AM150 in 0.48mm base metal thickness (BMT) manufactured by NS BlueScope Vietnam.

Product Description

ZINCALUME® Ultra steel consists of a steel substrate with a metallic coating incorporating BlueScope's patented Activate™ technology (hot dipped aluminium-zinc-magnesium alloy AM150 coating) to provide enhanced corrosion resistance, and then further protected and enhanced with a special surface treatment passivated and resin coated.

It is typically formed into roofing and walling, garage doors, structural sections, or other general manufactured articles. It suits a wide range of building designs including a variety of commercial and industrial projects as well as rural sheds. It can also be used as an iconic design feature in residential applications.

This EPD sets out information on the average ZINCALUME® Ultra steel product manufactured by NS BlueScope Vietnam, in the base metal thicknesses (BMTs) presented in the table below.

Product	Metallic Coating	Base Metal Thickness (BMT)	Product mass (kg/m^2 flat product)
ZINCALUME® Ultra steel	AM150	0.40 mm	3.28
		0.42 mm	3.44
		0.45 mm	3.67
		0.48 mm	3.90
		0.55 mm	4.44

The metallic coated base steel (G300, G550 or as the requirement of customer strength grade) conforms to AS 1397:2021: *Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium.*

On the other hand, the product also conforms to AS/NZS 1365, AS/NZS1530.3, TCVN 13027 and the product is manufactured at an ISO 9001-2015 certified site.

The Metal Roof Sheet - ZINCALUME® Ultra steel range offers base metal thicknesses from 0.40 mm to 0.55 mm. While the coating layer and production process remain consistent, the thickness and weight of the base metal vary. These variations use the same coating type (same materials and thickness), with the base metal thickness being the only physical difference.

This Environmental Product Declaration (EPD) focuses on the 0.48 mm thickness, chosen as the representative product due to its highest annual production volume and consumer preference. This thickness provides an ideal balance of durability and versatility, making it the preferred choice for numerous applications. The A1-A3 Environmental Impact Data for other thicknesses have been individually assessed, with their Global Warming Potential (GWP) detailed in the Additional results for different product thicknesses.

1. Refer to the ZINCALUME® Ultra steel datasheet for more details.

Manufacturing Process

ZINCALUME® Ultra steel is the finished product of the continuous hot dip process Metal Coating Line (MCL).

MCL has six major sections: entry, cleaning, furnace, bath metal, surface treatment, and exit section. Its major raw material is cold rolled full hard steel from local outsourcing or oversea sourcing.

At the metal coating line, the steel is annealed to the required strength, metallic coated for corrosion resistance. A chemical surface treatment and resin coating are then applied to protect the product through transportation, storage and downstream processing. Finally, the coil is packaged and ready for shipment to customers for further processing.

Technical Specifications

Coating mass: AM150 for both sides.
Surface treatment: passivated and resin coated.

Product and Site Standards

* Australian Standard: AS/NZS1365, AS1397:2021, AS/NZS1530.3
* ISO 9001-2015 Quality System certified
* Vietnam Standard: TCVN 13027

Additional Technical Information

Further information can be found at nsbluescope.com/vn/.

Product Content

The average composition[2] of one flat square meter (1 m^2) of ZINCALUME® Ultra steel, with a substrate metal coating class of AM150 in 0.48mm base metal thickness (BMT) is:

Product composition		Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-%	Biogenic material, kg C/DU
Steel Substrate	Carbon Steel	3.73	6	0	0
Metallic Coating (AM150)	Aluminium	0.071 – 0.086	0	0	0
	Zinc	0.057 – 0.078	0	0	0
	Magnesium	0.002 – 0.005	0	0	0
	Silicon	0.001 – 0.003	0	0	0
Surface treatment	Passivation	0.004	0	0	0
	Resin	0.013	0	0	0
Sum		3.9	5.7	0	0

ZINCALUME® Ultra steel with AM - Activate™ 4-matrix-phase technology lies in the unique composition and microstructure of 4 phases including Aluminium - Zinc and 2 strategically positioned magnesium compounds with a regular spangle surface coated with passivation and resin. The 4-matrix-phases technology compounds create a self-sealing effect that greatly improves corrosion resistance at cut edges, screw holes and scratches.

