

Environmental Product Declaration



In accordance with
ISO 14025 and EN 15804:2012+A2:2019 for:

Hot dip Galvanized Coils

from

Acciaierie d'Italia S.p.A.



Programme:

The International EPD® System, www.environdec.com

Programme operator:

EPD International AB

EPD registration number:

S-P-11862

Publication date:

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2028-12-19

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



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1. General information

1.1. EPD, PCR, LCA Information

EPD Information	
Programme	The International EPD® System www.environdec.com info@environdec.com
Programme operator	EPD International AB Box 210 60 SE-100 31 Stockholm, Sweden
Declaration holder	Acciaierie d'Italia Viale Certosa 239, Milan, Italy www.acciaierieditalia.com
Product	Hot dip Galvanized coils
CPC Code	412 Products of iron or steel
Geographical Scope	Global
Reference standards	ISO 14025:2006; EN 15804:2012+A2:2019
Reference period	2022-01-01 – 2022-12-31

Product Category Rules (PCR)	
Reference PCR	"Construction Products" 2019:14, Version 1.2.5
Data of Issue	2022-11-01 (VALID UNTIL 2024-12-20)

Third-party verification	
Demonstration of verification	External, accredited certification body independent verification
Third party verifier	RINA Services S.p.A, accredited by Accredia (Registration number 0002VV)
Follow-up procedure	Follow-up procedure of data during EPD validity does not involve third-party verifier

Life cycle assessment (LCA)	
Title	Hot dip Galvanized coils
Reference standards	ISO 14040/44 standard
LCA accountability	Maria Chiara Caruso, Marcello Casa, Vincenzo Lariccia – Rina Consulting S.p.A.

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 characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

2. Company information

2.1. Owner of the EPD

Acciaierie d'Italia S.p.A.
sostenibilita@acciaierieditalia.com

2.2. Contact

To get more information regarding this product declaration and/or related configurations to contact sostenibilita@acciaierieditalia.com

2.3. Description of the organization

Acciaierie d'Italia is one of the largest Italian industrial groups and one of the most important integrated-cycle steel producers at European level.

Our mission is to produce the steel for the leading sectors of Italian and European industry: automotive, buildings and bridges, construction, furniture, packaging, ship.

At the Taranto plant the complete steel manufacturing cycle is carried out for most of the products of the portfolio. Hot rolled heavy plates, hot rolled coils and hot dip galvanized thin coils are prepared for the customer. Important sites, due to their strategic location in the north of Italy namely Genoa, Novi Ligure and Racconigi, are also terminals of high quality verticalized products like tin coated cold rolled strip for packaging and beverage, hot dip galvanized cold rolled strips specialized for the automotive sector and structural pipes.

Taranto plant is strictly connected with the most important merchant harbor in the south of Italy from which the steel products can be delivered around all the Mediterranean Sea and to the world.

Steel production is based on the use of iron ore as a raw material. However, ADI uses approximately 19% of scrap steel in conjunction with steel production.

When scrap steel is used instead of virgin raw materials in steelmaking, the carbon dioxide emissions originating in steel production decrease accordingly. Steelmaking at Acciaierie d'Italia uses scrap material from ADI's own production processes and material sourced on the scrap steel market.

At ADI, steelmaking processes have been continuously improved and the latest state of the art equipment has been installed for improving the environmental impact of the production processes. Most of the energy used in ore-based steel production comes from coal, which is used as a reducing agent in iron-making. The mineral products formed in iron and steel production processes and the by-products generated in the coking process are recycled as industrial raw material or material to replace virgin resources. A high percentage of the dust originating in various processes is returned to the process to reduce waste and improve material efficiency.

Steel is a fully recyclable material for infinite times without losing any of its original properties. Therefore, it is never consumed but continuously transformed through recycling processes that make it a permanent material, contributing substantially to the development of a circular economy.

2.4. Product-related or management system-related certifications

Acciaierie d'Italia has a management system certified according to ISO 14001 (Environment), ISO 50001 (Energy) (only Taranto plant), ISO 9001 & IATF 16949:2016 (Quality), ISO 45001 (Health and Safety) and SA8000 (Social Responsibility).

2.5. Name and location of production site

Hot dip Galvanized coils are manufactured at:

- Novi Ligure Plant: Strada Boscomarengo 1, 15067 Novi Ligure (AL)

3. Product information

Coils, generally cold rolled, are processed by the hot-dip coating lines for annealing and **metallic coating**. This one, obtained continuously by immersion in a hot zinc bath guarantees long lasting protection making the product usable in a very wide range of applications. The composition of the molten bath of the coating for **hot dip galvanized** provides for a zinc content is at least 99%.

