



Trapezoidal Steel Sheets for Structural Floors, Composite Slabs and Long Span Roof Decking

GALVANIZED STEEL | PRE-PAINTED STEEL



Environmental Product Declaration

In accordance with ISO 14025:2006 and EN15804:2012+A2:2019/AC:2021

Programme: The International EPD® System - www.environdec.com

Programme operator: EPD International AB

EPD registration number: S-P-10179

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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 www.environdec.com

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): <i>CONSTRUCTION PRODUCTS, PCR 2019:14, VERSION 1.2.5</i>
PCR review was conducted by: <i>Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se</i>
Life Cycle Assessment (LCA)
LCA accountability: e3 – studio associato di consulenza
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by accredited certification body Third-party verification: <i>Certiquality Srl</i> , approved certification body accountable for the third-party verification The certification body is accredited by: <i>Accredia, accreditation n. 003H</i>
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, 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 characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025

Company information

Owner of the EPD: Sandrini Metalli Spa

Contact: Giovanni Depedro, tecnico@sandrinimetalli.it

Description of the organisation

The history of Sandrini Metalli begins when in the 1950s, Nazareno Sandrini started the metal production and processing business. Currently the manufacturing is developed into two production plants, the historical one in Costa Volpino (BG), and the more recent one in Chiari (BS); in these locations are produced:

- metal sheets for roofing and cladding (Costa Volpino plant)
- metal sheets for structural and composite steel-concrete floors (Costa Volpino plant)
- metal sheets for long span roof decking (Chiari plant)
- metal sheets for standing seam roofing systems (Chiari plant).

Moreover, the company deals with the processing and trading of metal coils and strips at the factory site of Piancamuno (BS).

Product-related or management system-related certifications

The company has implemented the following quality and product certifications:

- Quality Management System according to UNI EN ISO 9001:2015 (TUV certificate nr. 50-100-14090 - Rev.003)
- Factory Production Control certification according to EN 1090-1:2009+A1:2011 (TUV certificate nr. 0948-CPR-0424, for Costa Volpino plant)
- Factory Production Control certification according to EN 1090-1:2009+A1:2011 (TUV certificate nr. 0948-CPR-0551, for Chiari plant)
- Accreditation as Corrugated Metal Sheets Processing Centre at the Italian Central Technical Service (Certificate nr. 1437/2011)

Name and location of production sites

- Costa Volpino plant, Via Palmiro Togliatti, 18A, 24062 Costa Volpino (BG)
- Chiari plant, Via Roccafranca, 13, 25032 Chiari (BS)






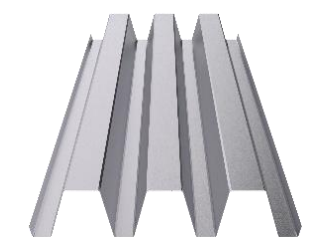
Product information


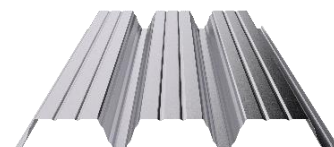








Product name

Trapezoidal Steel Sheets for Structural Floors, Composite Slabs, and Long Span Roof Decking

Product identification and description

The analysed products are structural use steel sheets, equipped with SANDnodrip anti-condensation felt:

Group	Material	Product	Image	Thickness mm	kg/m ²
Trapezoidal steel sheets for structural and composite floors	Steel (galvanized, pre-painted)	SAND A55 P600		0,40	5,23
				0,50	6,54
				0,60	7,85
				0,70	9,16
				0,80	10,47
				1,00	13,08
				1,20	15,70
				1,50	19,63
		SAND A55 P750		0,40	5,23
				0,50	6,54
				0,60	7,85
				0,70	9,16
				0,80	10,47
				1,00	13,08
				1,20	15,70
				1,50	19,63
		SAND A55 P800		0,40	4,90
				0,50	6,13
				0,60	7,36
				0,70	8,59
				0,80	9,81
				1,00	12,27
				1,20	14,72
				1,50	18,40
		SAND A75 P570		0,40	5,51
				0,50	6,89
				0,60	8,26
				0,70	9,64
				0,80	11,02
				1,00	13,77
				1,20	16,53
				1,50	20,66
		SAND A75 P760		0,40	5,17
				0,50	6,46
				0,60	7,75
				0,70	9,04
				0,80	10,33
				1,00	12,91
				1,20	15,49
				1,50	19,37
		SAND 100		0,40	6,28
				0,50	7,85
				0,60	9,42
				0,70	10,99
				0,80	12,56
				1,00	15,70
				1,20	18,84
				1,50	23,55