Packaging Materials	Weight, kg	Weight-% (versus the product)	Biogenic material, kg C/DU
Plastic	0.003	0.07	0
Steel	0.007	0.19	0
Sum	0.010	0.26	0

Product Raw Material Main Composition

Raw material category	Amount, mass- %	Material origin
Metals (Steel Substrate) or Cold Rolled Steel Coils (CRC)	99.6	Korea, Japan, Australia, Vietnam
Minerals	0	N/A
Fossil materials	0.4	Vietnam
Bio-based materials	0	N/A

Substances, Reach - Very High Concern

The product does not contain any REACH SVHC substances in amounts greater than 0.1 % (1,000 ppm).

2. The product composition provided is an average and variability among individual products is expected. Please note that we are constantly working to improve our products, and changes to their composition may occur over time. If clarification on a particular product is needed, please contact NS BlueScope Vietnam.

Product Life-Cycle

Manufacturing and Packaging (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A1 Raw material supply
Cold Rolled Steel Coils (CRC) are the main raw material for the metallic coating line. After being processed, the mechanical properties of the steel are altered, and the steel is coated with an aluminium-zinc-magnesium alloy and surface-treated to produce finished products. These finished products are then transferred to the packaging department and stored in the finished product warehouse. Any steel coils that need to be cut into smaller sizes are transferred to the Combined Slitting Line (CSL).

A2 Transport
The considered transportation impacts (A2) include exhaust emissions resulting from the transport of all raw materials from suppliers to NS BlueScope Vietnam production plant as well as the environmental impacts of the production of the used fuel. The transportation distances and methods were provided by NS BlueScope Vietnam.

A3 Manufacturing
The environmental impacts considered for the production stage (A3) cover the manufacturing of production materials (ancillary materials such as pretreatment agents, cleaners, ancillary gases) and the energy used by machines.

Finished products are metallic-coated steel coils that meet the customer's quality requirements and will be packaged by wrapping them in PE film, steel straps, and corrugated plastic to protect the edges.

The handling of waste generated during the production processes at the factory is also covered. The environmental impacts of this stage have been calculated using the most recent data applicable to the factory. The study considers the losses of main raw materials occurring during the manufacturing process, estimated at 0.17% of testing failures as scrap steel, which is sold and transported a maximum of 50 km to a local recycling facility.

Additionally, the plant generates wastewater, which is collected and treated in the plant's wastewater treatment system. Emissions include dust, carbon monoxide, nitrogen oxides, and vapor from the annealing/furnace stages of the coating line, the post-coating cooling process and the drying process.

Transport and Installation (A4-A5)

This EPD does not cover the transport (A4) and installation (A5) phase.

Product Use and Maintenance (B1-B7)

Impacts in stage B1-B7 have not been studied and not considered in this EPD.

Air, soil, and water impacts during the use phase have not been studied.

Product End of Life (C1-C4)

End of life stage includes deconstruction/demolition (C1), transport to waste processing (C2), waste processing for reuse, recovery and/or recycling (C3) and disposal (C4).

C1 De-construction, demolition

Demolition is assumed to take 0.01 kWh/kg of element. It is assumed that 100% of waste is collected.

C2 Transport

The transport to the disposal of the materials and landfill is estimated as 100 km.

C3 Waste processing

85% of steel is assumed to be recycled based on World Steel Association, 2021.

C4 Disposal

It is assumed that 15% of steel is taken to landfill for final disposal.

Benefits and loads beyond the system boundary (D)

D Reuse / recovery / recycling potential

Due to the recycling process, the end-of-life product is converted into recycled steel.

Contributing to a sustainable future

Sustainability and Climate Action

Steel is central to a circular economy – one where resources and materials are kept in use for as long as possible and then repaired, returned or recycled.

Steel can be infinitely recycled and is 100% recyclable without loss of quality, in some cases, it can be reused without reprocessing.

BlueScope strives to reduce the embodied carbon of our products, which is supported by our climate strategy and plans. Our global decarbonization roadmap outlines our plan to meet our 2030 greenhouse gas emission intensity reduction targets[3].

For more information about BlueScope's Sustainability, visit bluescope.com/sustainability or visit nsbluescope.com/vn/company/sustainability/ for NS BlueScope Vietnam's credentials and certifications.