The coating protects the steel from corrosion through a barrier and sacrificial effect (cathodic protection) which guarantees the protection of the steel support even in case of coating damage or edge trimming.

This feature, combined with a remarkable drawability and formability, typical of cold rolled products, implies that hot dip coated coils are suitable for use in the automotive components, in industrial and building carpentry, in general structural applications, etc.

The steels used for the hot dip-coated products are, with regards to chemical composition, Low Carbon, Niobium micro alloyed or Interstitial Free.



Facilities

Production lines (nr.):	1
Production site:	Novi Ligure
Production capability (mt/year):	550.000

Dimensional ranges

	Wide strips
Thickness (mm)	0,55 ÷ 2.50
Width (mm)	Up to 1.815
Internal diameter (mm)	508 or 610

Main reference quality standard		
Applications	Standard	Steel grade
Low carbon steels for cold forming	EN 10346	DX51D; DX52D; DX53D; DX54D; DX56D
Steels for construction	EN 10346	S220 GD; S250 GD*; S280 GD*; S320 GD*; S350 GD*
Steels with high proof strength for cold forming	EN 10346	HX260 LAD; HX300 LAD; HX340 LAD; HX380 LAD; HX420 LAD; HX220 YD; HX220 BD
Dual phase steel for cold forming	EN 10346	HCT 590X
Steels for general purposes, structural, drawing	ASTM A653	CS type A - B - C; FS type A - B; DDS type A; SS Grade 33 - 37 - 40 - 50
Anti fluting	EN 10346 Internal ADI standard	DX51D CBF FE K0GZ
Automotive	Main automotive standards	

- On request, different qualities can be supplied with respect to the standards listed above or in accordance with the customer's technical specifications.

* Approval according to D.M. 17/01/2018 Italian regulation (structural steels, technical rules for buildings).

Supply conditions:

- Surface quality type A, B, C according EN 10346 or other international standards;
- Size and dimensional tolerances according to EN 10143 or other standards or agreed specifications. Tight ADI tolerances are also available;
- Technical documents according to EN 10204 or ISO 10474;
- Coating mass in g/m² (total on both surfaces), from Z80 to Z600 for galvanized.

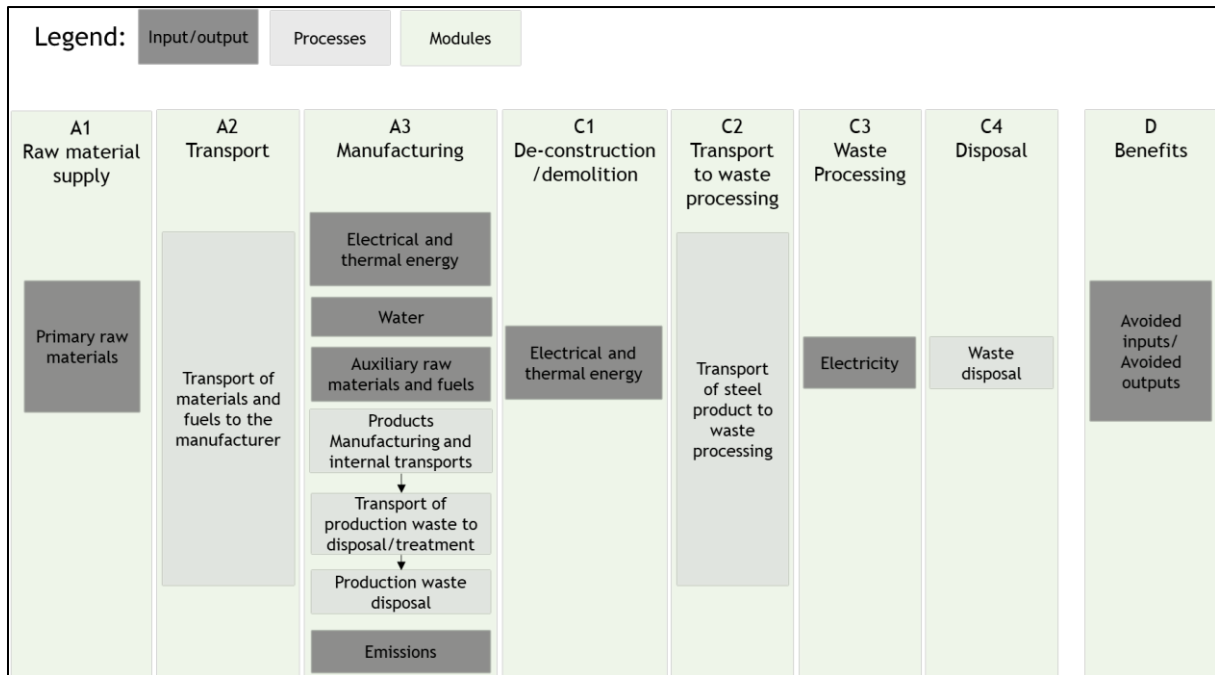
On request, different coating mass for each surface can be supplied.