Trapezoidal steel sheets for long span roof decking	Steel (galvanized, pre-painted)	SAND 105		0,75	8,03
				0,80	8,56
				0,88	9,42
				1,00	10,70
				1,15	12,31
				1,25	13,38
		SAND 110		1,50	16,06
				0,75	8,41
				0,80	8,97
				0,88	9,87
				1,00	11,21
				1,15	12,90
		SAND 115		1,25	14,02
				1,50	16,82
				0,75	9,30
				0,80	9,92
				0,88	10,91
				1,00	12,39
		SAND 135		1,15	14,25
				1,25	15,49
				1,50	18,59
				0,75	8,49
				0,80	9,06
				0,88	9,96
		SAND 145		1,00	11,32
				1,15	13,02
				1,25	14,15
				1,50	16,98
				0,75	9,39
				0,80	10,02
		SAND 151		0,88	11,02
				1,00	12,53
				1,15	14,41
				1,25	15,66
				1,50	18,79
				0,75	9,76
		SAND 153		0,80	10,41
				0,88	11,45
				1,00	13,01
				1,15	14,96
				1,25	16,26
				1,50	19,52
		SAND 160		0,75	10,15
				0,80	10,83
				0,88	11,91
				1,00	13,53
				1,15	15,56
				1,25	16,92
SAND 160		1,50	20,30		
		0,75	11,78		
		0,80	12,56		
		0,88	13,82		
		1,00	15,70		
SAND 160		1,15	18,06		
		1,25	19,63		
		1,50	23,55		

Since the products are very numerous, the “worst case” is declared in this EPD.

For each indicator this EPD declares the highest result of the included products, which is the results of several of the included products.

An analysis of the variations in impact with varying finishes and thickness is reported below.

UN CPC code: CPC 42190 *Other structures (except prefabricated buildings) and parts of structures, of iron, steel or aluminium; plates, rods, angles, shapes, sections, profiles, tubes and the like, prepared for use in structures, of iron, steel or aluminium; props and similar equipment for scaffolding, shuttering or pit propping*

Geographical scope:

Modules A1-A2: Global

Modules A3-A4, C1, C2, C3, C4, D: Italy

LCA information

The Environmental performance of the products was calculated using the LCA (life cycle assessment) methodology, starting from the coil production until the delivery of the finished product to the customer, including its end of life.

The study was conducted according to PCR CONSTRUCTION PRODUCTS, PCR 2019:14, VERSION 1.2.5.

Declared unit:

The declared unit is 1 m² of sheet, this means that all the results are referred to 1 m² of sheet.

Time representativeness

the reference year for the data collection is 2022.

Database and LCA software used

The database is Ecoinvent 3.9.1 allocation, cut-off by classification and the software is Sima Pro 9.5.