Credentials and Certifications

NS BlueScope Vietnam Phu My site, where the steel for NS BlueScope Vietnam's branded products is manufactured, is certified to the ResponsibleSteel™ Standard v1.1. The ResponsibleSteel™ certification can give organizations in the steel value chain confidence in the environmental, social and governance performance, and may help them to meet their climate objectives and manage supply chain risks.

A number of our products with Environmental Product Declarations can contribute to the achievement of credit points under a range of rating tools recognized in Vietnam. These include LEED, LOTUS, GRESB, EDGE, or Green Mark.

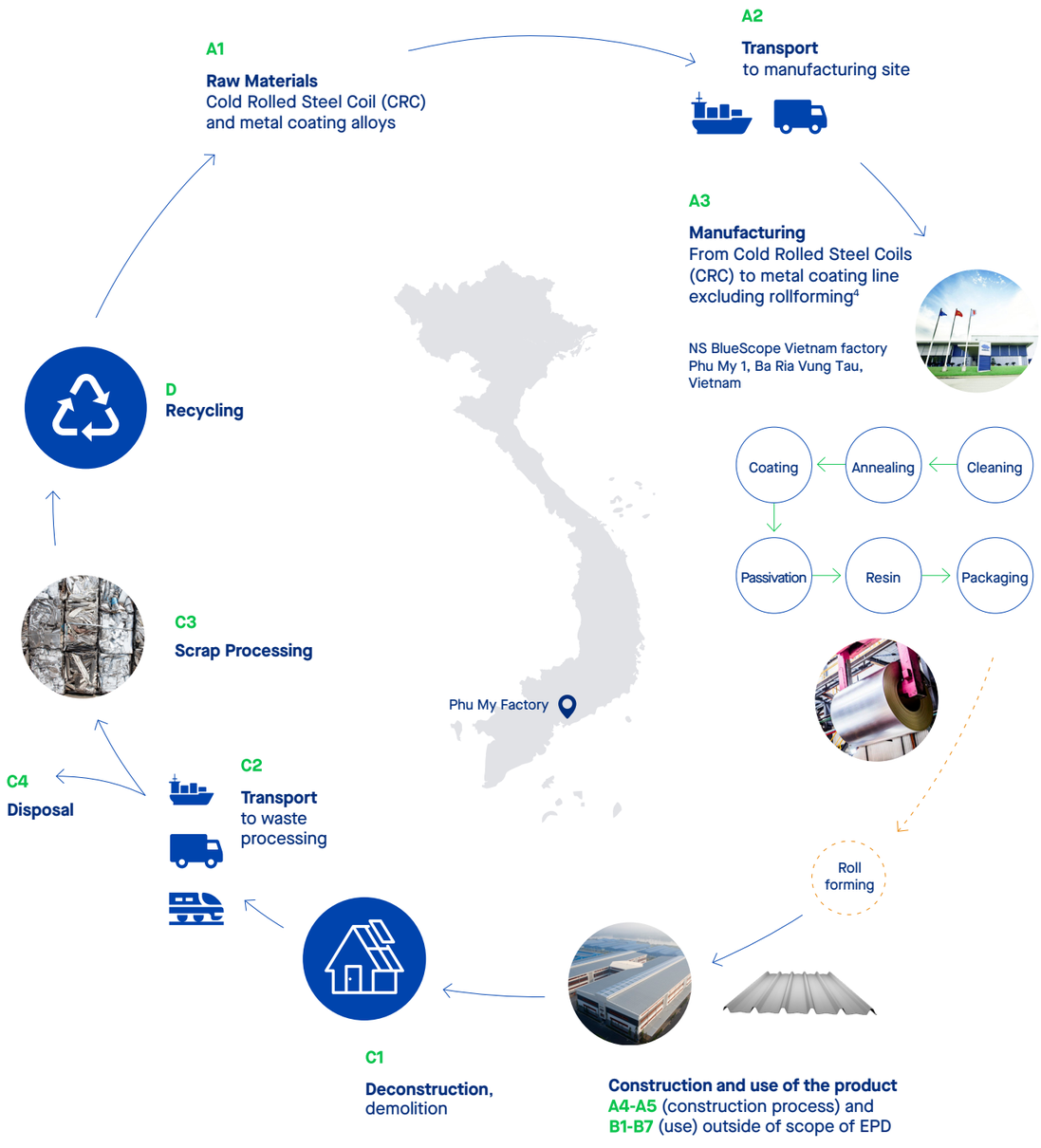
In addition to Environmental Product Declarations, a range of NS BlueScope Vietnam's products are certified to the Eco Label - Singapore Green Building Product (SGBP).