- 3) The iron ores, along with other materials is treated in the **sintering plant** and transformed into sinter to feed the blast furnace, the heart of the steel cycle;
- 4) Blast furnaces produce **hot metal or pig iron**, the metal alloy of iron and carbon (Fe-C), that in the same plant are made subservient to process and automation control systems, which allow supervision and process control;
- 5) Pig iron is an iron alloy, composed of iron and a small percentage of carbon. The hot metal (liquid pig iron) is transferred into the steel mill, to be transformed into **steel**, through a process that uses huge converters into which the hot metal is poured. Oxygen insufflation allows then the reduction of the carbon content;
- 6) The liquid steel is transferred to the continuous casting plants where it is poured into **ingot molds**, inside which the solidification process gets started. The obtained semi-finished product is called slab.

Then, **hot rolled coils** are produced in dedicated hot strip mills, allowing the incoming slab to be preheated in order to be pressed and rolled to achieve the thickness reduction.

Finally, coils (generally cold rolled), are processed by the hot-dip coating lines for annealing and metallic coating to produce **hot dip galvanized coils** use in the automotive components, in industrial and building carpentry, in general structural applications, etc.

System diagram:



Module A1 includes the supply of all raw materials, considering their extraction and processing. Raw materials are completely used for the production of the steel slabs and can be listed as follows:

- Iron ores
- Solid Pig iron
- Fluxes
- Ferroalloys
- Materials for treatment in BOF
- Lime
- Limestone
- Fossils
- Coke
- PCI
- Iron scrap
- Zinc

Module A2 includes the data on transportation of the materials to the manufacturing site, by means of different transport typologies, i.e., ship, train, lorry. Transports by ships are exclusively made for the raw materials supply, whilst auxiliary materials are supplied by lorry, except for a small number of refractories coming from China by ship.

Module A3 regards the entire manufacturing process of the product. This module includes all the inputs/outputs related to the activities and processes taking place in the manufacturing site and is modelled through specific data.

For each production step, data referred to Module A3 include: the list of ancillary and gaseous materials utilized, the electrical and thermal energy inputs, the water consumption, other materials internally used, steel industry gases outputs, emissions into air, water and soil, waste. Machines, infrastructure, construction, production equipment, and tools, as well as input and output flows related to their scheduled maintenance and repair activities, have not been included in the system boundary. All the machines are powered by electrical and thermal energy. Electrical energy is modelled considering that 6,6% of electricity is purchased by the national grid and 93,4% of electricity is produced within the AdI group plant in Taranto by AdI Energy (ADIE), which converts steel-making process gases (i.e., Blast Furnace Gas, Coke Oven Gas and Oxygen Converter Gas) into electrical energy. The energy conversion process has also been modelled as a stand-alone production step.

Module C1 concerns the deconstruction phase of the product after its usage. The product can have multiple applications and it is generally removed through a cold shearing/cutting process. In particular, this stage has been modelled considering the energy consumption to cut a material with 485 MPa UTS (Ultimate Tensile Strength) and τ / σ equal to 0,8. Three different techniques have been modelled with different weight: mechanical shear with electric motor drive (20%), mechanical shear with diesel motor drive (20%), mechanical shear with electrohydraulic drive (60%). A recovery percentage of the material at its end of life equal to 95% has been assumed.

Module C2 includes the data on transportation of dismantled product to the waste treatment site. Considering that the product can have multiple applications, the transports to waste processing or disposal are different for each use. Therefore, C2 stage is modelled assuming that 1000 kg of steel product is sent to waste processing site, which is assumed to be 100km far. Assumed truck is a Euro 5, 28 - 32t gross weight truck.

Module C3 is included in the system boundary. Waste treatment of steel basically consists in steel sorting and shredding, before sending the steel scrap to further recycling treatments. For this reason, even if this is an activity AdI has no control over it, energy consumptions related to steel sorting and shredding has been considered. In particular, a value of electric consumption equal to 0,075 kWh/kg of treated steel has been assumed according to Norgate T. (2013)¹.