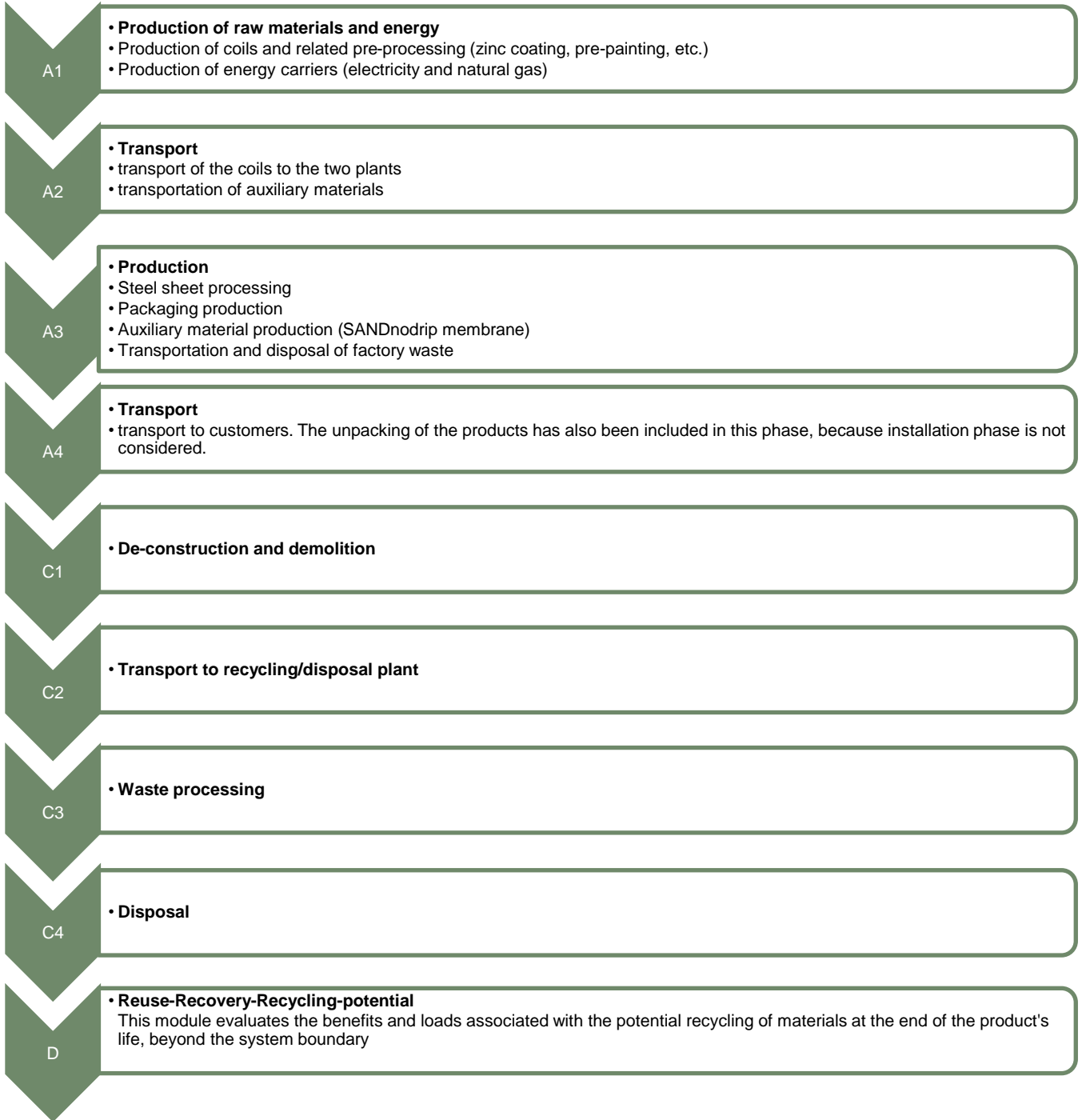
Description of system boundaries:

Cradle to gate with options, modules A1-A3 + module A4 + modules C1–C4 and module D.

The system boundaries are from cradle to gate with options and analyse:

- production of steel coils and energy (Module A1)
- transport of steel coils and auxiliary materials to the production sites (Module A2)
- manufacturing of corrugated steel sheets for roofing, production of auxiliary materials, waste disposal, on-site emissions (Module A3)
- transport to customers (module A4)
- end-of-life of products (modules C1-C4)
- module D which calculates the net benefits of product recycling

System diagram:



More information

Within the production range for each indicator, it's declared the highest result of the included products (i.e., the results of a "worst-case product")

For steel coils used for the production, primary data of the suppliers have been used, where available:

- primary data derived from a supplier's EMAS declaration;
- primary data derived from a supplier's EPD;

- data was collected on the technology used to produce the coils (technology with EAF furnaces or blast furnace technology);
- the country-specific energy and water mix of suppliers were considered.