For more information about NS BlueScope Vietnam's credentials and certifications, visit nsbluescope.com/vn/.

Responsible Steel™ CERTIFIED SITE RS 788259

3. The target applies to our midstream activities that include our metal coating and painting lines. It excludes our downstream activities.

ZINCALUME® Ultra steel Manufacturing and Processing in Vietnam



4. Results in the "Results section" are not inclusive of the rollforming process

Scope of Declaration

This declaration is for one flat square meter (1 m²) of ZINCALUME® Ultra steel, with a substrate metal coating class AM150 in 0.48mm base metal thickness (BMT) manufactured by NS BlueScope Vietnam. The scope of this declaration is from cradle to gate (modules A1-A3), with modules C1-C4 and module D.

The use of the results of modules A1-A3 without considering the results of module C is discouraged.

Modules A4-A5 (construction process) and B1-B7 (use) have not been included due to the inability to predict how the material will be used following manufacture.

The system boundary applied in this study extends from raw materials such as CRC; transport to and within the manufacturing site; metallic coating and packaging for dispatch to direct customers at the exit gate of the manufacturing site.

The system boundary also includes the Manufacturer of other required input materials, transport between processing operations, the production of external services such as electricity, natural gas and water, which have been removed using allocation techniques. Wastes and emissions to air, land and water are also included, as are modules C1-C4 (end of life stage), and module D (reuse, recovery and/or recycling potential).

Life-Cycle Assessment Information

Period for data	2023 calendar year

Declared And Functional Unit

Declared unit	One flat square meter (1 m²) of ZINCALUME® Ultra steel manufactured by NS BlueScope Vietnam
Mass per declared unit	3.9 kg

System Boundary

	Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundary
	Raw material supply	Transport	Manufacturing	Transport	Construction / installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction, demolition	Transport	Waste processing	Disposal	Reuse / recovery / recycling potential
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	VNM	VNM	VNM	–	–	–	–	–	–	–	–	–	VNM	VNM	VNM	VNM	VNM
Specific data	6%			–	–	–	–	–	–	–	–	–	–	–	–	–	–
Variation – products	+12/-13%			–	–	–	–	–	–	–	–	–	–	–	–	–	–
Variation – sites	0%			–	–	–	–	–	–	–	–	–	–	–	–	–	–

X = Module declared; ND = Not declared (such a declaration shall not be regarded as an indicator of a zero result).

Life Cycle Assessment (LCA) Methodology

This EPD has been produced in conformance with the requirements of PCR 2019:14 v1.3.4 Construction Products and the International EPD® System General Programme Instructions (GPI) v5.0.1.

Primary data

This study focuses on the metallic coating of steel Cold Rolled Coil (CRC) to produce ZINCALUME® Ultra steel. Upstream Cold Rolled Steel manufacturing data for Cold Rolled Coil used in this study was obtained from generic data from the Worldsteel LCA Methodology Report in 2021.

Primary data were collected for the relevant NS BlueScope Vietnam manufacturing site (Phu My factory) in Ba Ria Vung Tau Province, Vietnam, for all inputs and outputs in the manufacturing stage (A3). This study is based on an annual average for the period January 2023 to December 2023.

Secondary data

The secondary data used were procured from the One Click LCA Database 2024. Most datasets used have a reference year between 2021 and 2024 and all fall within the limit allowable for generic data under EN 15804.

For the modelling for NS BlueScope Vietnam's manufacturing site, the electricity supply has been calculated by the data provider and did not correspond with the production volumes entered in the undefined datasets of the different electricity supplying technologies. The shares have been calculated based on statistics from 2020: IEA World Energy Statistics and Balances. OECD iLibrary, eISSN: 1683-4240, DOI: 10.1787/enes-tats-da-ta-en. This dataset describes the electricity available on the high voltage level in Vietnam. This is done by showing the transmission of 1kWh electricity at high voltage.

Technology: Low voltage level below 1 kV. Average technology used to transmit and distribute electricity. Includes underground and overhead lines, as well as air-, vacuum- and SF6-insulated high-to-medium voltage switching stations.

Water use in relation to NS BlueScope Vietnam's manufacturing site was modeled using the generic water data in the Global geography.