Regarding the disposal and the recycling potential, the proportion of the steel material in the product that is recycled in a subsequent system is equal to 95% w/w². Therefore, **Module C4** is modelled considering that 5% w/w of steel waste is not reused or recycled, but it is sent to landfill as inert material.

Module D includes the reuse, recovery and/or recycling potentials, expressed as net impacts and benefits. In particular, Module D has been modelled by considering the environmental benefits deriving from 4 different contributions:

1. post-consumer steel waste
2. Gas by-products for energy production
3. Sold by-products
4. Waste to recovery/reuse

¹ Norgate T. (2013) Metal recycling: The need for a life cycle approach. EP135565, CSIRO, Australia

² Product Environmental Footprint Guidance: Annex C – List of Default Values for A, R1, R2, R3 and Qs/Qp available at https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR_guidance_v6.3.pdf
https://ec.europa.eu/environment/eussd/smgp/pdf/2019-06-28_PEFRCR_Metal_Sheets_final.pdf

More information:

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	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO, EU, IT	GLO, EU, IT	-	-	-	-	-	-	-	-	-	IT, GLO	IT, GLO	IT, GLO	EU, GLO	IT, EU, GLO
Specific data used	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-

(X = declared module; ND = module Not Declared)

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Fe	993,82	99,38	0
C	0,64	0,06	0
Mn	3,84	0,38	0
Others	1,69	0,17	0
TOTAL	1 000	100	-

No packaging materials are here presented because the hot dip galvanized coils are sold unpacked.

The list of components does not include products included in the “Candidate List of Substances of Very High Concern for Authorizations” by European Chemicals Agency (ECHA).

4.1. Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per 1000 kg of Hot dip galvanized coils										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	4,13E+02	2,34E+02	2,65E+03	3,30E+03	3,55E-04	6,56E+00	3,04E+01	2,63E-01	-1,73E+03
GWP-biogenic	kg CO ₂ eq.	1,15E+00	2,76E-01	3,82E+00	5,25E+00	3,23E-06	2,30E-02	4,89E-01	1,72E-04	3,76E-01
GWP-luluc	kg CO ₂ eq.	1,23E+00	4,97E-02	1,44E-01	1,42E+00	8,73E-08	4,40E-02	1,08E-02	2,54E-04	-2,50E-01
GWP-total	kg CO ₂ eq.	4,16E+02	2,34E+02	2,65E+03	3,30E+03	3,58E-04	6,62E+00	3,09E+01	2,63E-01	-1,73E+03
ODP	kg CFC 11 eq.	8,10E-05	1,37E-11	1,37E-05	9,47E-05	3,34E-11	6,42E-13	6,22E-10	1,07E-07	-5,99E-05
AP	mol H ⁺ eq.	3,50E+00	8,33E+00	3,74E+00	1,56E+01	1,90E-06	2,12E-02	4,21E-02	2,48E-03	-6,16E+00
EP-freshwater	kg P eq.	6,98E-01	7,54E-05	4,97E-02	7,48E-01	5,81E-09	2,34E-05	1,48E-04	2,41E-05	-6,00E-01
EP-marine	kg N eq.	6,59E-01	2,21E+00	9,08E-01	3,78E+00	8,00E-07	9,65E-03	1,24E-02	8,62E-04	-1,41E+00
EP-terrestrial	mol N eq.	6,66E+00	2,42E+01	1,01E+01	4,09E+01	8,75E-06	1,08E-01	1,33E-01	9,42E-03	-1,53E+01
POCP	kg NMVOC eq.	1,79E+00	6,16E+00	3,76E+00	1,17E+01	2,38E-06	1,90E-02	3,28E-02	2,74E-03	-7,37E+00
ADP-minerals & metals*	kg Sb eq.	3,02E-02	8,99E-06	7,25E-04	3,09E-02	1,38E-10	6,59E-07	8,83E-06	6,01E-07	-2,10E-02
ADP-fossil*	MJ	2,72E+04	2,83E+03	9,86E+03	3,99E+04	4,95E-03	8,58E+01	4,30E+02	7,38E+00	-2,53E+04
WDP*	m ³	1,91E+02	4,84E-01	4,50E+02	6,41E+02	8,60E-05	7,31E-02	1,23E+01	3,39E-01	-1,46E+02
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.