For each product the specific supply mix of the year 2022 was considered.

For the production phase, the bill of materials of the products was considered and primary data on yield, energy consumption, atmospheric emissions, water consumption and waste production were collected at the two plants in Costa Volpino and Chiari.

The Italian residual mix was used for electricity consumption.

A cut-off of 1% in terms of environmental significance was used.

For transport A4, to calculate the distance product - customer, the 2022 sales in the various Italian regions were analysed, thus calculating the weighted average distance:

Transport to customers	Unit	Value
Vehicle used for transportation Usage capacity Density of the product transported	n.a.	100% by truck (Transport, freight, lorry >32 metric ton, EURO5)
Weighted average distance to the customer	km	318 km
Average load factor	t	15,96 t (GVW 29,96 t)
Density of the transported product	kg/m	7850 kg/m ³

End of life scenario:

C1 – De-construction demolition
It is assumed a diesel consumptions for the dismantling operations of 239 MJ/t.
C2 – Transport
An average distance of 50 km has been assumed for the transport to recycling facility.
C3 – Waste processing
A 98% recycling rate derived from Italian average recycling rate was used – Eurostat data for demolition waste in Europe in 2020.
C4 – Disposal
A landfill percentage of 2% was assumed
D – Benefits and loads beyond the system boundary
Module D considers the potential environmental benefit of putting recycled steel back on the market. The advantage is considered as the difference between the impacts of a blast furnace, in which virgin ores are used, and an EAF steel mill, using scraps. In calculating the environmental advantage, the melting yield is considered and the content of recycled material already present in the purchased coils is deducted.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	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
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	IT	IT	-	-	-	-	-	-	-	-	IT	IT	IT	IT	IT
Specific data used [1]	26%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products [2]	80%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	<5%					-	-	-	-	-	-	-	-	-	-	-	-

[1] According to PCR, we considered specific data only these data:

- consumption of electricity and natural gas of the two plants;
- the data from the EPD or the EMAS declaration of the suppliers;
- transport data of incoming semi-finished products.

[2] To determine the maximum variation, both product and thickness variations within the analyzed family were considered

Content information

Declared unit: 1 m²

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Low alloyed steel ¹	23,55	n.d.	0%
Polytersulfone membrane	0,15	0%	0%
TOTAL	23,70		
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Plastic packaging	0,001	<1%	0
Wood packaging	0,008	<1%	0,004
TOTAL	0,009	<1%	

The declared product is the “worst case” in the range analysed,

The product does not contain SVHC substances above 0.1%.

¹ Possible finishes:

- Prepainted steel with coating nature: Z100 and polyester coating 25/7 µm
- Galvanized steel - UNI 10346, coating nature: Z100 / Z140

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per functional unit (1 m ²)								
Indicatore	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	63,6	0,6	0,6	0,1	0,6	0,3	-22,9
GWP-biogenic	kg CO ₂ eq.	0,4	0,3	0,0	0,0	0,0	0,0	0,0
GWP-luluc	kg CO ₂ eq.	0,1	0,0	0,0	0,0	0,0	0,0	0,0
GWP-total	kg CO ₂ eq.	63,6	0,7	0,6	0,1	0,6	0,3	-22,8
ODP	kg CFC 11 eq.	1,9E-06	1,3E-08	8,9E-09	2,7E-09	9,5E-09	4,1E-10	-4,3E-07
AP	mol H ⁺ eq.	1,162	0,002	0,005	0,000	0,007	0,000	-0,036
EP-freshwater	kg P eq.	4,6E-02	4,2E-05	1,7E-05	8,7E-06	3,5E-04	1,3E-06	-9,4E-03
EP-marine	kg N eq.	2,4E-01	7,4E-04	2,4E-03	1,4E-04	1,6E-03	3,1E-04	-7,9E-03
EP-terrestrial	mol N eq.	5,34	0,01	0,03	0,00	0,02	0,00	-0,09
POCP	kg NMVOC eq.	0,622	0,003	0,008	0,001	0,005	0,000	-0,046
ADP-minerals&metals*	kg Sb eq.	1,1E-03	1,6E-06	1,9E-07	3,3E-07	3,7E-05	2,6E-08	-2,2E-04
ADP-fossil*	MJ	771	9	7	2	8	0	-221
WDP*	m ³	9,27	0,04	0,02	0,01	0,10	0,02	-1,36
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption							