Cut off criteria

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available, are included in the calculation. There is no neglected unit process that counts for more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

Allocation

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.

2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.

3. Allocation should be based on economic values. Allocation used in Ecoinvent 3.10.1 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 standard.

For datasets in this study, the allocation of the inputs is generally carried out via the production volume (m^2 of product). The consumption and transportation of raw materials were allocated by production volume ratio.

In this study, one allocation occurs on coated steel production in allocating the input and output, i.e. energy within the production site such as electricity and emission allocation is done via the annual total production.

During the production process of coated steel, there are no other by-products produced from the production line, hence there is no occasion that requires allocation for multi-output processes.

For this project, there is only one production site. So, there is no allocation among factories.

Key assumptions and qualifications:

- Accuracy of data measurement falls within normal industrial weighing systems accuracy limits of +/-5%.
- Transport and packaging of minor materials is insignificant to the overall impact.
- Nominally identical products are produced on a combination of production lines in parallel, so the impacts of each product are a weighted average of the various production lines. The impact of any differences in the composition of the products, apart from any change in base metal thickness (BMT), is insignificant on the outcomes of the LCA.
- Upstream data taken from the One Click LCA database reflects average or generic production and therefore does not correspond to NS BlueScope Vietnam's actual suppliers.
- The Module D recovery stage assumes that resin coatings are incinerated, and metal coatings are lost as slag during the steel recycling process. This is a conservative assumption for metal coatings as they are likely to make up part of future steel alloys.

Environmental Performance

The environmental impact indicators included in this EPD are described in the table below. All the result tables from this point will contain the abbreviations only. All results reported in MJ are in net calorific value.

Indicator	Abbreviation	Units
Core Environmental Impact Indicators – EN 15804+A2, EF 3.1 (PEF)		
Climate change – total	GWP-total	kg CO2-eq.
Climate change – fossil	GWP-fossil	kg CO2-eq.
Climate change – biogenic	GWP-biogenic	kg CO2-eq.
Climate change – land use and land use change	GWP-luluc	kg CO2-eq.
Ozone depletion	ODP	kg CFC-11-eq.
Acidification	AP	mol H+-eq.
Eutrophication aquatic freshwater	EP-freshwater	kg P-eq.
Eutrophication aquatic marine	EP-marine	kg N-eq.
Eutrophication terrestrial	EP-terrestrial	mol N-eq.
Photochemical ozone formation	POCP	kg NMVOC-eq.
Depletion of abiotic resources – minerals and metals[5]	ADP-minerals & metals	kg Sb-eq.
Depletion of abiotic resources – fossil fuels[5]	ADP-fossil	MJ
Water depletion potential[5]	WDP	m3 world-eq. deprived
Additional (Optional) Environmental Impact Indicators – EN 15804+A2, EF 3.1 (PEF)		
Particulate Matter emissions	PM	Disease incidence
Ionizing radiation – human health	IRP	kBq U-235-eq.
Eco-toxicity – freshwater	ETP-fw	CTUe
Human toxicity potential – cancer effects	HTP-c	CTUh
Human toxicity potential – non-cancer effects	HTP-nc	CTUh
Land use related impacts / soil quality	SQP	dimensionless

5. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Indicator	Abbreviation	Units
Use of Natural Resources		
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ
Use of renewable primary energy resources used as raw materials	PERM	MJ
Total use of renewable primary energy resources	PERT	MJ
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ
Total use of non-renewable primary energy resources	PENRT	MJ
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ
Use of non-renewable secondary fuels	NRSF	MJ
Net use of fresh water	FW	m^3
End Of Life - Waste		
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
Components for re-use	CRU	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported energy, electricity	EEE	MJ
Exported energy, thermal	EET	MJ
Environmental Impacts – GWP-GHG - The International EPD System		
Climate change	GWP-GHG	kg CO_2e

Results for 1 m² of ZINCALUME® Ultra steel in 0.48mm Base Metal Thickness (BMT)

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Note: Additional environmental impact data may be presented in Additional results for different product thicknesses.
The results of modules A1-A3 should not be used in isolation without considering the results of module C, to ensure a comprehensive and accurate assessment of the product's life cycle.