4.2. Additional mandatory and voluntary impact category indicators

Results per 1000 kg of Hot dip galvanized coils										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-GHG³	kg CO ₂ eq.	4,14E+02	2,34E+02	2,65E+03	3,30E+03	3,55E-04	6,60E+00	3,04E+01	2,63E-01	-1,73E+03

4.3. Resource use indicators

Results per 1000 kg of Hot dip galvanized coils										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	6,23E+02	1,71E+01	1,76E+03	2,40E+03	2,42E-03	5,95E+00	3,68E+02	6,40E-02	-9,91E+02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	6,23E+02	1,71E+01	1,76E+03	2,40E+03	2,42E-03	5,95E+00	3,68E+02	6,40E-02	-9,91E+02
PENRE	MJ	2,72E+04	2,83E+03	9,86E+03	3,99E+04	4,95E-03	8,61E+01	4,30E+02	7,38E+00	-2,53E+04
PENRM	MJ	1,59E-01	0,00E+00	9,18E-02	2,51E-01	0,00E+00	0,00E+00	0,00E+00	1,29E-03	-7,52E-01
PENRT	MJ	2,72E+04	2,83E+03	9,86E+03	3,99E+04	4,95E-03	8,61E+01	4,30E+02	7,39E+00	-2,53E+04
SM	kg	0,00E+00	0,00E+00	2,63E+02	2,63E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	4,44E+00	2,38E-02	1,05E+01	1,50E+01	2,25E-06	6,87E-03	3,25E-01	7,88E-03	-3,40E+00
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									

³ 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.

4.4. Waste indicators

Results per 1000 kg of Hot dip galvanized coils										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	8,20E-13	1,17E-08	2,18E-06	2,19E-06	5,95E-13	4,56E-10	9,09E-08	0,00E+00	-1,97E-06
Non-hazardous waste disposed	kg	4,30E-06	2,73E-01	3,49E+00	3,76E+00	3,12E-06	1,40E-02	4,77E-01	0,00E+00	-1,18E+00
Radioactive waste disposed	kg	1,74E-07	3,29E-03	1,19E-01	1,23E-01	1,26E-07	1,60E-04	1,93E-02	0,00E+00	-9,45E-04

4.5. Output flow indicators

Results per 1000 kg of Hot dip galvanized coils										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	2,19E+02	2,19E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	4,75E-01	4,75E-01	0,00E+00	0,00E+00	9,50E+02	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	9,31E-01	9,31E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	7,66E+03	7,66E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

4.6. Other environmental performance indicators

Results per 1000 kg of Hot dip galvanized coils										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Particulate matter	Disease incidences	2,55E-05	1,42E-04	2,64E-05	1,94E-04	4,54E-11	1,23E-07	3,65E-07	4,85E-08	-8,76E-05
Ionising radiation, human health	kBq U235 eq.	5,17E+01	4,83E-01	2,97E+01	8,18E+01	3,30E-05	2,41E-02	3,57E+00	3,27E-02	4,11E+01
Ecotoxicity, freshwater	CTUe	6,04E+04	1,97E+03	4,39E+03	6,67E+04	2,82E-03	6,08E+01	2,40E+02	4,67E+00	-4,75E+04
Human toxicity, cancer	CTUh	2,46E-06	3,66E-08	6,17E-07	3,11E-06	9,59E-14	1,25E-09	7,23E-09	1,18E-10	1,08E-05
Human toxicity, non-cancer	CTUh	1,32E-05	1,73E-06	4,10E-05	5,59E-05	2,28E-12	7,68E-08	2,08E-07	3,05E-09	-3,51E-05
Land Use	Pt	3,39E+03	4,67E+01	1,52E+03	4,95E+03	1,79E-03	3,63E+01	2,33E+02	1,54E+01	-3,94E+03

References

- [1] General Programme Instructions of the International EPD® System. Version 4.0.
- [2] PCR 2019:14. Construction products. v.1.2
- [3] BS EN 15804:2012+A2:2019 "Sustainability of construction works — Environmental product declarations Core rules for the product category of construction products"
- [4] ISO 14040:2021 "Environmental management -- Life cycle assessment -- Principles and framework"
- [5] ISO 14044:2021 "Environmental management -- Life cycle assessment -- Requirements and guidelines"
- [6] ISO 14025:2010, Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures
- [7] DG JRC/IES, ILCD Handbook, 2011
- [8] EU Commission, Product Environmental Footprint Pilot Guidance, Guidance for the implementation of the EU Product Environmental Footprint (PEF) during the Environmental Footprint (EF) pilot phase, 2016
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