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

The negative value in module D indicates an environmental benefit.

Results per functional unit (1 m ²)								
Indicatore	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG ²	kg CO ₂ eq.	63,2	0,6	0,6	0,1	0,6	0,3	-22,9

Use of resources

Results per functional unit (1 m ²)								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	52,9	0,1	0,0	0,0	1,3	0,0	-16,3
PERM	MJ	1,4	0,0	0,0	0,0	0,0	0,0	0,0
PERT	MJ	54,3	0,1	0,0	0,0	1,3	0,0	-16,3
PENRE	MJ	783	9	7	2	8	0	-184
PENRM	MJ	6	0	0	0	0	0	0
PENRT	MJ	789	9	7	2	8	0	-184
SM	kg	5,42	0,00	0,00	0,00	0,00	0,00	0,00
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m ³	1,34	0,00	0,00	0,00	0,00	0,00	-0,07
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

² This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Waste production and output flows

Waste production

Results per functional unit (1 m ²)								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,05	0,00	0,00	0,00	0,00	0,00	0,00
Non-hazardous waste disposed	kg	26,1	0,8	0,0	0,2	23,3	0,6	-7,0
Radioactive waste disposed	kg	5,36E-03	2,63E-06	8,01E-07	5,45E-07	1,64E-05	5,64E-08	2,45E-04

Output flows

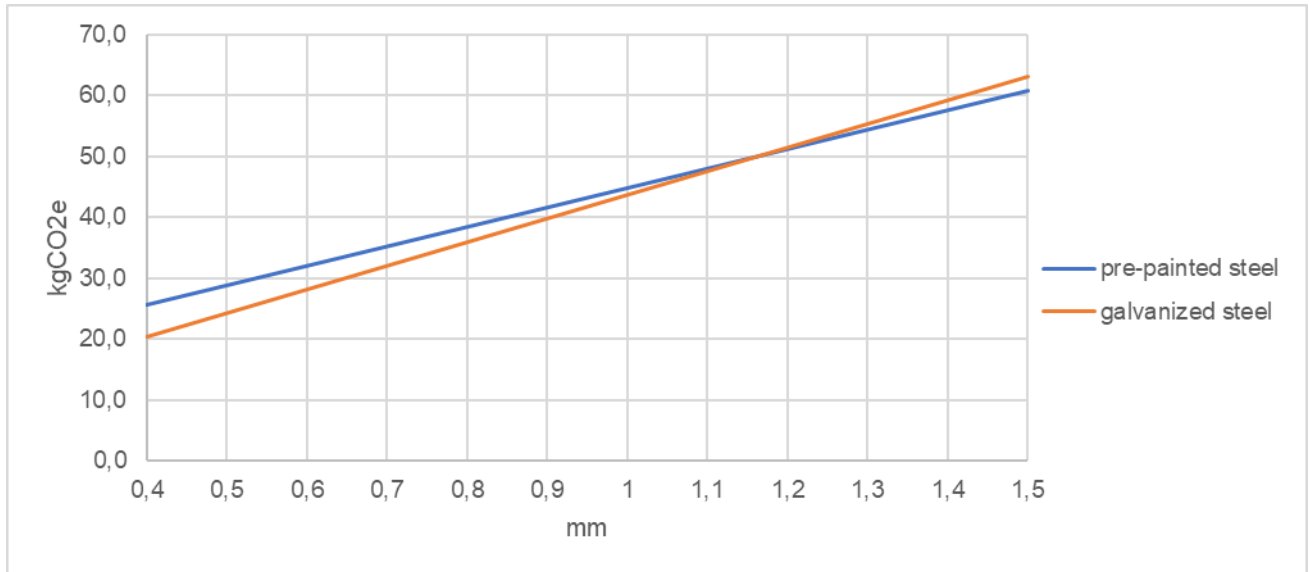
Results per functional unit (1 m ²)								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,3	0,1	0,0	0,0	23,1	0,0	0,0
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	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	0,00E+00