In accordance with EN 15804:2012+A2:2019
Product mass: 3.90 kg/m² flat

Core Environmental Impact Indicators – EN 15804+A2, EF 3.1 (PEF)

Impact category	Unit	A1-A3	C1	C2	C3	C4	D
GWP – total	kg CO_2e	1.35E+01	1.41E-02	4.20E-02	6.81E-02	3.65E-03	-2.87E+00
GWP – fossil	kg CO_2e	1.35E+01	1.41E-02	4.20E-02	6.80E-02	3.65E-03	-2.87E+00
GWP – biogenic	kg CO_2e	2.30E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.21E-03
GWP – LULUC	kg CO_2e	9.62E-03	1.44E-06	1.88E-05	7.71E-05	2.09E-06	1.67E-04
Ozone depletion potential	kg CFC_{-11}e	7.32E-08	2.15E-10	6.20E-10	3.93E-10	1.06E-10	-4.82E-09
Acidification potential	mol H⁺e	6.35E-02	1.27E-04	1.43E-04	4.38E-04	2.59E-05	-1.01E-02
EP-freshwater	kg Pe	4.87E-03	4.06E-07	3.27E-06	2.96E-05	3.00E-07	-8.99E-04
EP-marine	kg Ne	1.27E-02	5.89E-05	4.70E-05	2.08E-04	9.87E-06	-1.51E-03
EP-terrestrial	mol Ne	1.35E-01	6.45E-04	5.12E-04	1.28E-03	1.08E-04	-2.67E-02
POCP (“smog”)	kg NMVOCe	4.42E-02	1.92E-04	2.11E-04	4.22E-04	3.86E-05	-7.90E-03
ADP-minerals & metals[6]	kg Sbe	1.73E-04	5.04E-09	1.17E-07	1.29E-06	5.80E-09	-4.40E-05
ADP-fossil resources[6]	MJ	1.38E+02	1.84E-01	6.09E-01	5.63E-01	8.96E-02	-2.34E+01
Water use[6]	m^3e depr.	4.36E+00	4.59E-04	3.01E-03	1.22E-02	2.59E-04	4.27E-01

Additional (Optional) Environmental Impact Indicators – EN 15804+A2, EF 3.1 (PEF)

Impact category	Unit	A1-A3	C1	C2	C3	C4	D
Particulate matter	Incidence	1.16E-06	3.61E-09	4.20E-09	4.57E-08	5.89E-10	-1.99E-07
Ionizing radiation[7]	kBq U235e	3.31E+00	8.15E-05	5.31E-04	3.01E-03	5.63E-05	3.46E-02
Ecotoxicity (freshwater)[6]	CTUe	6.89E+01	1.01E-02	8.62E-02	2.11E+00	7.52E-03	1.82E+01
Human toxicity – cancer[6]	CTUh	1.36E-08	1.45E-12	6.93E-12	4.00E-10	6.73E-13	1.40E-09
Human toxicity – non-cancer[6]	CTUh	1.52E-07	2.29E-11	3.94E-10	3.59E-09	1.55E-11	2.20E-07
SQP[6]	-	3.89E+01	1.29E-02	6.13E-01	2.85E+00	1.76E-01	-1.17E+01

Use of Natural Resources

WDP	Unit	A1-A3	C1	C2	C3	C4	D
Renewable PER as energy	MJ	1.30E+01	1.16E-03	8.35E-03	7.90E-02	8.65E-04	-3.54E+00
Renewable PER as material	MJ	1.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable PER	MJ	1.30E+01	1.16E-03	8.35E-03	7.90E-02	8.65E-04	-3.54E+00
Non-renewable PER as energy	MJ	1.36E+02	1.84E-01	6.09E-01	5.63E-01	8.96E-02	-2.34E+01
Non-renewable PER as material	MJ	2.18E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable PER	MJ	1.38E+02	1.84E-01	6.09E-01	5.63E-01	8.96E-02	-2.34E+01
Secondary materials	kg	1.02E+00	7.64E-05	2.59E-04	1.01E-03	2.25E-05	1.92E+00
Renewable secondary fuels	MJ	1.38E-03	2.00E-07	3.29E-06	8.00E-05	4.66E-07	-4.22E-04
Non-renewable secondary fuels	MJ	1.31E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m^3	9.94E-02	1.22E-05	9.01E-05	2.86E-04	9.32E-05	-9.28E-02

End Of Life – Waste and Output Flows

Impact category	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste	kg	4.42E+00	2.05E-04	1.03E-03	5.72E-03	9.90E-05	-1.70E+00
Non-hazardous waste	kg	3.09E+01	2.79E-03	1.91E-02	2.27E-01	2.26E-03	4.24E+01
Radioactive waste	kg	8.33E-05	2.00E-08	1.30E-07	7.35E-07	1.37E-08	7.97E-06
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	1.33E-02	0.00E+00	0.00E+00	3.31E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	2.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	7.34E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Environmental Impacts – GWP-GHG - The International EPD System

Impact category	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	1.35E+01	1.41E-02	4.20E-02	6.81E-02	3.65E-03	-2.87E+00

6. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.
7. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and some construction materials, is also not measured by this indicator.

Additional results for different product thicknesses

This table refers to scaling options within range. Reported GWP was calculated separately.

ZINCALUME® Ultra steel range is available in thickness ranging from 0.40 mm to 0.55 mm. These variations have the same coating type and thickness; the thickness of the base metal is the only physical differentiating factor.

Environmental Impacts

Product data	Declared unit	Declared unit mass (kg)	GWP total (kg CO_2e)					
Thickness (mm)			A1-A3	C1	C2	C3	C4	D
0.40	1 m^2 of steel	3.28	1.17E+01	1.18E-02	3.53E-02	5.73E-02	3.07E-03	-2.41E+00
0.42	1 m^2 of steel	3.44	1.22E+01	1.24E-02	3.70E-02	6.01E-02	3.22E-03	-2.53E+00
0.45	1 m^2 of steel	3.67	1.29E+01	1.32E-02	3.95E-02	6.41E-02	3.44E-03	-2.70E+00
0.48	1 m^2 of steel	3.90	1.35E+01	1.41E-02	4.20E-02	6.81E-02	3.65E-03	-2.87E+00
0.55	1 m^2 of steel	4.44	1.51E+01	1.60E-02	4.78E-02	7.75E-02	4.16E-03	-3.26E+00

Variation declaration

As requested by PCR, EPD should declare the variation of each environmental impact indicator results for which the variation, aggregated over all included modules (from A to C), is above 10% between any of the included products.

Variations of 0.42 mm and 0.45 mm compared to 0.48 mm (representative product) are less than 10% in all environmental impact indicator results, thus are not mentioned in detail in this report.

As variations of 0.40 mm and 0.55 mm compared to 0.48 mm (representative product) are more than 10%, the detailed variations in all environmental impact indicator results are shown on the tables below.

Core Environmental Impact Indicators – EN 15804+A2, EF 3.1 (PEF)

Thickness (mm)		0.48mm	0.40mm		0.55mm	
Impact category	Unit	A-C	A-C	Variation	A-C	Variation
GWP – total	kg CO_2e	1.36E+01	1.18E+01	-13%	1.52E+01	12%
GWP – fossil	kg CO_2e	1.36E+01	1.18E+01	-13%	1.52E+01	12%
GWP – biogenic	kg CO_2e	2.30E-03	1.94E-03	-16%	2.62E-03	14%
GWP – LULUC	kg CO_2e	9.72E-03	8.74E-03	-10%	1.06E-02	9%
Ozone depletion potential	kg CFC_{-11}e	7.45E-08	6.56E-08	-12%	8.27E-08	11%
Acidification potential	mol H^+e	6.42E-02	5.66E-02	-12%	7.12E-02	11%
EP-freshwater	kg Pe	4.90E-03	4.26E-03	-13%	5.49E-03	12%
EP-marine	kg Ne	1.30E-02	1.15E-02	-12%	1.46E-02	12%
EP-terrestrial	mol Ne	1.38E-01	1.20E-01	-13%	1.53E-01	11%
POCP (“smog”)	kg NMVOCe	4.51E-02	3.93E-02	-13%	5.03E-02	12%
ADP-minerals & metals	kg Sbe	1.74E-04	1.62E-04	-7%	1.85E-04	6%
ADP-fossil resources	MJ	1.39E+02	1.21E+02	-13%	1.57E+02	12%
Water use	m^3e depr.	4.38E+00	3.79E+00	-13%	4.91E+00	12%

Additional (Optional) Environmental Impact Indicators – EN 15804+A2, EF 3.1 (PEF)