LCA interpretation

For all products, the most significant contribution is due to the production of the coil and the impacts are significantly influenced by the mix of supply of steel (from blast furnace or EAF).

SANDnodrip anti-condensation felt contributes about 1% to the GHG-GWP value and it was considered in the worst case declared.

The variation of the global warming impact with the thickness and finishes was analysed for the modules A1-A3; the results are as follows:



GWP-GHG variations with different steel thickness and finishes

With reduced thicknesses, the impact of the coating (linked to the surface) is significant, while as the thickness increases, the coil production mix (from blast furnace or EAF) becomes more important.

The environmental impacts referring to 1 kg of product are shown below.

To convert the results from area (1 m²) to mass (1 kg) a conversion factor of **0,0425** is applied.

Results per 1 kg of product								
Indicatore	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	2,70	0,03	0,02	0,01	0,03	0,01	-0,97
GWP-biogenic	kg CO ₂ eq.	0,02	0,01	0,00	0,00	0,00	0,00	0,00
GWP-luluc	kg CO ₂ eq.	0,00	0,00	0,00	0,00	0,00	0,00	0,00
GWP-total	kg CO ₂ eq.	2,70	0,03	0,02	0,01	0,02	0,01	-0,97
ODP	kg CFC 11 eq.	8,2E-08	5,5E-10	3,8E-10	1,1E-10	4,0E-10	1,7E-11	-1,8E-08
AP	mol H ⁺ eq.	4,9E-02	8,9E-05	2,2E-04	1,7E-05	2,8E-04	4,6E-06	-1,5E-03
EP-freshwater	kg P eq.	1,9E-03	1,8E-06	7,3E-07	3,7E-07	1,5E-05	5,6E-08	-4,0E-04
EP-marine	kg N eq.	1,0E-02	3,1E-05	1,0E-04	6,0E-06	6,6E-05	1,3E-05	-3,4E-04
EP-terrestrial	mol N eq.	2,3E-01	3,3E-04	1,1E-03	6,4E-05	7,4E-04	2,1E-05	-3,6E-03
POCP	kg NMVOC eq.	2,6E-02	1,4E-04	3,3E-04	2,7E-05	2,2E-04	6,3E-06	-1,9E-03
ADP-minerals&metals*	kg Sb eq.	4,6E-05	6,7E-08	8,3E-09	1,4E-08	1,6E-06	1,1E-09	-9,4E-06

ADP-fossil*	MJ	32,7	0,4	0,3	0,1	0,3	0,0	-9,4
WDP*	m ³	0,39	0,00	0,00	0,00	0,00	0,00	-0,06
GWP-GHG	kg CO ₂ eq.	2,68	0,03	0,02	0,01	0,03	0,01	-0,97
Acronyms	<p>GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption</p>							

Additional environmental information

The analysed products are made of steel and can be recycled at the end of life.

References

General Programme Instructions of the International EPD® System. Version 4.0.

PCR CONSTRUCTION PRODUCTS, PCR 2019:14 VERSION 1.2.5 of 01/11/2022 EPD® system.

"Studio LCA del 19/07/2023 di lamiere grecate per coperture e rivestimento e lamiere a giunto drenante e lamiere grecate per solai strutturali e lamiere grecate strutturali per le grandi luci".