Thickness (mm)		0.48mm	0.40mm		0.55mm	
Impact category	Unit	A-C	A-C	Variation	A-C	Variation
Particulate matter	Incidence	1.21E-06	1.07E-06	-12%	1.35E-06	11%
Ionizing radiation	kBq U235e	3.31E+00	3.27E+00	-1%	3.30E+00	0%
Ecotoxicity (freshwater)	CTUe	7.11E+01	6.52E+01	-8%	7.65E+01	8%
Human toxicity – cancer	CTUh	1.40E-08	1.21E-08	-13%	1.58E-08	13%
Human toxicity – non-cancer	CTUh	1.56E-07	1.38E-07	-11%	1.73E-07	11%
SQP	-	4.26E+01	3.67E+01	-14%	4.79E+01	12%

Environmental Impacts – GWP-GHG - The International EPD System

Thickness (mm)		0.48mm	0.40mm		0.55mm	
Impact category	Unit	A-C	A-C	Variation	A-C	Variation
GWP-GHG	kg CO_2e	1.36E+01	1.18E+01	-13%	1.52E+01	12%

Interpretation of Results

Impact Category Results

The majority of production (A1-A3) impacts arise from the combustion of fossil fuels, either directly or in the upstream production of electricity and materials. The upstream production of Cold Rolled Coil steel substrate was the most significant contributor to most environmental impact indicators, and the base metal thickness (BMT) has a significant influence on the results due to the dominance of the manufacturing of the steel substrate. This emphasizes the importance of selecting the appropriate BMT for the intended application; where a thicker steel sheet does not contribute to structural integrity, a lighter-weight version of ZINCALUME® Ultra steel with a lower BMT should be considered.

The raw materials, transportation and production of metal coating alloys – a combination of aluminium, zinc and magnesium applied to the steel substrate for corrosion protection – was the most significant contributor to ADP-minerals & metals, and also contributed significantly to most indicators.

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity, low voltage, in Vietnam. Ecoinvent 3.10.1, year: 2024.
Electricity $kgCO_2e$ / kWh	0.67
Energy data source and quality	Market for natural gas liquids, Global data Ecoinvent 3.10.1, year: 2024.
Energy $kgCO_2e$ /kg	0.75

References

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and framework.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

AS 1397:2021 Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium.

AS/NZS 1365 Tolerances for flat-rolled steel products.

AS/NZS 1530.3 Methods for fire tests on building materials, components and structures - Simultaneous determination of ignitability, flame propagation, heat release and smoke release.

TCVN 13027 Continuous hot-dip metallic coated steel sheet and strip 55% aluminium-zinc and 52% aluminium-zinc-magnesium alloy coatings.

ISO 9001-2015 Quality management systems — Requirements.

Ecoinvent database v3.10.1 (2025) and One Click LCA database.

International EPD System PCR 2019:14 Construction products, version 1.3.4 (2024.04.30).

EPD International (2024). General Programme Instructions of the international EPD® system. Version 5.0.0. environdec.com.

World Steel Association (2021) - Life cycle inventory (LCI) study report.

For further reference

EPD Owner	**NS BlueScope Vietnam Co., Ltd.**
LCA Author	**NS BlueScope Vietnam Co., Ltd.** **Nguyen Thi Huong Thu** *GreenViet Green Building Consultancy*
Programme Operator	**The International EPD System**
Product Website	nsbluescope.com/vn/
Background data	This EPD is based on Ecoinvent 3.10.1 (Allocation, cut-off, EN15804) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA EPD Generator for Construction products.
ReponsibleSteel™ site certification	nsbluescope.com/vn/company/sustainability/
NS BlueScope Sustainability	nsbluescope.com/vn/company/sustainability/
For further information on Sustainability at BlueScope, please visit	bluescope.com/sustainability

Cover image: The ZINCALUME® Ultra steel roof of the KIZUNA factory.

For further information, contact
NS BlueScope Vietnam

T: +(84-254) 392 2666
nsbluescope.com/vn/

NS BlueScope Vietnam Co., Ltd.

Factory: Phu My 1 Industrial Zone, Phu My Ward, Phu My City,
Ba Ria Vung Tau Province, Vietnam.
Head Office: 3rd Floor, Pearl 5 Building, 05 Le Quy Don Street,
Vo Thi Sau Ward, District 3, Ho Chi Minh City, Vietnam.